Towards Motive Driven Story Generation for Encouraging SMEs Innovation

促進中小企業創新之智慧型激勵故事生成

by

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Abstract

Service innovation is one of the tendencies to cope with the environmental change in the current fierce competition, but the most SMEs in Taiwan don't know how to put service innovation into practice in their business. On the other hand, the most SMEs don't know what service innovation is; however, even they know service innovation could rescue their poor business; they have no courage to do so. For these reasons which mentioned above, the aim of this research is to reference the motivation theory and try to generate the mini customized advertising-like to stimulate SMEs and let them know the advantage of service innovation and have confidence to do so. In order to achieve this goal, we use Probabilistic Extended FSM as the implementation approach to integrate the private information of our target SMEs with the story framework which is constituted by the three-act Structure including the Dramatica elements and the elements of ten types of innovation. By this kind of stimulating mini customized advertising-like story, the SMEs could get some enlightenment to ameliorate the precarious business to achieve the ideal of their mind.

Keywords: Service Innovation, SME, Motivation, Probabilistic Extended FSM, Story Generator, Narrative Advertising.

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CHAPTER 1 INTRODUCTION

1.1 Research Background and Motivations

In recent years, there has been a dramatic proliferation of research concerned with business service innovation. With the increasingly fierce competition between enterprises, effective strategies for competition have become critical.

For decades, the importance of services to the global economy has grown steadily while the importance of goods is being declined. Services are believed to be one of the main drivers of technical changes and economic progress (Czarnitzki & Spielkamp, 2003). Because of this exigency the companies are constantly seeking to provide better services, regardless of whether they are in a "pure" service business or in a manufacturing industry that must increasingly rely on its service operations for continued profitability. So the academics define an idea: "Market-creating service innovation" for a performance enhancement that customers perceive as offerings of new benefits of sufficient appeal that dramatically influence customers behavior, as well as the behavior of competing companies (Berry et al., 2006)).

SMEs (Small- and Medium-sized enterprises) are also facing the same situations of fierce competition. For survival, the SMEs must do some efforts in innovation (Sun & Wu, 2008). Although SMEs demand for service innovation to continue improvements in their business, but most of them don't know how to put it into practice. Actually, even if they know how to put service innovation in their business, they may be afraid to do diversification and don't have enough determination to do it. Not to mention the fact that some SMEs have no ideas when they confront the fierce competition. They don't know which they need to do is service innovation.

A growing number of research studies are now available to shed some light on service innovation. Some academic researches mention about innovation motivation,

and use the cases study to do research. For example, Jian-ying LI used commercial banks as a survey-based empirical study to discuss service innovation motive (Li& Feng, 2007). The regression result shows that strategic management and organizational factors play a vital role in driving service innovation by commercial banks. Other academics who define an strategy idea : ”Market-creating service innovation” used Google (incorporated in 1998) and eBay Inc. (started in 1996) to be the successful innovation examples, and the other instances include Rent-A-Car Company of revenues exceeding $8 billion (Berry et al., 2006). These academic researches furnish some motivation and fluky case, but this enterprise strategy does not constitute the intention for SMEs to do service innovation. We have tried to convince SMEs which situate in the Mt. Pillow Recreational Agriculture Area in Ilan County that service innovation is a useful way to face the impact of WTO policies, and used Google as an example. However, this instance couldn’t resonate. SMEs consider that the large enterprises like Google there are many human and resources. Therefore, we need to find some ways specifically for encouraging SMBs to do service innovation.

On the other hand, for governments, (e.g., Small and Medium Enterprise Administration of Ministry of Economic Affairs in Taiwan (URL: http://www.smecluster.org.tw/en/index.php), there are some resources particularly made for the SMEs, such as setting websites to furnish SMEs some information about the innovation, industry analysis and transition counseling. The governments go through surveys and other methods to identify skills / knowledge requirements to enable SMEs to do innovation in both the product way and the service way. However, for the SEMs there are gaps between using these resources given by governments and knowing they need to use these resources. As we mentioned before, we need to let the SMEs know their demands.

It should be noted, however, that there have been few attempts to establish a direct method to encourage SMEs do service innovation. SMEs demand more vivid and close their daily life's instance that them know not only large enterprises can do service innovation. Also, lets some SMEs know why they need to do service innovation, and let them understand only do service innovation can help their precarious business.

In this case, we argue that we can use short customized motivation stories to encourage SMEs do service innovation. Functioning as narrative advertisements, story-based communication might be highly applicable to services advertising (Anna S. Mattil, 2000). A narrative is a story that is created in a constructive format that describes a sequence of fictional or non-fictional events. The word derives from the Latin verb: Narrare. Narratives are uniquely effective in portraying and conveying experience (Boller, 1988), and story-based appeals might be especially effective for communicating the value of experiential services (Padgett & Allen, 1997). For this reasons, we consider that SMEs can be inspired by the short customized motivation story, and have some idea about how to implement in their small business.

About this short customized motivation story, we create it by a story generating machine. We hope this story generating machine will investigate the information from every SME, and generate unique story for them. Dr. Bernd Schmitt mentioned: "Only link target consumer's psychological perspective with their life experience and touching memory, brand can be truly in customer's mind thoroughly and create loyalty (Schmitt, 1999)." When we simulate events, we frequently think about our own actual or potential behaviors, creating behavioral scenarios, similar to stories, in which we are the main character (Escalas, 2004). For this reason, since the motivating stories are created based on the SME's situation, the high similarities of the plot will create a sense of empathy to SME and makes the story more convincing. Therefore,

our story can reinforce SME's courage, prosecuting and innovating their enterprise just like what the protagonist do in a story.

1.2 Research Questions

Given the theoretical positions taken for the study and the status of the field as briefly reviewed above, the study aims to provide a short vivid customized story functioning as advertising to stimulate SMEs. Further, we hope the story can be generated automatically.

In considering the SMEs stimulated to do service innovation issue, the first question that arises concerns what kind of the element and content of story can do this.

Holbrook and Hirschman (1982) argue that consumption is by definition experiential. Therefore, we can say that service is parts of consumption and identically can use experience to render. Many services are experiential, so we can use the service experience as a consumer-oriented concept for addressing service innovation advertising. We delimit service innovation advertising as an advertisement for encouraging SMEs to do service innovation, and let them know how important service innovation is.

Drama has been used to describe a series of consumption-related contexts, including rituals (Wallendorf and Arnould, 1991), consumer experiences (Holbrook and Hirschman, 1982), and services (Grove and Fisk, 1983). Hence, we can use a story as some kind of drama to form the advertising.

Understanding experience is the domain of narrative psychology (J. Bruner, 1986). The basic premise of narrative psychology is that "people have a natural propensity to organize information about people and their actions in story format" (Padgett & Allen, 1997). Jerome Bruner (1986) suggested that people use the

paradigmatic mode of thought when presented with stimuli that include implicit or explicit arguments and also narrative mode of thought to understand storied stimuli.

Based on the above research, we know we can use personal experience to be a story's element and content. A story form by personal experience does really can irritate someone to do some change.

In sum, there are four issues that to be resolved in this regard:

(a) *Whether we can incorporate the SME's information into the story generator design?*

We design an automatic story generator to generate different story for different SMEs. How to implement story generator with SME's personal information systematic is our main objective.

(b) *Whether we can determine the similarity without causing SMEs resentment?*

If we provide a situation describing a person who is old, poverty-stricken and hopeless, people may be opposed to connect this role with him and can't emerge sympathetic response. This is an unsuccessful story which can urge SMEs to do service innovation. For the encouraging purpose, we have faith in the positive psychology. Base on the positive psychology "The aim of positive psychology is to begin to catalyse a change in the focus of psychology from preoccupation only with repairing the worst things in life to also building positive qualities (Seligman & Csikszentmihalyi, 2000)." We need to provide a positive story to incite SMEs. Let them know they can have a better life as long as do some transformation.

(c) How can we improve previous story generator?

Recent studies that have attempted to establish story generator have not been very successful. For example, SUMO is an automatic story generator that generates story text for children from a given input set of picture elements (backgrounds, characters and objects) (Pease et al., 2010). They have a series of stationary element

(backgrounds, characters and objects). If the user use with a few more, they may dig out that the story generator have a foolproof method. Moreover, the story is senseless and cannot moving people.

(d) Whether we can assess the SMEs moving degree?

Our ultimate goal is to encourage SMEs to do service innovation, so it's important to measure whether this story is adequate or insufficient in the emboldened.

The aforementioned questions then lead to the following research objectives.

1.3 Research Objectives

The overall goal of this research is to develop a creative and automatic approach that can create a story to embolden SMEs to do service innovation.

In order to ensure the story can be generated automatically, the first thing we need to do is find some common story structure. We choose Dramatica as a part of the elements required. "The Dramatica theory of story explores both the aspects of the writing process providing structural guidelines to clarify communication and the artistic techniques for enhancing style (Phillips & Huntley, 2001)".

Second, responding to different demand for innovation, we put SIT (Service Innovation Type) as another part of element. SIT is the abbreviation of the ten service innovation types, including four categories – Process, Offering, Delivery and Finance (FPOD), defined by Larry Keeley, the President of Chicago-based Doblin, Inc (1999). We then combine the two kinds of elements, and use "Three-act Structure" to render. The Three-Act Structure is a model used in writing and evaluating modern storytelling which divides a screenplay into a three parts called the Setup, the Confrontation and the Resolution (Syd Field, 1979). The most story models and Dramatic approaches are more or less derived from the classical three-act structure of Aristotle providing an arc model with exposition, rising action to climax and

denouement (Göbel et al., 2006). For this reason, we choose three-act structure as our story's architecture.

Based on the above theory and examination we can further take advantage of FSM (Finite-state machine) to generate different purpose stories for SMEs.

To achieve our goal, the following list of more specific objectives is to established.

(a) To construct FSMs of states mapping to story elements, generating favorable and vivid stories. The most important thing is to ensure stories to embody some peaks that can let SMEs feel moving.

(b) To separate SMEs into different regimentations according to different requirement of service innovation in order to attain unequal types of stories.

(c) To implement a prototype system to demonstrate the feasibility and practicability of the proposed method, together with measuring those automatically generated stories. We can reference the innovation system usage to measure the level of impact by our efforts. Supposing that SMEs feel our moving story truly touching their hearts, they will be engaged in the subsequent development of their service innovation. Therefore, we can simply inspect their system usage to assess our moving story's effect.

By successfully forming a unique and attractive story, SMEs can then feel stauncher and have inspiration to do service innovation.

1.4 Attempted Research Contributions

The aim of this research is to demonstrate an automatic story generation system that uses personal experiences to construct unique stories for SMEs, and provokes them to do service innovation, hoping for encouraging SMEs who are afraid to do service innovation but need to do some change in their small business.

In addition, we try to reform traditional automatic story generation systems; the design, method, and architecture of this system could be domain-independent and used for other applications.

1.5 Research Method

This research follows information system (IS) research framework proposed by Hevner (2004) as the research methodology. The seven guidelines of this methodology illustrates that the research should produce viable artifact from relevant business problems on the basis of related theories and methodologies.

The contributions of IS research are assessed as they are applied to the business need in an appropriate environment and as they add to the content of the knowledge base for further research and practice. IS research framework provides a foundation to test the artifact of our implemented service system.

First of all, we define the environment. “For IS research, it is composed of people, (business) organizations, and their existing or planned technologies (Silver et al. 1995)”. In it are the goals, tasks, problems, and opportunities that define business needs as they are perceived by people within the organization (Hevner, 2004). Our target SMEs have encountered bottlenecks and need to do service innovation, but they don’t know why they need to do or lack of courage to do. Therefore, follow the IS research we build service innovation advertising system to urge SMEs, and through our system we can evaluate the effect.

Finally the service innovation advertising system can be added to the knowledge base, and reused for other IS researcher.

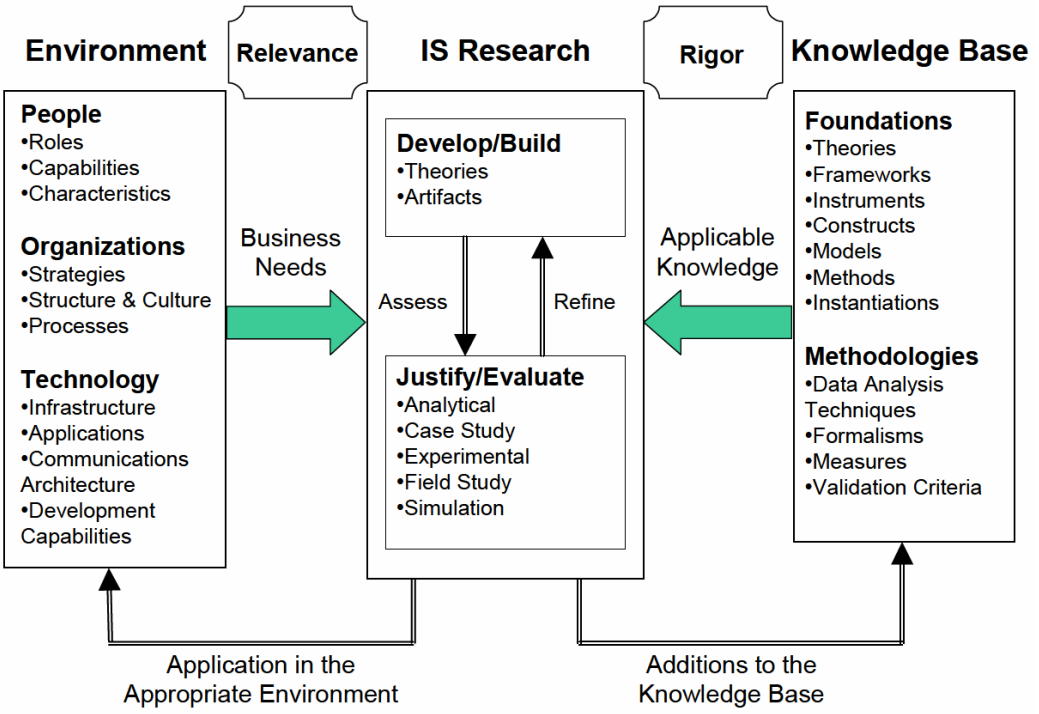

Figure 1.1 Information System Research Framework (Hevner et al., 2004)

1.6 Content Organization

This research is organized as follow brief introductions:

- Chapter 2 – Literature Review :

  This chapter first compares different existing mechanisms about the story generator. Each of them has their own merits and shortcomings. Second, we will do some survey about FSM, and explain why we choose FSM as our methodology.

  After investigating different kinds of methodologies, we survey some dissertations about the content. We begin with the structure of story, and then find some theories to support our story content. From a psychological theory point of view to illustrate our story substance is a convincing.

- Chapter 3 – Motivation Applications :

  This chapter depicts the whole picture of our research project and demonstrates the role of the proposed approach in the application context.

- Chapter4 – Towards Motive Driven Story Generation For SMEs Innovation :

  In this chapter we introduce the conceptual framework and the system architecture of the automatic story generation systems.

  The particulars of the design and methodology will be described, including the explanation of Probabilistic Extended FSM Module, Story Framework Module, Story Element Module and Matching Module.

- Chapter 5 – Application Scenario
- Chapter 6 – Evaluation

  Hypotheses and experiments for evaluation are depicted in this chapter.

- Chapter 7 – Conclusion

  Contributions, implications, limitations, and future works of our research are provided in this chapter.

CHAPTER 2 LITERATURE REVIEW

In Chapter 1, we have shown the background and motivation of our research, and indicated the objective of the ultimate mechanism. For the encouraging SMEs to do service innovation purpose, we need a service advertising-like story which could be generated automatically. Based on IS research (Figure 1.1), before we develop the system architecture we need to reference the existing applicable knowledge and this is the aim of Chapter 2.

Figure 2.1 is a succinct presentation of the existing literatures which supporting our settlement mechanism and providing the interrelated domain for consultation and comparing.

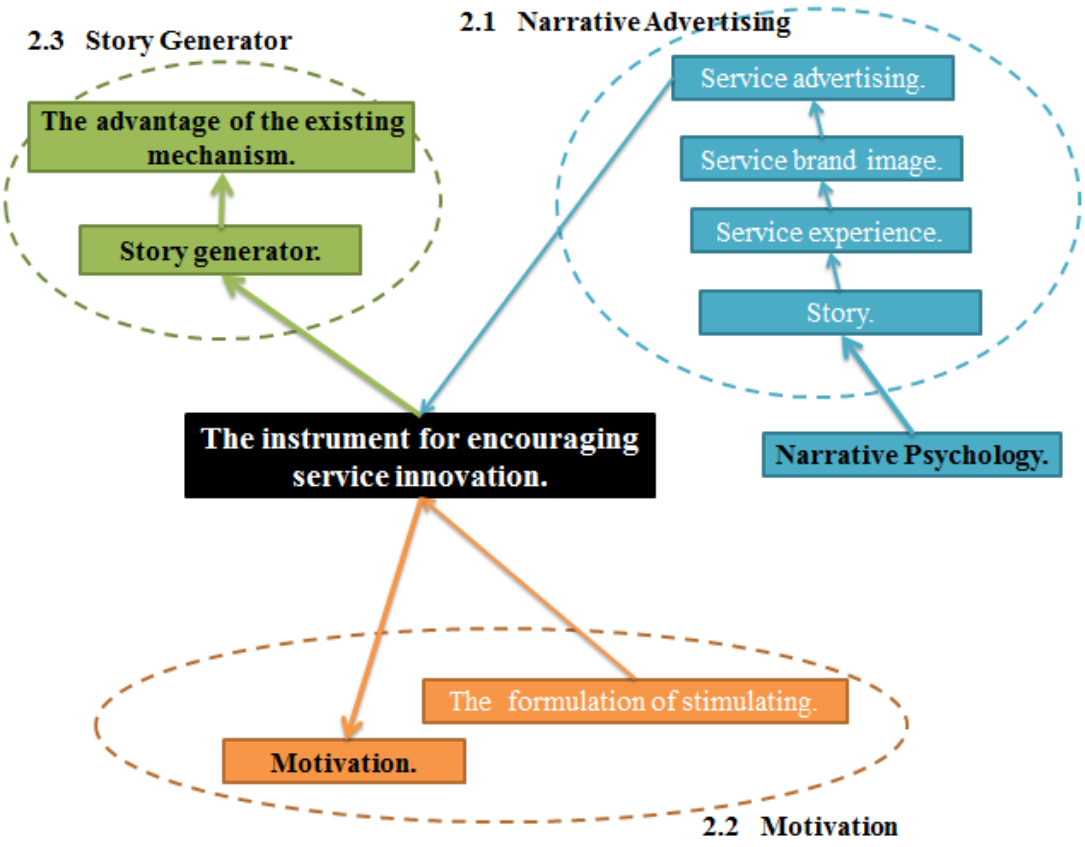

Figure 2.1 The succinct presentation of the existing literatures

First, we briefly introduce and discuss the domain of Narrative Psychology

(Section 2.1), supporting why we use "story" as the intermediary to communicate with our target SMEs, and explain the relationship among the story, service experience, service brand image and service advertising to create a narrative advertising. Second, we focus on the emphasis of the stimulation's formulation by investigating the Motivation Theory (Section 2.2). In other word, we discuss the motivation theory deeply and find out the potential incentive formula, and then divert the same incentives element to our instrument of the incentive in the domain of service innovation for the encouraging purpose. Finally, Because of the many target SMEs, we need this instrument of the incentive (we will use "service advertising-like story" as the instrument of the incentive which presented later) to be generated automatically for different target users. That's the reason why we refer to the mechanism, orientation and content of the other story generator machine, and expound the advantage of the existing mechanism which we use to build our story generator machine.

2.1 **Narrative advertising**

This section wants to investigate why we locate our settlement mechanism as an advertisement, and communicate with our target SMEs in the form of story which called "service advertising-like story".

From the advertising function point of view, some scholars suggest that general advertising objectives should include informing, persuading, and reminding consumers (Kotler & Armstrong, 1996). Colley (1961) defined that the advertising goal is the specific communication issues which must be reached on the certain extent in a certain period of time for the specific audience. These are the functional side of the advertising which corresponds to our target goal (encouraging our target SMEs to do service innovation) and give a definition as "the advertising-like".

On the school of advertising, more examination emphasized the emotion of people which could affect the advertising (Holbrook & Batra, 1987) (Peterson et al., 1986), and stand on the customer's perspective to view the advertisements (focusing on the experience, emotion, culture and lifestyle of customer, not only popularize the features of product) (Celsi & Olson, 1988). Based on the motivational perspective, constructing the connection between the brand attributes and the abstract consumer values is the appropriate advertising goal (Padgett & Allen, 1997). In other word, the content of the advertising will be diverted from emphasizing the function of the product to the emotion of customer.

The above-mentioned theories are all about the actual product advertising, however, there is facing different questions about advertising effect in the service advertising (we delimit our advertising should be classified as the service advertising which could communicate the intangible qualities of a service to their target audiences (Sheth et al., 1999), because we want to promote the intangible qualities of the service innovation). Padgett and Allen (1997) suggested the concept of service brand image as a more encompassing construct which is more helpful in providing a foundation for considering the effects of services advertising. Brand image which functions to define the product's position for consumers and make the differentiation from the other competitor (Padgett & Allen, 1997) is the concept of summary that imply the customer buy their brand for the physical attribute, functions and the symbolic meaning of the brand (Levy, 1973). Therefore, for service, the definition of the service brand image includes the attributes and functional consequences and the symbolic meanings which the consumers associate with a specific service (Padgett & Allen, 1997). On the other hand, the symbolic meanings of the service brand are appending the personal experience through the service, communication with other people, and advertising (Padgett & Allen, 1997).

In sum, the concept of service brand image is a customer-oriented concept, prompting a discussion of the customer's point of view to understand the meaning of service, because what the customer's "think" about services is the important part of the service brand image (Padgett & Allen, 1997). In the Padgett and Allen s' opinion, the consumer's perspective of a service and the attaching of self-relevant meaning to service are the important part to build the service brand image.

Based on the above theory, in order to understand service brand image (the customer's perspective of a service), we need a customer-oriented conceptualization of service and interpret the service from the customer's point of view. The consumption behavior is by definition experiential (Holbrook and Hirschman, 1982). In the same view, we can understand consumption of service to be an experience. Padgett and Allen (1997) considered that many services are experiential and we can use the service experience as a customer-oriented conceptualization for understanding the service brand image issues. On the other hand, Padgett and Allen (1997) defined service experience as the cognitive, affective, and behavioral reactions associated with a specific service event.

Understanding experience is the domain of narrative psychology (Robinson & Hawpe, 1986). Narrative psychology is considered as the "storied nature of human conduct" (Sarbin, 1986). In the other words, the narrative psychology is about how people deal with experience by constructing story or listening to other's story. Jerome Bruner (1986, 1990) suggested there are two modes of cognitive functioning order experience, the paradigmatic and the narrative modes of thought. The paradigmatic modes of thought attempts to achieve an idea of a formal, mathematical logic system to interpret and describe experience. On the other hand, the objective of narrative modes of thought is to understand the story's stimuli, and include the causally/chronologically connected events enacted by characters (including ad form

or presentation format—drama, song, dance, mime, etc.). Based on the Bruner (1986, 1990), the advertising which describes the actors (or brands) to achieve some objective will be interpreted through the narrative modes of thought because people will create a story to give explanatory notes of the story's stimuli. Based on the above theory, we can understand that a narrative mode of thought is branches of the narrative psychology, which can represent the experience through the form of the story and let people comprehend the stimuli of the story.

Figure 2.2 is the concept of the theory to support the service advertising-like story as our ultimate mechanism for encouraging the target SMEs to do service innovation. First, connecting our ultimate mechanism with the service advertising, and delimit the service brand image implied the content of service advertising which use the customer's perspective. In order to understand the service brand image, we need the customer-oriented conceptualization of service which is expressed as the service experience. Finally, the narrative modes of thought which is the branch of the narrative psychology are used to understand the service experience and be presented in the form of the story (a form of the narrative modes of thought). The above-mentioned are the theory to conceiving our ultimate mechanism: the service advertising-like story.

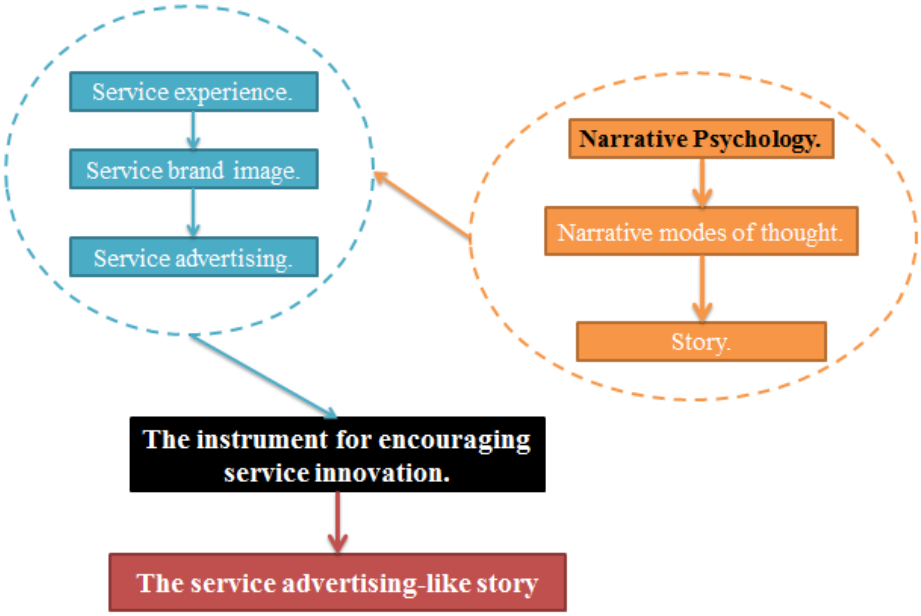

Figure 2.2 The concept of the theory to support the service advertising-like story as the ultimate mechanism

2.2 Motivation

Because of our objective being to encourage the target SMEs to do service innovation, this section aims to investigate the incentives factors through the motivation theory and integrate the motivation theory into the innovation motivation at the last.

Motivation means a person's internal disposition to be concerned with, approached by positive incentives, or avoided by negative incentives which refer to the anticipated reward or aversive event available in the environment (Atkinson, 1958). Schopenhauer and Kolenda (1960) also proposed that the motivation is impossible to be existent independently and it should have the relationship between motivation and behavior, according to people being always motivated toward something or avoid for something. In other words, there are must be something to motivate people: incentives.

Incentive means a reward, no matter tangible or intangible, is performed after the occasion of an action (i.e. behavior) with the deliberate intention to cause the behavior to occur again (Deckers, 2001). However, the same incentive couldn't have same effectiveness for the encouraging. David Freemantle (2000) proposed that the effect of the specific incentives will decline if continued use. Repetitive action-reward combination will cause this to be a habit. Figure 2.3 is the effectiveness of the stimulus proposed by David Freemantle, which we can understand clearly that the stimulus will retrograde with the time.

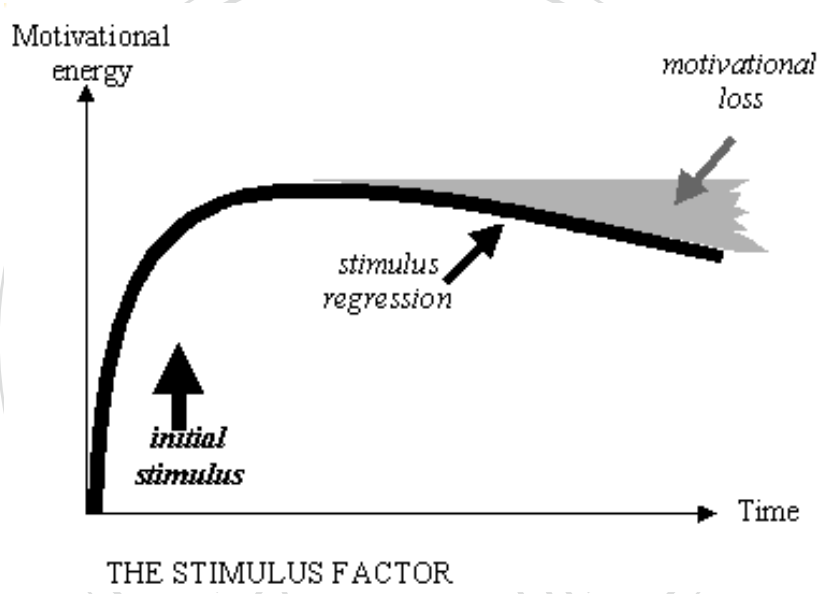

Figure 2.3 The effectiveness of the stimulus (David Freemantle, 2000)

Therefore, for sustaining and effecting of motivational energy, David Freemantle suggested that if we want to provide effective motivation level, it must use the unequal and updated incentive (Figure 2.4).

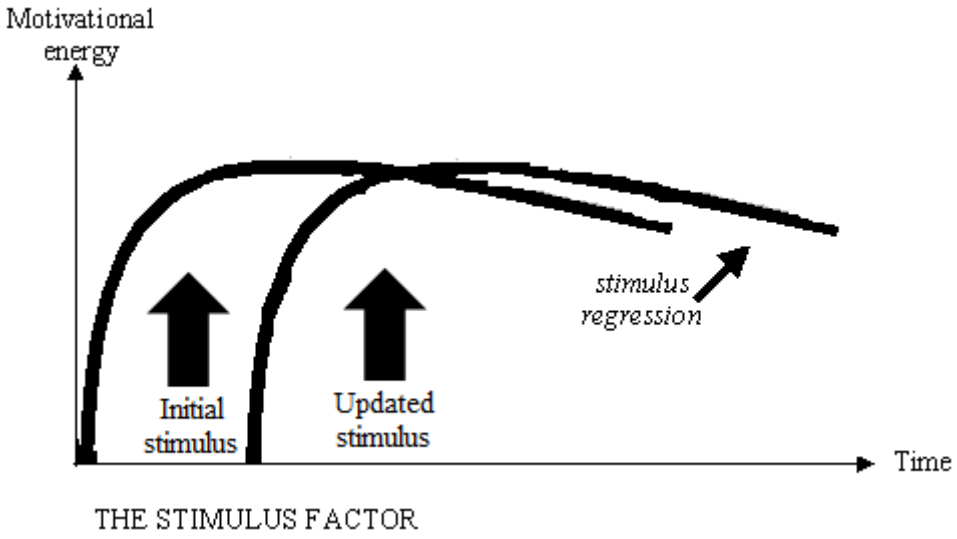

Figure 2.4 The effectiveness of the stimulus (David Freemantle, 2000)

As above theories, we can know that the motivation and incentive are complementary. On the other hand, different motivation could lead to different demands of suitable incentives.

Motivation is said to be intrinsic or extrinsic (Garderner and Lambert, 1972) (as same as the incentive that could be classified into the intrinsic or extrinsic). The extrinsic motivation comes from the extrinsic incentives, such as money, good grades, the approval of others or coercion and the threat of punishment (Deckers, 2001). Extrinsically motivated behavior is forced on outside of the individual by the environment contingencies. On the other hand, intrinsic motivation, on the contrary, does not be affected by the external source but instead is driven by an interest or enjoyment in the task itself and freely chosen (Deckers, 2001). The behavior of the intrinsic motivation is not coerced by the environmental events, substituting it is spontaneous and autonomous. On the Deckers' (2001) point of views, the intrinsic motivation could be classified as psychological needs including drives, needs, glory, and awareness, and the extrinsic motivation could be classified as the relationship between life events and stress including money, coping and health (close to the

physiological needs).

According to the above theories, we can simply classify motivation into two categories, physiological needs and psychological needs. Based on the Abraham Maslow's (1943) theory, the activities about the human needs all belong to the motivated behavior. From the basic physiological need to the complex needs of self-actualization, Maslow divided the human needs into five categories (including physiological needs, safety needs, love needs, esteem needs and self-actualization needs). Maslow proposed the theory Z which mentioned the Over Actualization level in 1969. If the self-actualization needs are fully satisfied, it will appear the short-lived experience called Over Actualization which usually appears when implement something or accomplish something. It is the experience about ecstasy and transient. Maslow claimed that if the needs of low-level (physiological needs) are fulfilled, the needs of high-level (psychological needs) will occur immediately. On the other words, in the theory of motivation satisfaction and shortage are the same important concepts because the satisfaction will liberate the low-level needs into the next level and the shortage of current level will lead people committed to meet this shortage. In addition, the highest-level (Over Actualization) is satisfied temporarily and no more level above the Over Actualization, so there are always shortage of next level. For instance, if people are long-term satisfied in the physiological need, the physiological need will not be considered as the determinants of the active behavior, but it will exist in the potential way and appear again if people are frustrated.

From the innovation's perspective, an investigation of the motivation and the incentive should begin with the innovation-decision process (Figure 2.5) (Proposed by Everett M. Rogers, 1962). The scholar in the diffusion of innovation considers that the personal innovation-decision process is not making decisions immediately; instead it occurs in a period of time and actions (Everett M. Rogers, 1962). Rogers (1962)

proposed five major stages (Figure 2.5) including knowledge (exposed to an innovation's existence and understanding the function of innovation), persuasion (forming an attitude of innovation with favorable or unfavorable), decision (acting about accepting or rejecting), implementation (putting a new idea into use) and confirmation (seeking further confirmation of the previous decisions. If encountering the opposite information, the decision-makers may reverse these previous decisions).

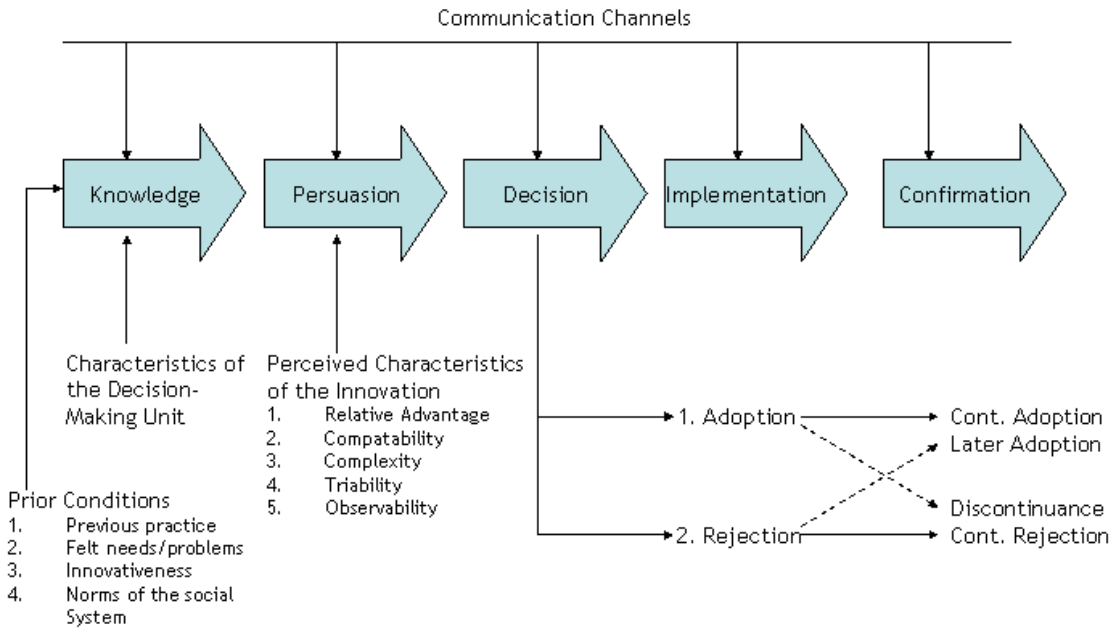

Figure 2.5 A model of five stages in the innovation-decision process (Everett M. Rogers, 1962)

In our research, we will focus on the knowledge stage and the prior conditions (Figure 2.5) (because these are two crucial stages to investigate the motivation of innovation). Hassinger (1959) argued that individuals seldom notice the information of innovation, if they begin to feel that they need this innovation. In other words, unless this innovation is considered unanimously with the individual's mentality or requirement, the contact of innovation is meaningless (Everett M. Rogers, 1962). This process is a selective perception, which is using the personal mentality and conviction

to interpret the communication message (Everett M. Rogers, 1962). The selective exposure and selective perception support the Hassinger's point of view that the needs for an innovation usually precede awareness-knowledge of innovation. However, the requirement is defined as if someone's appetence exceeds the load of their own and appears as dissatisfaction and frustration. In the other word, the individual may develop a demand when they are aware of the existence of the innovation (Everett M. Rogers, 1962). Therefore, innovation could drive the requirement, and vice versa.

From the above theories, we can know that the propulsion of innovation process is the requirement of innovation, and the Maslow's hierarchy of needs also talks about the different levels of requirements. That's the reason about why we will use the Maslow's hierarchy of needs as our previous mechanism in the Chapter 4.

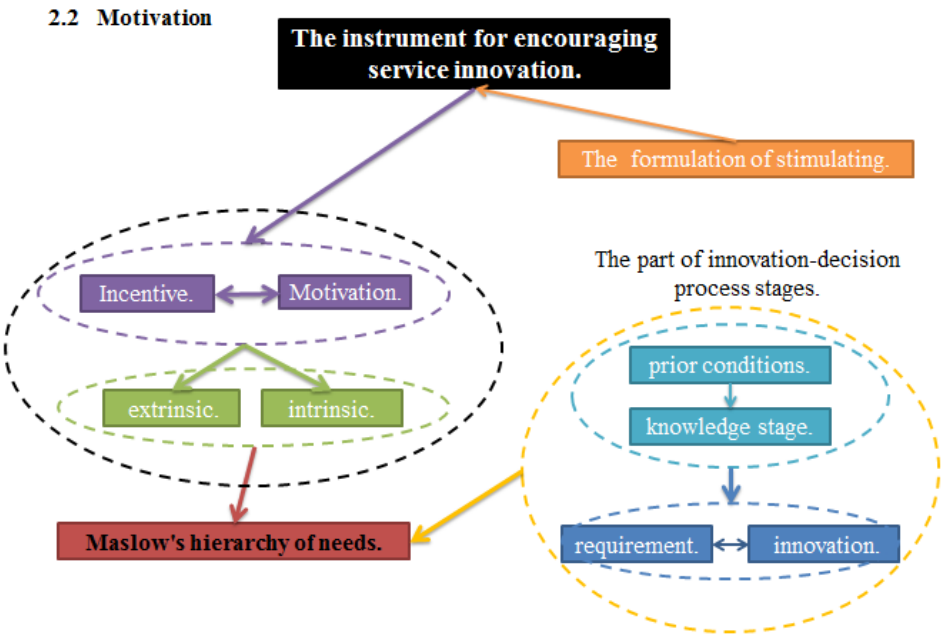

Figure 2.6 The concept of theories about the motivation toward innovation

Figure 2.6 is the concept of theories about the motivation toward innovation. Because of the requirement of stimulating to inspire SMEs to do innovation, we investigate the theory of motivation and the motivation of innovation. First, we

understand that the motivation and incentive are interdependent, and both can assort into extrinsic and intrinsic. In other words, based on the different requirements, we can give appropriate incentive to inspire. That's the reason why we investigate the Maslow's hierarchy of needs to resolve the different requirements. On the other hand, from the innovation point of view, the issue of the motivation is discussed in the previous parts of stages on the innovation-decision process, i.e., the prior conditions and knowledge stage. These two stages also mentioned the relationship between the innovation and requirement. In sum, the two perspectives (from the motivation point of view and the innovation point of view) of the requirements lead this research to adopt the Maslow's hierarchy of needs in motivating toward innovation.

2.3 **Story Generator**

In this section we will consider the domain of story generator, for the automatic generation of service advertising-like story purpose. The ultimate objective of our research is generating the customized service advertising-like story based on every different target users. For this reason, there are two necessary points of the story generator in our research, customized and automation.

The existing examination of story generator can be divided into the following:

(a) Constructing a rule-based approach for the text processing (Alfred Correiea, 1980).

(b) Interacting with user and adapting the behavior of user to generate the story (Barber & Kudenko, 2007).

(c) Utilizing a given input set of element, such as backgrounds, characters and objects, and let user to choose then generating the story (Solis et al, 2009).

Alfred Correiea (1980) proposed the Story Tree which was based on the rule-based computational model for text comprehension. The theoretical basis is the

macrostructures proposed by Kintsch and van Dijk (1978). There is a simple formulation: A <= B, C, and D which proposed by Kintsch and van Dijk (1978). The meaning of the formulation is "you may assert the truth (presence) of macrostructure A if you can find the (nearly) contiguous propositions B, C, and D present in the input text" (Alfred Correiea, 1980). The rules of coherence could involve several criteria: causal connectedness (B causes/is the result of C, which causes/is the result of D), or temporal ordering (B happens before/after C, which happens before/ after D). Alfred Correiea (1980) organized this macrostructure into tree hierarchies and described their interrelationships in rule-based story grammars which related to the Kowalski logic based.

Simply put, the Story Tree is a series of existing plots of the story, and constitutes in the form of tree structure. For maintaining the continuity of the sentence's purpose, the sentence's structure of each node is formed by the concept of the formulation: A <= B, C, and D which was proposed by Kintsdch and van Dijk (1978). In this circumstance, the stories are generated steadfastly and are written in advance.

On the other hand, there is an interactive way to generate story between the system and the users. Barber and Kudenko (2007) proposed a structure of system that can generate the interactive stories and adapt to the user's behavior (Figure 2.7).

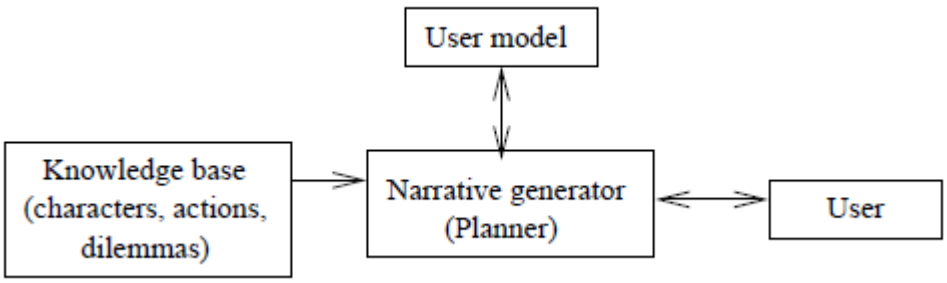

Figure 2.7 System components and their interactions (Barber & Kudenko, 2007)

The knowledge base consists of the information of the characters, story action, and the dilemmas which can occur in the story world. In order to make sure that the dilemmas which may be chosen by the user is met within the story world, the narrative generator (planner) finds out the possible dilemmas and let users choose based on the situation of the current state. Figure 2.8 is the overview of the system moving between states dependent on plans, dilemmas and user decisions (the part of relationship between the narrative generator and user). Based on the situation of the current state, the planner selects the appropriate dilemma and lets user to make choice, and then decides the next state dependent on the user's choice.

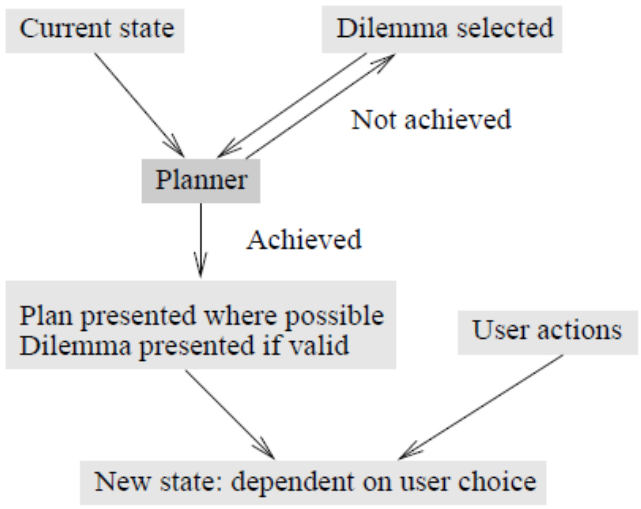

Figure 2.8 The overview of the system moving between states based on plans, dilemmas and user decisions (Barber & Kudenko, 2007)

The function of the user model is to achieve the aims of predicting the user's decisions based on presentation of a dilemma accurately. This model is used to identify which decision is the user's most likely choice, and build up by observing previous user actions assumptions made.

The example of last approach is Picture Books (Solis et al, 2009) which is an automatic story generator that generates story for children from a given input set of

picture elements (backgrounds, characters and objects). Background is the critical to set up the story and combine the object to decide the theme of the story. The linkage among the backgrounds, object and the story theme are defined by the author them self. For example, if user chooses the background as the bedroom, the associate objects may be the lamp or the toy block. Integrating the background as bedroom and the object as lamp will generate the story theme about the bravery (defined by the author). Such associations in the Picture Books are manually determined and entered into the database.

On the other hand, the plots of Picture Books are subdivided into four subplots, namely the problem, rising action, solution and climax. Each subplot contains at least two author goals which represent the goal of the scene and the corresponding consequence of the goal and each author goal contains one or more character goals which represent an action performed by the character for the purpose to achieve the author goal. Figure 2.9 is an example of the first subplot in the Picture Book.

Subplot #1	
Author goal 1.1:	
Goal of the scene	Child is doing an activity
Character goal	*<character> plays <object>*
Resulting text	*Rizzy the rabbit played near a lamp.*
Author goal 1.2:	
Goal consequence	Child caused a problem
Character goal	*<character> destroys <object>*
Resulting text	*Rizzy broke the lamp.*

Figure 2.9 The example of the Picture Book (Solis et al, 2009)

Based on the Picture Book, there was another new architecture, SUMO (Pease et al, 2010). Instead of creating the associations among the backgrounds, characters and object manually determined and encoding into narrative knowledge, these

associations are inferred automatically through axioms that should be the commonsense in the SUMO (Figure 2.10).

```
(=>
   (and
    (instance ?RABBIT RabbitCharacter)
    (attribute ?RABBIT Female)
    (attribute ?RABBIT Child))
   (name ?RABBIT "Rizzy"))
```

Figure 2.10 An example axiom to represent a female child RabbitCharacter whose name will be “Rizzy” (Pease et al, 2010)

Figure 2.11 is the architecture of SUMOs. The Story Editor processes the generation of assertions which correspond to the input picture elements specified by the user, and the Story Planner is planning the flow of events in the story based on the SUMO logic which decide the subsequent actions based on the character’s emotions.

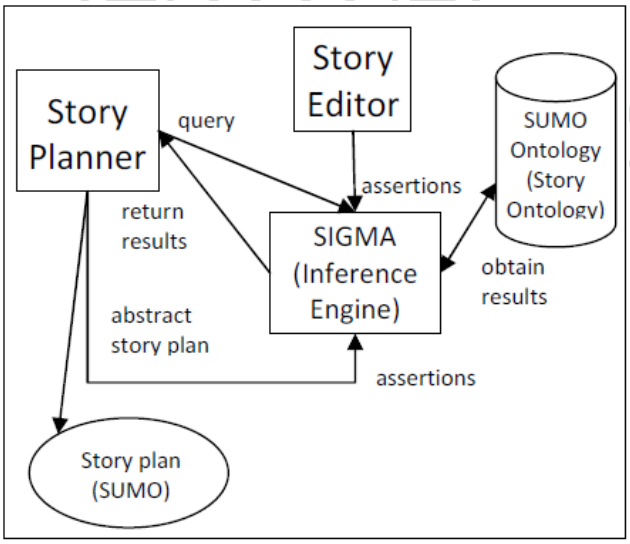

Figure 2.11 The architecture of SUMOs (Pease et al, 2010)

Based on the theory mentioned above, we sort out some gaps between the aim of our research and the existing story generator theory, and point out the advantages of the existing story generator theory (Figure 2.12).

The existing story generator theory proposed the sentence structure and rule-based (the Story Tree (Alfred Correiea, 1980)), interactive approach to reference the determination of user (Barber & Kudenko, 2007) and the story plot which combine backgrounds, characters and objects (Picture Books (Solis et al, 2009), SUMOs (Pease et al, 2010)).

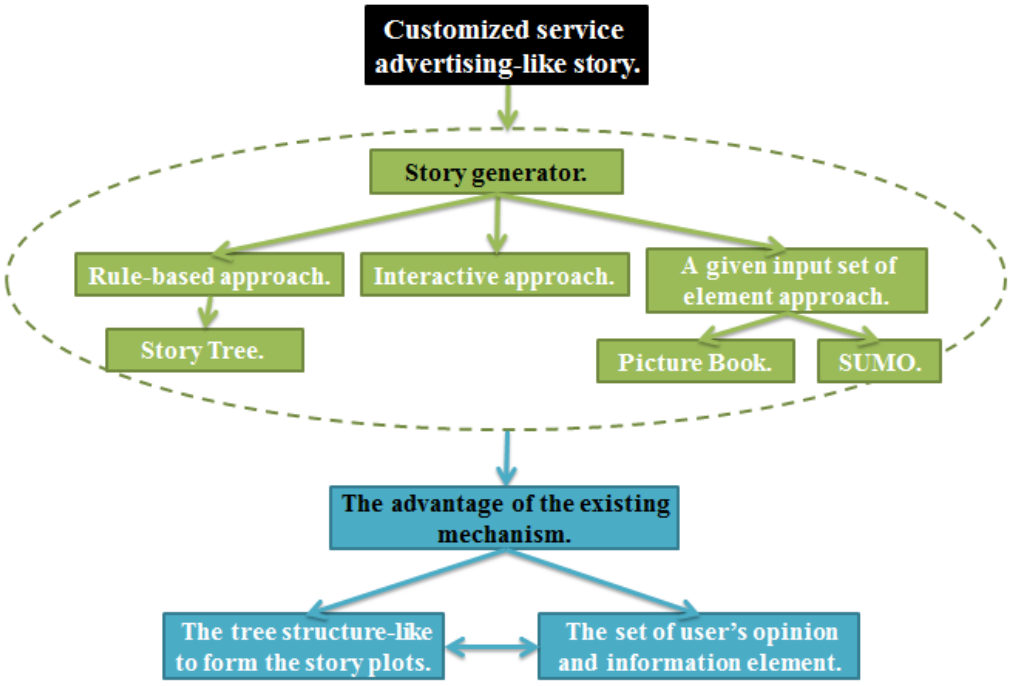

Figure 2.12 The gaps and advantages of the existing story generator theory

The aim of our research is to generate the customized service advertising-like story based on every different target users automatically. Our research wont' involves the aspect of interactive story generation because we want our story serve as the advertising-like and users could read the stories directly instead of interactively. (The "interactive" in here means that user could modify the story by interacting with system. In the after chapter, we also use the world "interactive", but it means interacting with the system process; like press the button; not modifying the story content.) However, if we want to achieve the aim of customization, we need the opinion and information from our target users that's the interactive story generation

can do directly. For this reason, we need to find out a method to anticipate the information and opinion into our story to replace the advantage of the interactive story generation methods. Referencing the Picture Book (Solis et al, 2009) and SUMOs (Pease et al, 2010), we can set the opinion and information of our target user as a given input element for the customized purpose. In other words, we can reference the method of the Picture Book (Solis et al, 2009) and SUMOs (Pease et al, 2010) to implement the customization aspect of inputs required as did by the interactive story generation methods in customized domains.

On the other hand, the sentence structure of Chinese is different from the English; so we couldn't use Story Tree immediately (Alfred Correiea, 1980). However, we could use the advantage of the tree structure to present the story plot, and use the other mechanism such as rule-based to move current node to the next node automatically.

In sum, we need the tree structure-like to form the story plots and combine with the set of user's opinion and information element to generate the customized service advertising-like story.

CHAPTER 3 MOTIVATION APPLICATIONS

This chapter depicts the whole picture of our research project- “ImageCons”, and demonstrates the role of the proposed approach in the application context. Moreover, our research project is built on top of the previous research results of the uVoyage project.

3.1 The Conceptual Framework

For the business success, there is a growing recognition that providing standout value to customers is influential (Cagan, 2002) (Kim, 2005). Kim (2005) argued that creating advances in customer-centric value can make competition irrelevant by opening up entirely new markets. In addition, customers rely more on the intrinsic aspects, except when these are not available or when their evaluation requires too much effort or time (Zeithaml, 1988). Therefore, we need to start from the psychological if we want to attract customers enduringly.

An important intrinsic aspect of customer-centric values is the sign value approach (Boztepe, 2007) considering that value come from socio-cultural-environmental contexts and is subjective with the socially assigned meaning as the service outcome. Owing to the foregoing researches, Yuan (2011) advanced sign value based service systems.

Based on the research “Service System Design: A Sign-Value-Based Approach” proposed by Yuan (2011), we conduct two projects: uVoyage and ImageCons. uVoyage is one part of the sign approach of service system design: Goal Imagery Delivery. This part contains a set of methods/models/tools that can enable SMEs to locate appropriate partners within a geographical cluster. SMEs can use this approach to find some partners to achieve the co-created imagery that can leave a deep

impression in the customers' minds.

After fulfilling this idea in the Mt. Pillow Recreational Agriculture Area in Ilan County, the uVoyage team found some issues. The most important one is that SMEs don't know how to describe their imagery. They told us they have perfect cropper and lovely scenery, but they can't give these a meaningful touching package for customers. They do not even know what their distinguishing feature is (please see the Appendix 1). Furthermore, the uVoyage team also observed that SMEs consider that service innovation is important, but they don't know how to put it into practice.

Thence, we initiate the ImageCons project for the purpose of making up the deficiency identified by the uVoyage team. In other words, we aim to implement the other part of the sign approach of service system design: Goal Imagery Creation.

3.2 The Conceptual Architecture

In the Goal Imagery Creation part, we utilize the design thinking paradigm (Brown, 2009) that fosters a collaborative and iterative style of work to achieve practical, creative resolution of the problem of goal imagery creation for driving business success.

There are an iterative sequence methods/models/tools (Figure 3.1) for creating goal imageries, and could motivate SMEs to change their commercial activity.

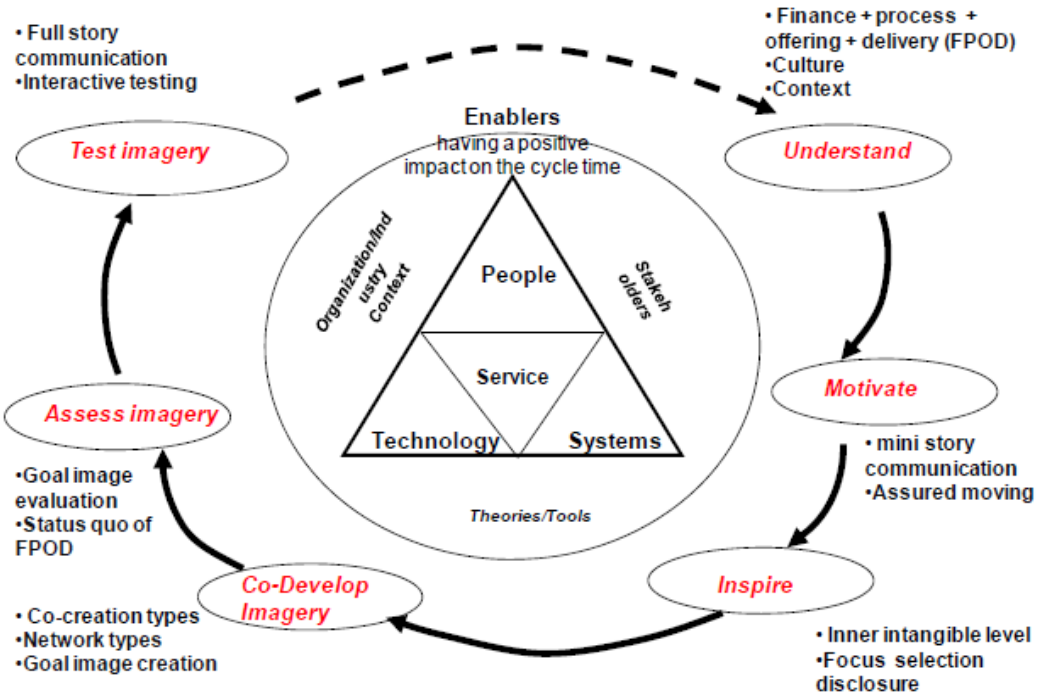

Figure 3.1 Architecture of goal imagery creation (Yuan, 2011)

There are six procedures for creating goal imageries:

(a) Understanding the culture where the business is located and the internal situation, aims to provide the service innovation typology models that can represent and compare the capabilities, socio-cultural and environmental context.

(b) Using a mini story to encourage SMEs to do some change, and appropriately connect the elements of story with the content of the context in order to automatically generate communication stories. Stated another way, the mini story could move SMEs to engage the subsequent development of their goal imageries toward innovation.

(c) "Inspiring" means the inner intangible level rehearsal of the selected focus of innovation.

(d) Co-developing the goal imagery attempts to provide the imagery model

and the co-creation network model that can bestead SMEs to co-create the goal imagery with their collaborators and customers.

(e) Evaluating the goal imagery anticipates devising the measurement models that can identify and quantify the gap between derived goal imagery and the current status quo of the SME context.

(f) Finally, testing the goal imagery attempts to provide the methods interactively prototyping the created goal imagery in order to automatically generate full communication stories (hinting how to fulfill the service innovation including finance, process, offering or delivery that can lead to the goal imagery delivery).

3.3 ImageCons System Architecture

There are mainly five modules ImageCons as shown in Figure 3.2.

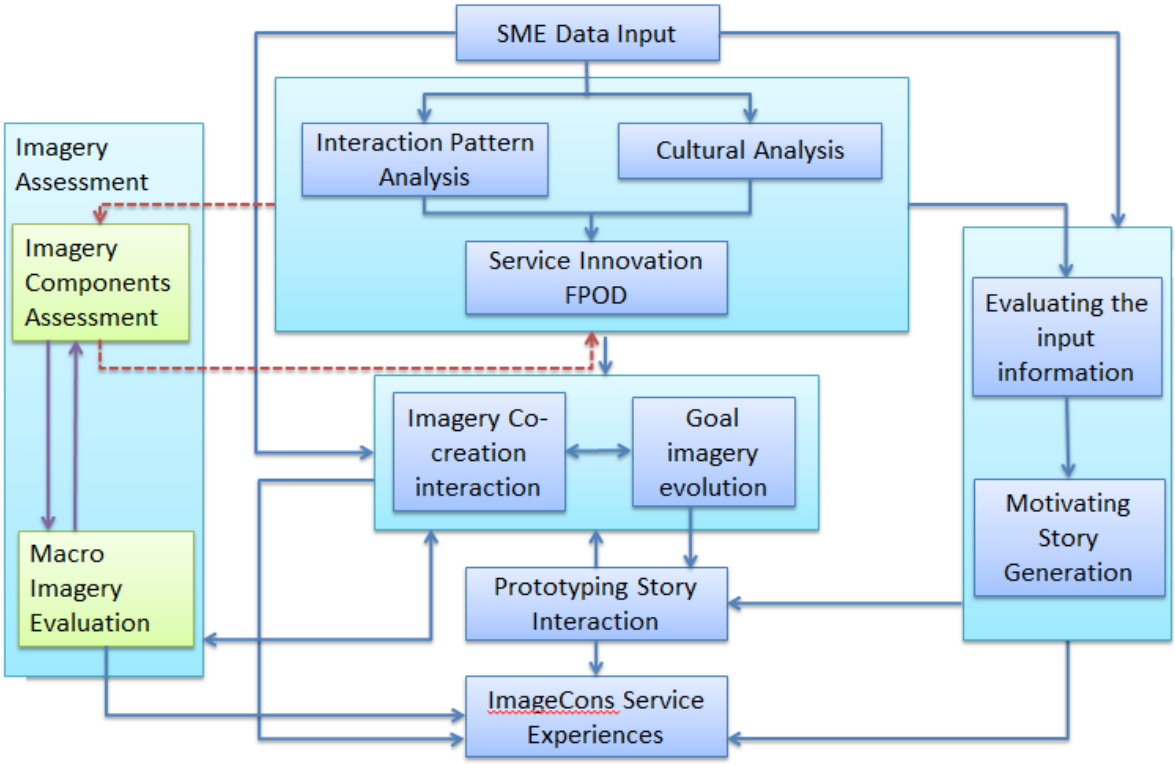

Figure 3.2 ImageCons Service System Platform Architecture

After receiving SMEs' input data, ImageCons does some analysis which about the interaction pattern and culture (the top middle region in Figure 3.2). Interaction Pattern is investigating the cooperation aspiration toward the other SMEs, and the Culture part is investigating the local culture whether it can affect the behavior or not. Both analyses aim to find some patterns to provide the service innovation typology models to help SMEs construct the image which is the ultimate goal of ImageCons. Finally, both service innovation typology models will connect to the FPOD (SIT (Service Innovation Type) including four categories – Process, Offering, Delivery and Finance) (Keeley, 1999) as the output of the models to communicate with the other part.

The analysis output and the SMEs' input data will deliver to two parts, the stimulating part (the right region in Figure 3.2) and the co-developing the goal imagery part (the middle region in Figure 3.2), and both parts will join to the Prototyping Story Interaction. The aim of the stimulating part is using a mini story to encourage SMEs to do some change. This part of system platform will evaluate the input data first and utilize this consequence in the story generator to create a customized and touching story to achieve its aim.

On the other hand, the co-developing goal imagery part aims to create each SMEs' distinctive imagery. Based on the information of SMEs and the utilization of the models of the imagery bank to conjecture the default imagery (the current imagery of SMEs), the system will help them to co-develop the goal imagery through the recommendation and coordination by different interpreters (e.g., customers and partners) to find the most suitable service innovation imagery which could be associated with the SME.

The stimulating part and the co-developing the goal imagery part both lead to the prototyping story interaction part (the bottom middle region in Figure 3.2) which aims

to generate the complete story through the interaction pattern. This part will utilize the mini stimulating story as the basic story framework and the SMEs' goal imagery, by way of interaction patterns to create a complete manual-like story to instruct the innovation direction to the SMEs. In the process of interaction, if the imagery of innovation is not meet what the SMEs want, it will return to the co-developing the goal imagery part to make correction.

The left region in Figure 3.2 is about the imagery assessment, which assesses the result of ImageCons service system. Imagery assessment includes three levels of function, the macroscopic experience of the service imagery, the measuring of the service imagery in terms of the degree about how the SME provides correspond to the feeling of the customer from different angle view dimensions and the multiple imagery comparing, extraction of imagery element, selection / extension of the imagery element and adjustment the service imagery for the SMEs. For these reasons, we can learn in Figure 3.2 that the imagery assessment will assess the analysis of interaction pattern and culture in the imagery components assessment part, but this process is of a loosely boundary that if there is no management the process still moving (The dashed arrow in here means the both analysis including interaction pattern and cultural could do some evaluation or not, not affecting the result of ImageCons service experiences). On the other hand, the imagery assessment part will evaluate the co-developing the goal imagery part.

In sum, finally, the imagery assessment, the goal imagery, the prototyping story and the moving story all will guide our target SMEs to go through ImageCons service experiences.

CHAPTER 4 TOWARDS MOTIVE DRIVEN STORY GENERATION FOR SMEs INNOVATION

This chapter describes the implementation details of motive-driven story generation machine for encouraging SMEs do service innovation. First of all, we define the environment that refers to the goals, tasks, problems, and opportunities defining business needs (Hevner et al., 2004). The foremost problem is that our SMEs are afraid to do service innovation but they need to do so. Next, following the IS research (Figure 1.1) we figure out that we can build service innovation advertising system to motivate SMEs. Finally, the service innovation advertising system can be added to the knowledge base, and reused for other IS researchers.

The primary purpose of this chapter is twofold. First, it elaborates the connections between different concepts including encouraging SMEs, motive driven story generation, and narrative advertisement and how to integrate them into the system architecture. Second, it provides a comprehensive description of system modules and exhibits its ability to generate unconventional solutions. Throughout this chapter, we make several instances to evidence the required data and related computations in terms of algorithms and formula performed at each step in the process so as to justify the feasibility and creativity of the system.

4.1 The Conceptual Framework

The underlying conceptual framework (i.e., the main ideas) of our method is shown in Figure 4.1 prescribing the interrelationships (arrow (1)~(4)) of the basic concepts (encouraging SMEs, motive driven story generation, and narrative advertisement).

In Figure 4.1, we assume that we can form stories based on the narrative

advertisement's theory to drive SMEs to do service innovation, that is, SMEs can be inspired by the short customized motivation story.

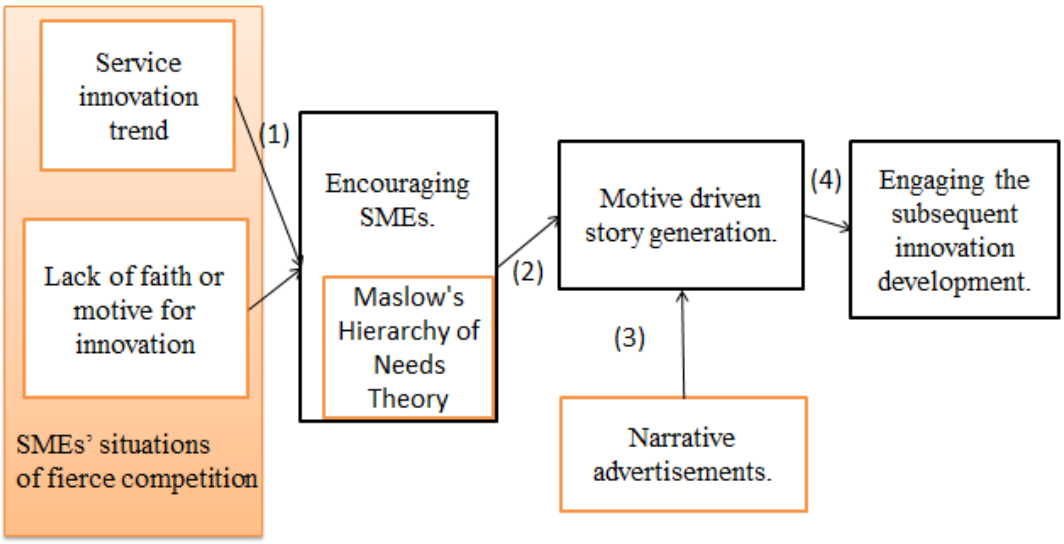

Figure 4.1 Conceptual framework of the motive story generator

SMEs' situations of fierce competition: With the international trend of financial liberalization and globalization, the enterprises are facing fierce and fast competition. Traditional research and development technology are insufficient to contend global competitive society. Not to mention the vulnerable and faraway local SMEs (i.e. local stores, like restaurants, hostels and agriculture). There is a general consensus that the pace of change including the globalization of markets; the spread of information technology and computer networks; the dismantling of hierarchy and the revolution in management; the information economy; has increased over the past few decades (Stewart, 1993). Undergoing fundamental transitions may well pose a particular challenge to the small and medium enterprises (SMEs), which restrict their abilities to maintain their position against larger competitors in quickly and violently changing business environments (Winch & McDonald, 1999). For this reason, we need to figure out some solutions to support them do several effort.

For hoping SMEs to survive, there are many methods. The government departments (small and medium enterprise administration, ministry of economic affairs) is also reaching out actively, such as loans for SMEs policy, information application guidance, and quality improvement guidance etc. (URL: http://www.moeasmea.gov.tw/np.asp?ctNode=606&mp=1) However, because of the international trend of financial liberalization and globalization, that the method mentioned before is not enough. Our natural resources and human resources are inferior to other powerful countries. The only way to have competitive is that build our own brand, including Taiwan's culture and characteristics. Therefore, we can put above-mentioned elements (i.e., Taiwan's culture and characteristics) into service innovation. One of the directions of service innovation mentioned "Brand" and "Customer Experience" (from FPOD), defined by Larry Keeley, the President of Chicago-based Doblin, Inc (1999).

As mentioned before, for survival, the SMEs must do some efforts in innovation (Sun & Wu, 2008). The problem is that SMEs have no idea about service innovation. They can't comprehend the features of service innovation, and don't know why they need to do service innovation. Our field research in the Mt. Pillow Recreational Agriculture Area in Ilan County lets us dig out that the vulnerable SMEs don't think they need to do service innovation. Actually, even we told them service innovation can support their business, they can't have any experience of this idea. "Service innovation" just like a new strategy substantive for SMEs, they don't think this will be closely related to them.

For example, there was an agriculture SME producing red guava (a special cropper growing in the Mt. Pillow Recreational Agriculture Area in Ilan County in Taiwan). This SME comprehended that they must to do some change in this radical change times, and told their ideas to other peasants. However, these ideas were

difficult to popularize. In addition, to promote the ideas, it was required to coordinate other peasants' busy farming season time and need some material incentives (e.g., a free cup for participants to attend the innovating courses).

Arrow (1): Comprehending the SMEs' situation, we must find some method to improve this kind of dilemma. On the other hand, we need to let the vulnerable SMEs know that to do service innovation is good for their business, not just for some material reason as exemplified above.

Encouraging SMEs: In order to achieve encouraging SMEs to do service innovation, first we have to delimit motivation that could be engaged using Maslow's Hierarchy of Needs Theory (Abraham Maslow, 1943). Maslow proposed that the personal growth is based on intrinsic motivation, and motivation is composed of multiple, different levels and nature of the demand. Maslow's theory include five levels: physiological needs, safety needs, love needs, esteem needs and self-actualization needs.

Based on our field research, we consider our target SMEs' growth motivation coinciding with the four parts of Maslow's theory. There are safety needs, love needs, esteem needs and self-actualization needs. Based on the Maslow's theory, after people satisfy the low-level needs, they can pursue high-level needs. We consider that physiological needs and safety needs in lowest level of our target SMEs is difficult to distinguish. They all need a stable life, and their characteristics are something like that "the works not going well", "meager salary", "too poor to feed their families" and so on. We repute it is unnecessary to subdivision between physiological needs and safety needs, and. For this reason, we define the lowest-level of our SMEs as the safety needs in Maslow's theory.

The SMEs which belonged to love needs in the Maslow's theory have the following features: they demand cooperating with other business, and believe

collaborating can help both of them get some advantage (e.g., Bed and Breakfast's entrepreneur cooperates with shuttle boat's entrepreneur in Sun Moon Lake in Taiwan. If the customer gets an accommodation in the Bed and Breakfast, the shuttle boat's ticket will have discount). We classify this type of SMEs as love needs in the Maslow's theory. The two kinds (including safety needs and love needs) of SMEs don't know what they need in service innovation. Actually, they even don't know what service innovation is.

We delimit the SMEs which have stable number of visitors and earnings, but nothing special in their business as the esteem needs in the Maslow's theory. These kinds of SMEs demand self-improvement and the sense of accomplishment. They are the ones who know they need to do service innovation, but service innovation just a vague concept for them. Some of them consider service innovation is a strategy of large enterprises, and feel uncertain and are afraid to do service innovation.

The last parts of SMEs are belonged to self-actualization needs. They are rich enough and have a certain reputation. Based on the Maslow's theory, they have fulfilled all of the above requirements, and it's a derived demand including the sublime realm of life to obtain high demand. In addition to making money, these kinds of SMEs hope to contribute to the society (As the example we mentioned above, they actively promoted regional agricultural development and helped their neighbors). They donate through the foundation, or set up a foundation to contribute the community. For example, Fubon Financial Clique (URL: http://www.fubon.com/financial/citizenship/000citizenship_01.htm) established four foundations to promote the social welfare services, including charity, culture, and education etc. We found some SMEs have similar ideas as the large enterprises like Fubon Financial Clique and regard these kinds of SMEs knowing they need to

do service innovation but do not know how to implement. Actually, just like what Everett M. Rogers (1962) said, “Someone may have known about an innovation for some time but not yet developed a favorable or unfavorable attitude toward it, nor have adopted or rejected.” We consider the last kind of SMEs’ situation is something like that.

Arrow (2): Every aspect in the Maslow's Hierarchy of Needs Theory needs to be satisfied by appropriate stimulating (David Freemantle, 2000). Consequently, we need to find some way to give these SMEs appropriate stimulating.

Everett M. Rogers (1962) defined a new word “diffusion” as the process in which an innovation is communicated through certain channels over time among the member of a social system. In his publication “Diffusion of Innovations” mentioned that persuasion is “equivalent to attitude formation and change on the part of an individual, but not necessarily in the direction intended by some particular source, such as a change agent”. The individual become more psychologically involved with the innovation at the persuasion stage. Based on Everett M. Rogers’ version, if we want to persuade SMEs to do service innovation, we need to start from the psychological, and give them some stimulating.

Narrative advertisements: “Compatibility” was defined by Everett M. Rogers (1962). It is “the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (Everett M. Rogers, 1962). This kind of compatibility helps the individual give meaning to the new idea so that it is regarded as more familiar (Everett M. Rogers, 1962). Based on the Everett M. Rogers’ point of view, personal experience is an important part of the degree of acceptance of service innovation.

Understanding experience is the province of narrative psychology (J. Bruner, 1986, 1990). The basic presupposition of narrative psychology is that people have a

natural propensity to organize information about people and their actions in story format (Padgett & Allen, 1997). Service is one of the examples, where customers must organize a complex sequence of events and their reactions to these events into a meaningful whole. Narrative theory suggests that people relate their interpretations of experience to others through narrating, or telling stories (Padgett & Allen, 1997). "Narrative deals with the vicissitudes of human intention" (J. Bruner, 1986), involving an involved, self-relevant reflection on experience. Bruner (1986) also suggested people can use the narrative mode of thought to understand storied stimuli. Hence, according to Bruner (1986), advertisement that portray actors (characters or brands) acting to achieve some goal would be interpreted through the narrative theory because people (In here means our target SMEs) could interpret the advertisement stimuli through the story (Padgett & Allen, 1997). In addition, Lewis and Bridger (2001) also said that if you want to convince consumers, in particular the new consumer, you have to compile this kind of story that can transmit messages and cause consumers to identify.

Arrow (3): Because Everett M. Rogers (1962) suggested that if we want to convince other to do service innovation, we should start from the past experiences. On the other hand, Bruner (1986) considered that we can use narrative psychology to understand experience, and telling stories is one form of narrative. Based on the Bruner's (1986) theory, our individual experiences are interpreted through the narrative mode as are the stories about experience told to us by another.

Motive driven story generation: According to arrow (3)'s requirement of stimulation of the heart and arrow (4)'s solution of empirical story, we figure out that we need a story which can manifest SMEs' personal experience and familiar culture. However, many SMEs need these kinds of stories, and we couldn't write for them one by one. The only way we can do is to find some instrument to create a

machinery to form these stories automatically.

Please note that this machinery demand to read SMEs' personal experience, including community, culture, and personal financial and so on. Based on the Everett M. Rogers' (1962) theory," An obvious principle of human communication is that the transfer of ideas occurs most frequently between two individuals who are similar, or homophilous". "Homophily" is the degree to which two or more individuals who interact are similar in certain attributes, such as beliefs, education, and the socioeconomic status (Everett M. Rogers, 1962). We should create a role, whose background is similar with our target SMEs, but not too similar. As we mentioned before, for the encouraging purpose, we have faith in the positive psychology. Therefore, we need to create a role, whose background is similar with our target SMEs, and emphasize the advantage and bright side.

Arrow (4): After we accomplish this mini customized motivation story generating machine, we can continue move on our ultimate goal.

Engaging the subsequent innovation development: The subsequent development is co-developing the goal imagery in terms of the imagery model and the co-creation network model that can bestead SMEs to co-create the goal imagery with their collaborators and customers.

Levy and Glick (1973) stood for some point of view that brand image is a summary concept that implies consumers buy brands for their physical attributes and functions and the meanings connected with the brands. Martineau (1958) contended store image is composed by the functional qualities and psychological attributes. Both of these definitions are congenial to Gardner and Levy's (1955) suggestion in their seminal article on brand image that consumers buy products not only because of their attributes and functional consequences, but also for the symbolic meanings associated with them. Generally speaking, the functions of

brand image are to define the product for consumers and differentiate the firm's offering from competitive offerings (Padgett & Allen, 1997).

For the same reason, we hope SMEs to create their own “image” as the “brand”, and let their customer have more spiritual experience. This will hope their businesses; because the image concept encompasses both functional and symbolic aspects of service and is by definition a consumer-oriented concept, stressing the consumer's active role in creating meaning in response to marketing stimuli and what the marketing stimuli represent (Padgett & Allen, 1997). Our story will hope them to have courage and clear idea about what they will do next, and have more interest and confidence to do so.

4.2 The System Architecture

In order to fit our target SMEs’ needs as we mentioned before; to antagonize the fierce competition and the innovating audacity; we demand a motive driven story generation which can generate stories function as promoting innovation advertisement. To achieve these ends, the system architecture is designed and presented as Figure 4.2. In Figure 4.2, we can locate clearly that the main idea in the entire system is analyzing the information of the SMEs and engender a vivid story to the SMEs. Due to the SMEs’ situations of fierce competition we mentioned in the Section 4.1, we infer that we can utilize a vivid story to stimulate our target SMEs to do some change in order to antagonize this harsh environment. Besides, in the Everett M. Rogers’ (1962) opinion that interrelated plight is an important element when someone wants to persuade other. For these reasons, before we generate the story, we must premeditate the information of the SMEs and add this information in our final story.

From a practical side, the overall system architecture provides the

implementation particulars, including the operation between each two different modules, the connection between the input and output and the distinct function of supporting database. This system architecture consists of five main modules, including: SMEs Information Module, SMEs Classification Module, Story Framework Identification Module, Story Element Suggestion Module and Matching Module.

In essence, based on the SMEs Information Module's analysis of information, the SMEs Classification Module classifies our target SMEs recommend on the Maslow's Hierarchy of Needs Theory we mentioned in the Section 4.1. And then, choosing a suitable story framework for each SME, and utilizing different sources to compose Story Element Suggestion Module. Finally, the Matching Module assembles the story framework and the story element provided by the Story Framework Identification Module and Story Element Suggestion Module.

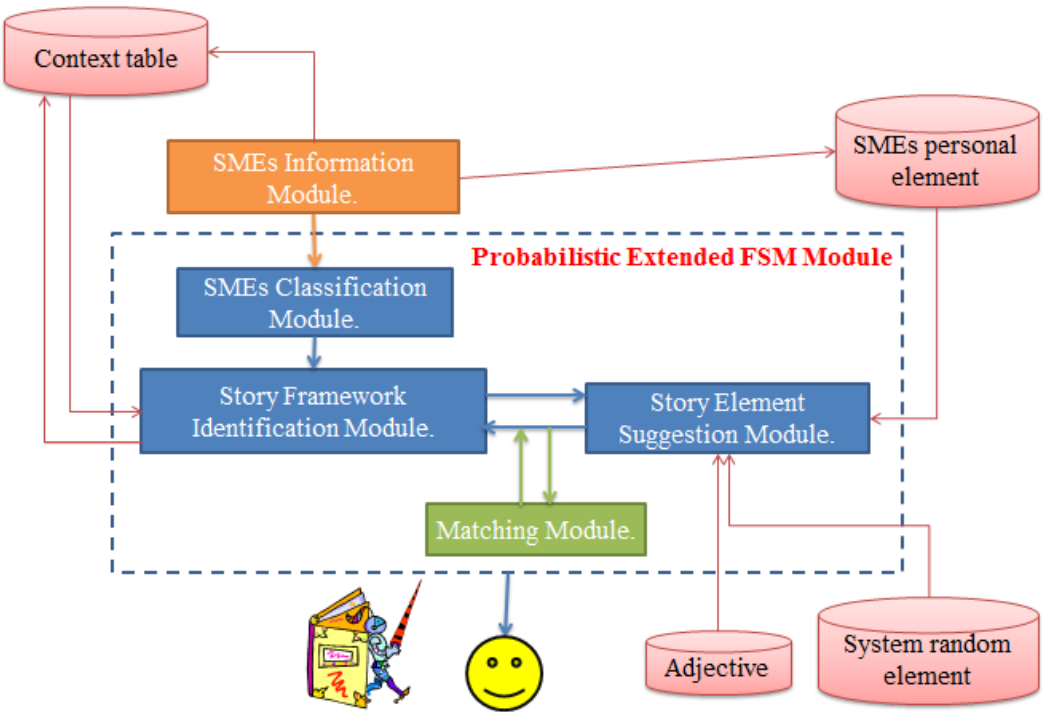

Figure 4.2 System architecture

SMEs Information Module: Based on the definition of "diffusion" and the narrative theory we mentioned in the Section 4.1, we know that if we want to use a story to persuade our target SMEs, the contents of the story must be interrelated with SMEs' sociocultural value and beliefs and individual experience (Everett M. Rogers, 1962). Consequently, the SMEs Information Module analyzes the current situation of SMEs, including their basic information (i.e., product and kinds of customer), socioeconomic status (compare with other SMEs) and the culture background, etc. After analyzing, this information will be archived to form a context table, and input the context table to the Probabilistic Extended FSM Module as base of endorsement.

Probabilistic Extended FSM Module: In this part we use probabilistic extended FSM to generate story. FSM (finite state machine) is a model contains a set of states, and each state represents a condition. In addition, there is a transition function in the FSM that would move current state to the next state. We use this distinguishing feature of FSM to build our story framework, and each state expresses an element from Dramatica (Phillips & Huntley, 2001) and SIT which can generate a paragraph of the story. We utilize user's basic information to complete the transition function in the FSM, moving from the start state to the end of state, and generate a complete and sundry story.

In the transition part, we subjoin hybridization between probabilistic and extended finite state machines. Because of the vivid and touching story needed for making encouragements, we need diversification by probability choosing next state. On the other hand, our goal is stimulating our target SMEs, and it behoove to measure if current state have qualification to move to next state, and according to the situation of current to create the paragraph of story. In an extended FSM model, the transition is satisfying the trigger conditions of each state first (through the

input alphabet), and then move to the next state and implement the specified data operations (the output alphabet) (Cheng & Krishnakumar, 1993). This part includes four modules: the SMEs Classification Module, Story Framework Identification Module, Story Element Suggestion Module and Matching Module. The context table database will support the Probabilistic Extended FSM Module to keep moving. After go through above four modules, there will be an exclusive vivid story for each SME.

SMEs Classification Module: According to the Maslow's Hierarchy of Needs Theory we mentioned in the Section 4.1, if we want to convince others, we need to satisfy them by appropriate stimulating according to their individual needs. Therefore, the first thing we need to do is to classify these SMEs. After classifying these SMEs, we can understand our target SMEs in terms of which kind of Maslow's theory's levels (there are safety needs, love needs, esteem needs and self-actualization needs).

Story Framework Identification Module: This module is the nucleus of the whole the Probabilistic Extended FSM Module, and could generate a story step by step sustained by the context table database. The Story Framework Identification Module will base on the information of the context table and the user behavior to determine which state will be the next state, and revising the context table. Actually, the Story Framework Identification Module is only the story's framework; it demands to coordinate with the Story Element Suggestion Module and Matching Module for generating a story.

Story Element Suggestion Module: For making our story more vivid to touch our target SMEs, we need the Story Element Suggestion Module to gather unequal source of element to replenish the story framework. There are three source to collect the element, including the SMEs personal element, Adjective and System

random element database. The SMEs Information Module will base on the SMEs' situation to build a SMEs personal element database including name, office and something about the SMEs. On the other hand, the system will randomize some elements about the protagonist of the story which the system uses for the requirement of other process situation. Because the position of the story generator part in ImageCons being playing the role of promotion and motivation instrument, it is possible to happen that user read the story before they fill in their own information. Hence, it is necessary to randomly prepare a protagonist of the story. Finally, the Adjective database contains a lot of adjective to enrich our story. SMEs personal element coordinate with Adjective and System random element database to constitute the Story Element Suggestion Module.

Matching Module: Finally, in order to combine the framework and all the elements, we still need Matching Module to coordinate these. Following the Story Framework Identification Module's procedure, and assist each state on the Story Framework Identification Module to pair with the element of the Story Element Suggestion Module. After we accomplish every state and reach to the final state, an integral vivid story will be generated.

4.3 SMEs Information Module

SMEs Information Module is designed for comprehending the essence of SMEs. At the beginning, we let SMEs fill the tabulation, and get some information we need after running (please see the Appendix 2). The information about current situation of SMEs includes their basic information, socioeconomic status and the culture background. After analyzing this information, the SMEs Information Module engenders two kinds of data, including context table (for the purpose of running extended FSM) and SMEs personal element (for the purpose of enriching

the story).

We present the context table first, which is the propulsion of FSM and record the SME's user behavior and information. The transition function of the extended FSM is satisfying the trigger conditions of each state first, and through the input alphabet to measure if the trigger conditions are fulfilled or not. We use the context table as the input alphabet for our extended FSM. If the value in the context table is satisfying the trigger conditions of a state, then it will move to the next state and implement the output alphabet (in here, the output alphabet is a paragraph of the story). On the other hand, when we move to the next state and implement the specified data operations (the paragraph of the story), we will base on the story plot to rewrite the context table in order to measure if it enough to move to the next state.

Figure 4.3 is coding of the context table. C_{ij} is the context table of each user. For example, C_{12} means the first user's second context table (because we need to rewrite the context table after running the state of FSM as we mentioned above, recording all of each user's context table can hope us to measure the performance of the story). On the measurement part, we can compare each user's C_{i1} and C_{if} (means the first context table and the final context table). If C_{if} is better than the C_{i1}, we can say that our story is a successful case. Besides, we believe that the successful case can provide a positive attitude based on the positive psychology that the positive human will repair the worst things in life and also building positive qualities (Seligman & Csikszentmihalyi, 2000). Based on the above statement, we can say that if the C_{if} is better than C_{i1}, the "moving story" will be touching and stimulating our target SMEs and satisfy one of our research questions.

A_a is the attribute, including the appellation of the business owners, gender, opposite position with other competitors (from 1 to 5, 1 means the lowest

satisfaction with this options, and 5 means the highest), , the satisfaction of the demand for the innovation (from 1 to 5), the operating conditions (from 1 to 5), age, the region, the willingness to cooperate (from I to V), the condition (which records the adding value of user) and the user behavior (which records if user presses the next button or not). The attribute can be separated into two parts, including the tangible part and the assessment part. For example, the appellation of the business owners, the gender, the age and the region is the tangible part, and the others are the assessment part (assessed by the user). V_a is the value of each attribute. Each value of the attribute is generated by user's determination or behavior, including the assessment part of the attribute. The reason why we let users evaluate themselves instead of being ranked by the objective economic indicators is that we consider each user has self-expectations enough to encourage themselves. We assume that the level of self-expectations could be classified into the different Maslow's Hierarchy of Needs. For example, the person who is classified to the self-actualization needs by the objective economic indicators may not be satisfied with status; so it is better for the user to determine the level of Needs in Maslow's theory based on their self-assessment.

In Table 4.1 indicates an example of the Mr. Wang's context table whose agriculture business is selling guava in Ilan, age 50, and receiving low fraction about the operating conditions, the satisfaction of the demand for the innovation and the opposite position. In addition, this SMEs' willingness to cooperate is I (choosing by the user), means the level of willingness to cooperate is low (I to V, V means high level of the willingness to cooperate). Beside, A_9 is the condition that records the adding value of user and A_{10} used to record the user behavior which decides if story paragraph go to the next one or not. At the beginning, the value of A_9 is 0, and based on the user behavior to choose if the value of A_{10} is Y or N. If

user presses the button “I want to the next page”, then the system will choose the suitable story paragraph for the user and the value of A_{10} is Y .

C_{ij} = The context table of each user.
(i = each user, j = the number of context table)
A_a = Attribute.
(a = the number of each attributes)
V_a = The value of the attribute.
(a = the number of each attributes)

Figure 4.3 The coding of the context table

Table 4.1 The example of the coding context table

C_{11}	V_a
A_1(The appellation of the business owners)	Mr. Wang
A_2(Gender)	Male
A_3(The opposite position with other competitors)	2
A_4(The satisfaction of the demand for the innovation)	1
A_5(The operating conditions)	2
A_6(Age)	50
A_7(Region)	Ilan
A_8(The willingness to cooperate)	I
A_9(The condition)	0
A_{10}(The user behavior)	Y

On the other hand, we need to construct the SMEs personal element database for satisfying the research question “Whether we can incorporate the SME’s

information into the story generator design" as mentioned in the Chapter1. For the persuading purpose (Everett M. Rogers, 1962), we create a role that is similar to our user for strengthening the persuasive act, using the SMEs personal element database. Figure 4.4 is the coding of the SMEs personal element. U_i means the user in our system and the E_e means the element of our story. For the instance we give in Table 4.1; the element would be "Mr. Wang, Guava, Brand, Agriculture and Ilan" in Table 4.2. In other words, we create a role that is also a farmer growing the guava in Ilan, and needs brand type of the SIT.

U_i = The user in our system.
(i = each user)
E_{ie} = Each user's story element.
(i = each user, e = the number of the element)
V_e = The value of the element.
(e = the number of each element)

Figure 4.4 The coding of the SMEs personal element

Table 4.2 The example of the coding SMEs personal element

U_1	**V_e**
E_{11}(The appellation of the business owners)	Mr. Wang
E_{12}(Gender)	Male
E_{13}(Age)	50
E_{14}(Region)	Ilan

It is noteworthy that for the requirement of the integral system process (ImageCons) SMEs personal element database sometime needs to be used interchangeably with System random element database which is described in the

Section 4.4.3.

4.4 Probabilistic Extended FSM Module

In this section we will introduce the reality implementation of the probabilistic extended finite state machine using a simple schematic diagram and the pseudo code, and then Section 4.4.1 to 4.4.4 will give more detail about how the probabilistic extended finite state machine is developed for the story generator.

Finite state machine is a model of terminate set of states expressing the current condition, including a start state, an input symbols, and a transition function that maps input symbols and directs the current states to a next state. This mechanism conforms to our supposing story generator machine that generates stories by current circumstances of the SMEs. In this machine, each state indicates the status of the SMEs in the story.

However, only using FSM can't be fulfilling the generation of a story meeting our research objectives; we need append other mechanism to the FSM. That the reason way we require using extended FSM, which uses input alphabet and output alphabet as the transition function. In the extended FSM (EFSM) the transition function will be expressed as an "if statement" consisting of a set of trigger conditions. If the trigger conditions (input alphabet) will be satisfied, the transition function will guide the machine from the current state to the next state and implement the specified data operations (output alphabet) (Cheng & Krishnakumar, 1993). The input alphabet is the context table (C_{ij}) and the output alphabet is the rewrite context table (C_{ij+1}) and the paragraph of the story (G_{ig}). Figure 4.5 is the coding of the extended FSM; G_{ig} means each user's paragraph of the story in the current state, S_s means the state, the S_0 is the start state , the S_f means the final state and the SC_s is the s state's trigger conditions..

G_{ig} = The paragraph of the story.
(i = each user, g = each paragraph of the story.)
S_s = The state.
(s = the number of the state)
S_0 = The start state.
S_f = The final state.
C_{ij} = The input alphabet.
C_{ij+1} = The output alphabet.
SC_s = The s state's trigger conditions.
(s = the number of the state)

Figure 4.5 The coding of the extended FSM

In addition, the schematic diagram of the extended FSM's transition function is demonstrated in Figure 4.6. There is a transition between S_0 and S_1, C_{11} is the input alphabet and C_{12}, G_{11} is the output alphabet. From Figure 4.6 we can learn clearly about the sequence of the implementation process. If the input alphabet C_{11} conforms to the trigger conditions in S_0, then the specified data operations will be implemented including G_{11} and C_{12}, and the state S_0 will be move to the next state S_1. It's worth noting that the trigger conditions of each state are the content of context table and the user behavior (which is also recorded in the context table). If the context table conforms to the trigger conditions, the next state will be shown based on the content of context table and generate G_{11}. After that, system will base on the user behavior to rewrite the context table into C_{12}.

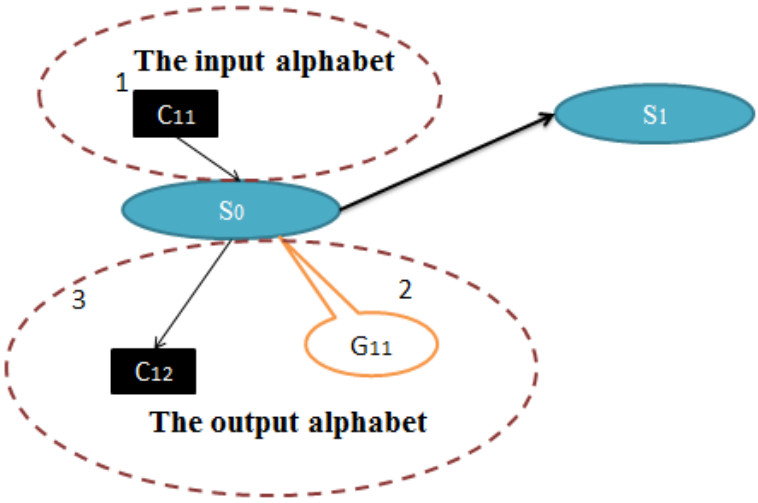

Figure 4.6 The schematic diagram of the extended FSM

Figure 4.7 is the pseudo code about the integral operation we mentioned above. The element GV_{ig} means the addition value in each state. In Figure 4.6, we can understand the C_{12} and G_{11} both are generated by S_0. C_{12} is generated through the original C_{11} plus the value of GV_{ig}. Meanwhile, the Table 4.3 is the example of GV_{ig}. The meaning of Table 4.3 represents the addition value of each attribute.

Extended FSM's transition function

The input:

SC_s = The s state's trigger conditions.

A_i = Attribute.

(i = the number of the attribute)

V_a = The value of the attribute.

(a = the number of each attribute)

GV_{ig} = The addition value in each state.

(i = each user, g = each paragraph of the story.)

Step1 : Compare the value of each attribute (V_a) with SC_s and $C_{ij.}$ (From s = 0, j = K+1.)

IF the value of each attribute in SC_s >= C_{ij} (means satisfying the trigger conditions)

THEN S_s move to S_{s+1},

AND output the G_{ig} (g=s+1).

ELSE Break.

END.

Step2 : Check the GV_{ig} in the G_{ig}.

IF the addition value in the GV_{ig} not equal null

THEN rewrite the $C_{ij} = C_{ij+1}$,

ELSE Break.

END

Step3 : Compare the value of each attribute (V_a) with SC_s and C_{ij}. (s++, j++)

Step4 : Stop in the final state(S_f). (There is no next state)

Figure 4.7 The pseudo code of the extended FSM implemented in the story generator machine

GVig = The addition value in each paragraph of the story.

(i = each user, g = each paragraph of the story)

Aa = Attribute.

(i = the number of the attribute)

V_a = The value of the attribute.

(a = the number of each attributes)

Figure 4.8 The coding of the addition value in each paragraph of the story

Table 4.3 The example of the coding of the addition value in each paragraph of the story

GVig	addition value
A_9(The condition**)**	1

Assuming after running the whole extended FSM, there will engender a story about the protagonist who is analogous to our target SMEs and process the course from the failure to the successfully.

On the other hand, the foremost purpose of composing probabilistic FSM to the original one is subjoining the diversity and interests in our story and avoiding the same user always reading the same plot and thus losing pleasure. For the above reason, we subjoin hybridization between probabilistic and extended finite state machines (the probabilistic extended FSM). In the implementation of the story generator machine, we check the trigger condition first. If it satisfies the trigger condition, then based on the probabilistic it randomly moves to the next state. Figure 4.9 is the schematic diagram of the probabilistic extended FSM. Because C_{11} conforms to the trigger condition of current state, we use random probabilistic to choose which state is the next. The example of Figure 4.9 shows the S_0's next state is S_2 (because of random probability).

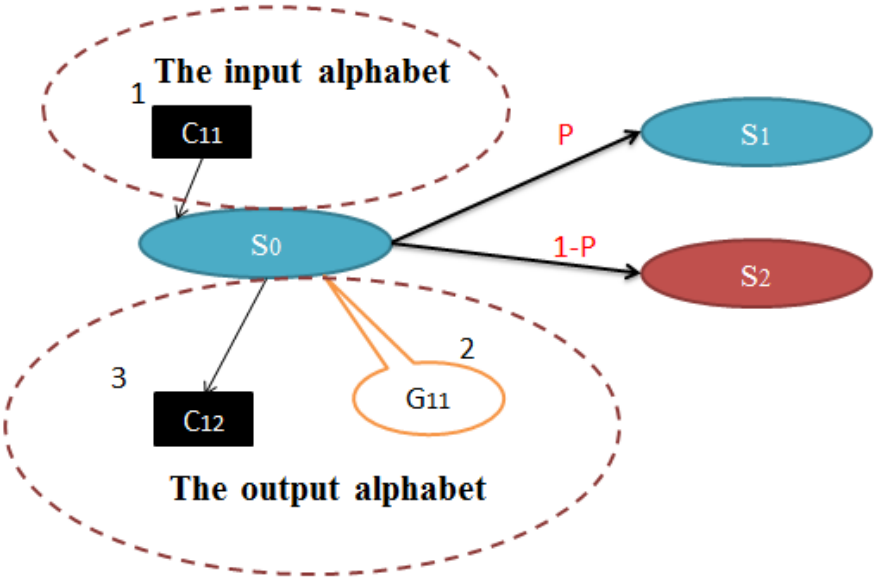

Figure 4.9 The schematic diagram of the probabilistic extended FSM

On the other hand, Figure 4.10 is the pseudo code of the probabilistic extended FSM (PEFSM) implemented in the story generator machine.

probabilistic FSM's transition function

The input:

P = The probability.

GV_{ig} = The addition value in each paragraph of the story.

(i = each user, g = each paragraph of the story.)

execute **Extended FSM's transition function**

IF there is the probabilistic mechanism in the current state

THEN (random) S_s move to S_{s+1},

AND output the G_{ig} (g=s+1).

Break.

END.

Step1 : Check the GV_{ig} in the G_{ig}.

IF the addition value in the GV_{ig} not equal 0

THEN rewrite the $C_{ij} = C_{ij+1}$,

ELSE Break.

END.

Figure 4.10 The pseudo code of the probabilistic extended FSM implemented in the story generator machine

The above mechanism is the kernel of the Probabilistic Extended FSM Module. Besides, there are SMEs Classification Module, Story Framework Identification Module, Story Element Suggestion Module and Matching Module in the Probabilistic Extended FSM Module to deal with more detail process, including the more touching plot of whole story, the more personal association and the more affluent in the story.

4.4.1 SMEs Classification Module

SMEs Classification Module is the first mechanism in the Probabilistic Extended FSM Module. The function of SMEs Classification Module is to classify our users to unequal type in order to customize for each user based on their background analyzed in SMEs Information Module (the context table).

First of all, based on the Maslow's Hierarchy of Needs Theory, we need to base on what the people's shortage and satisfy their shortage for encouraging. That's the reason why we classify our users first. There are four categories according to their types of needs, safety needs, love needs, esteem needs and self-actualization needs.

After that, for enriching the diversity of our story, there are two directions about the plot of the story: learning and cooperation. Based on Table 4.1, the example of context table, there is an attribute about the level of cooperation (A_8 = The willingness to cooperate) which the SMEs choose. According to this level classification, the picking of low level of cooperation need's SMEs we consider they want to improve themselves more, so give them a model story to imitate. On the other hand, the SMEs who select the high level of cooperation need more supporting from other, so we give them a story about cooperation to hope them

gather more inspiration about how to collaborate.

Figure 4.11 is the summary about the whole category of SMEs Classification Module. It is clear that first our mechanism chooses which needs level based on the Maslow's Hierarchy of Needs Theory a user belongs to (story framework), and then based on the user's aspiration, the mechanism selects which directions about the plot of the story is the most appropriate for the user.

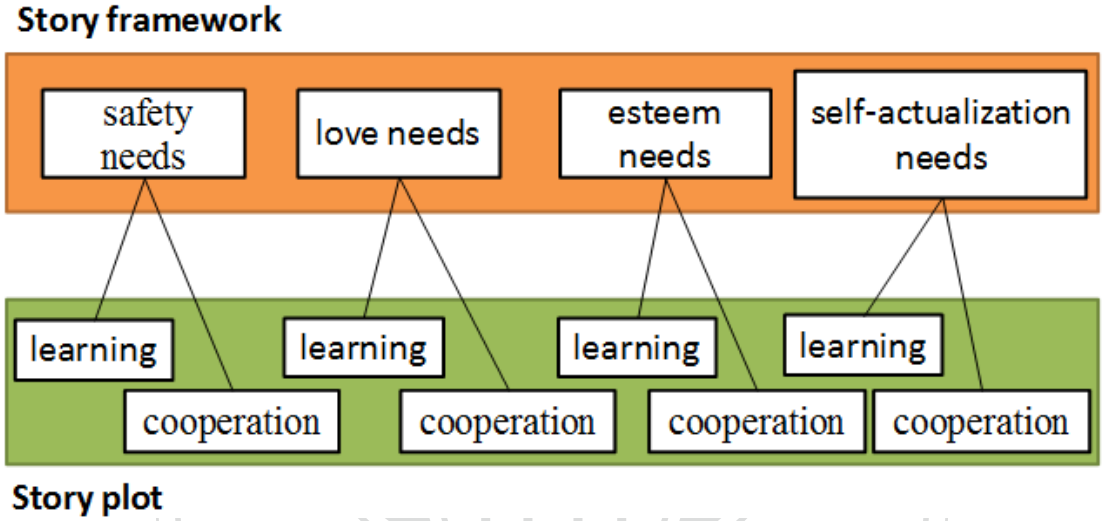

Figure 4.11 The category of SMEs Classification Module

Figure 4.12 is the pseudo code of SMEs Classification Module's mechanism. We use the attribute of the context table, including A_8 and the Sum Value. On the other hand, M_m means the four level of Maslow's Hierarchy of Needs Theory (safety needs, love needs, esteem needs and self-actualization needs) and LC means the direction of the story (learning or cooperation).

The step1 of Figure 4.12 is classifying the SMEs into which needs of Maslow's Hierarchy of Needs Theory. When we fill the context table C_{ij} in the SMEs Information Module, we let user to decide the value in each attribute, including the opposite position with other competitors, the satisfaction of the demand for the innovation and the operating conditions which we use to be the

Sum Value for the classification purpose. And then, we use the Sum Value (including three attributes, A_3 (The opposite position with other competitors), A_4 (The satisfaction of the demand for the innovation) and A_5 (The operating conditions) given that only these three attributes are assessed by the numerical scores. Moreover the highest score of each attribute is 5 and the lowest score of each attribute is 1) to decide which Needs of Maslow's Hierarchy the SMEs belong to (by using isometric Sum Value to achieve the classification purpose). Meanwhile, the top of Sum Value is 15 (when getting the full marks in each attribute) and the lowest score is 3 (when getting one point in each attribute).

In other words, we let SMEs choose indirectly which Needs of Maslow's Hierarchy they belong to, instead of using financial indicators to determine. Because the purpose of our story is to achieve each SMEs' maximum satisfaction, we don't rank our target SMEs. Instead, we let SMEs to survey the self-satisfaction by them. If they already feel satisfied on themselves, they will give them high score in each attribute we mentioned above, and will be assigned to the high level in the Maslow's Theory.

Finally, the step2 is to decide their willingness of cooperation.

SMEs Classification Module

The input:

A_a = Attribute.

(a = the number of the attribute)

A_8 = The willingness to cooperate.

Sum value = Sum the V_a of assessment part attribute, deducting the A_9.

M_m = the level of Maslow's Hierarchy of Needs Theory.

(m = the number of the needs)

(m=1 means Safety needs; m=4 means Self-actualization needs)

LC = The direction of the story (learning or cooperation).

Step1 : choose the SMEs belong to which needs of Maslow's Hierarchy of Needs Theory.

IF Sum Value >= 13

THEN $M_m = M_4$ (M4 means the user's level is Self-actualization need)

IF Sum Value 13 > V_v >= 10

THEN $M_m = M_3$(M3 means the user's level is Esteem need)

IF Sum Value 10 > Vv >= 7

THEN $M_m = M_2$(M2 means the user's level is Love need)

ELSE $M_m = M_1$(M1 means the user's level is Safety need)

END.

Step2 : Check the A_9.

IF $A_9 \in$ I & II THEN Return LC = learning.

IF $A_9 \in$ III THEN Return LC = random LC

ELSE Return LC = cooperation END.

Figure 4.12 The pseudo code of SMEs Classification Module

In this research, for simplicity we use the equidistant way to determine which Maslow level a user is belonging to (as Figure 4.12). The reason why we use equidistance of Sum Value is that we don't mark each user as good or bad, and we just relatively classify our users to give appropriate excitation. That is, we adopt the simple and rough classification rather than the accurate one.

4.4.2 Story Framework Identification Module

Story Framework Identification Module is composed by a series of FSM's

states. Based on the Maslow's Hierarchy of Needs Theory, there are four types of story framework for their different needs. On the other hand, beside the Maslow's Hierarchy of Needs Theory, in this part we also use the dramatic element of Dramatica (Phillips & Huntley, 2001) and the ten types of innovation (SIT) (Keeley, 1999).

According to Dramatica (Phillips & Huntley, 2001), the authors delimit four classes (including Universe, Physics, Psychology and Mind) to classify the problems of the Story Mind which is one of the unique concepts in Dramatica theory and predicate that every complete story is a model of the mind's problem solving process (Phillips & Huntley, 2001). In order to increase the precision, each class could be subdivided into four types (Figure 4.13). The authors of Dramatica had more description about the subdivided of each type, however, instead of the script we want to represent advertising-like story. The subdivided of each type is focusing on how the characters are represented in the different ways with which the Story Mind can solve the story's problem. That is the reason why we don't investigate more particulars about the 64 variations and 64 elements of the 16 types.

For the purpose of satisfying the fluency of the story, we don't demand all the 16 types. Instead of using all the 16 types, we only choose the 10 types among the 16 types (including Future, Progress, Present, Understanding, Obtaining, Doing, Learning, Being, Becoming and Conscious) to decorate our advertising-like story and each type is the one state in the FSM. The reason why we choose those elements is that we use existing advertisements to examine the 16 types of Dramatica, and find the least number of elements (because of the requirement of the advertising-like story is often concise) used to tell a complete encouraging story. In simply, we use the selected types of Dramatica to constitute a story structure that

each type will express a state of probabilistic extended FSM. Follow the type of each state which could generate the story paragraph and based on the mechanism of probabilistic extended FSM to choose next state and generate the next story paragraph (Figure 4.14). Figure 4.17 to Figure 4.20 are the realistic circumstances of using the aforementioned Dramatica story elements (combining with other elements to be introduced later).

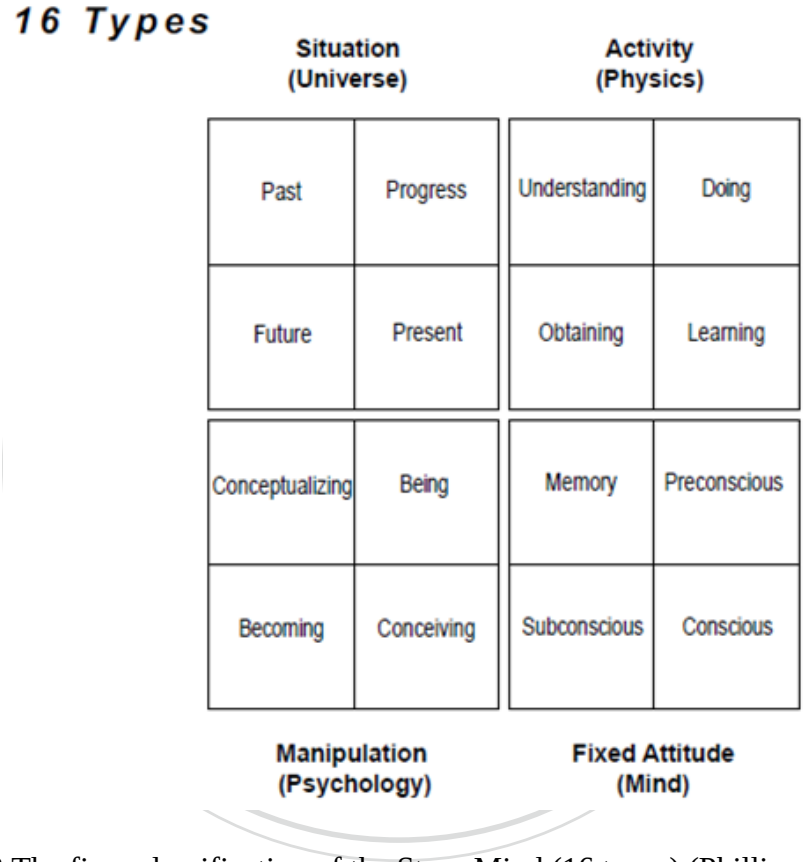

Figure 4.13 The finer classification of the Story Mind (16 types) (Phillips & Huntley, 2001)

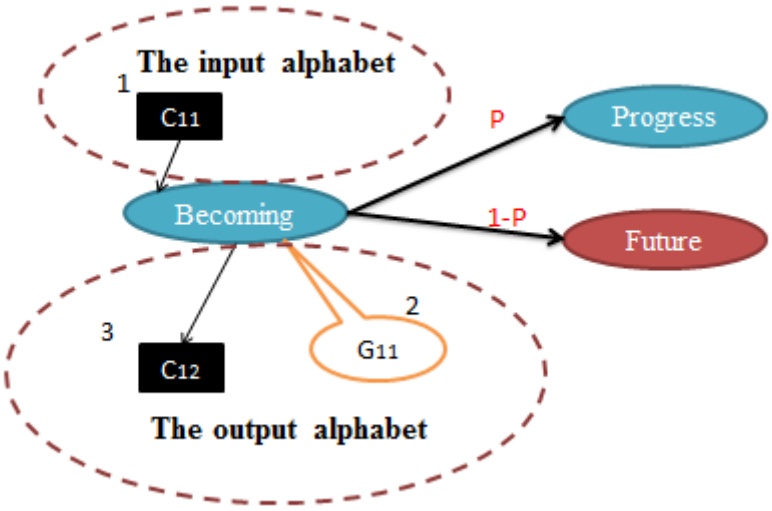

Figure 4.14 The example of using the 16 type of Dramatica

Owing to the special requirement of our advertising-like story, we need to add other material into the story. Because the purpose of our advertising-like story is to stimulate our target SMEs to do service innovation, it must have some material concerning the service innovation. We choose SIT (Larry Keeley, 1999), the ten type of innovation, as our additional story material. SIT include two "inside-out" categories (Process and Offering) and two "outside-in" categories (Delivery and Finance) (Figure 4.15).

For the same reason, our purpose is to generate a simple advertising-like story; so we use the major categories instead of the detailed breakdown of each category. In other words, Process, Offering, Delivery and Finance are another part of the states of FSM.

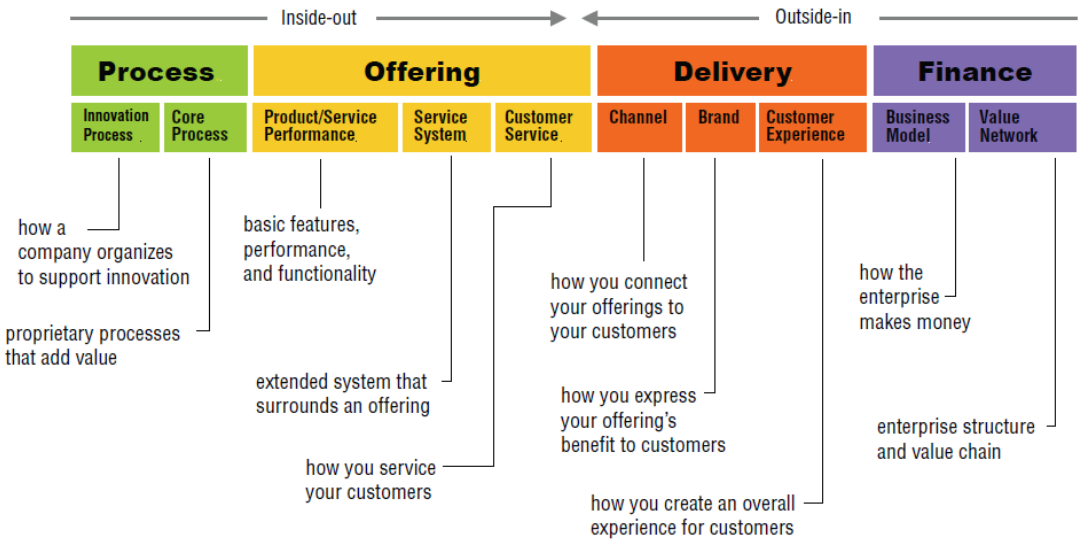

Figure 4.15 The ten types of innovation (SIT) (Larry Keeley, 1999)

After introduce all the story material (Dramatica and SIT), now is presenting how to assemble them. For the moving purpose, we choose the Three-act Structure which is a story model used in writing and divides a screenplay into a three parts called the Exposition, the Conflict（Complication）and the Resolution (Syd Field, 1979) to get the pick of the story. The objective of Exposition in the Three-act Structure is about the protagonist's status and difficulties encountered. The second screen is Conflict, according to the protagonist facing more and more difficult obstacles encountered and the dramatic also rising and getting the pick of the story. The final screen is Resolution, concerning how the protagonist finds the solution and gets some change.

According to the Three-act Structure, we set up our states of FSM following the structure. Figure 4.16 is the plot of our advertising-like story juxtaposing with the Three-act Structure. In the Exposition screen we elaborate the protagonist's current situation, and describe how the protagonist's attempt fails, and finally find the sticking point from the wrong to the right method in the Conflict screen. Finally, the protagonist finds the correct answers and gets the story's conclusion in the

Resolution screen.

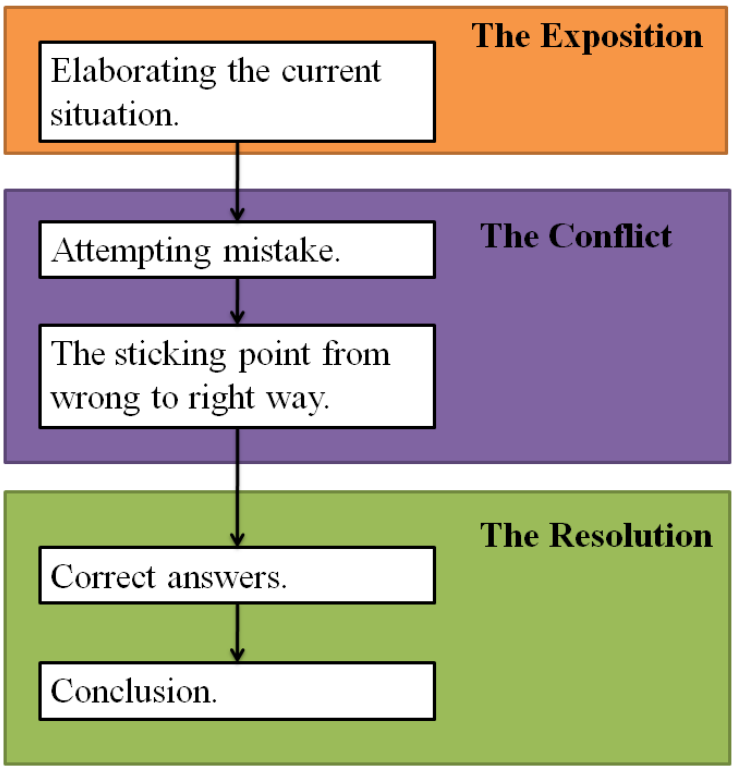

Figure 4.16 The plot of advertising-like story juxtaposing with the Three-act Structure

Finally, we realistically demonstrate the PEFSM combining the material of story including Dramatica with SIT and the Three-act Structure. Figure 4.17 to Figure 4.20 sequentially demonstrate the story framework of Safety needs, Love needs, Esteem needs and Self-actualization needs' PEFSM.

After implementing the SMEs Classification Module, the mechanism will decide that our target SMEs belong to which PEFSM (this is what we called story framework, have states only). According to Figure 4.11, each story framework has four story content (that's about different content for different job occupation) and each story content has two story plots (that's about which the story direction, a model to learn is or a cooperation of the story). In other words, each story

framework can generate eight kinds of different stories, and totally our story automatically generator can generate thirty-two kinds of different stories.

Figure 4.17 is the story framework for the SMEs who belong to the Safety Needs of Maslow's Need-Hierarchy Theory. The rough story circumstances as the following five paragraphs: First, describe the plight of the protagonist, who is situated in Safety Needs state, and then depict the protagonist's conscious about how the attempting mistake is. Fallowing, the SIT states represent the turning point which the protagonist figures out the right idea to succeed. The Present state describes the detail about how the protagonist fulfills the idea, and then the Being state shows protagonist's perfect prospect.

The reason why we choose the Conscious, Present and Being as the Safety Needs' arteries and veins of the story framework is that the beginning state we need to describe the protagonist's feeling of attempting mistake, and the appropriate elements of the 16 types in Dramatica are the Understanding, Obtaining and Conscious. In addition, only the Conscious is classified to the "fixed attitude" among the choices of the 16 types in Dramatica (Figure 4.13), the others seem more positive (because of being classified to the activity part in Figure 4.13). In other words, we consider that the more conservative approach is more suitable for the Safety Need.

Furthermore, the Present state wants to express the situation after get a sticking point (the SIT states), and the Being state shows how the protagonist manipulates his business in the future.

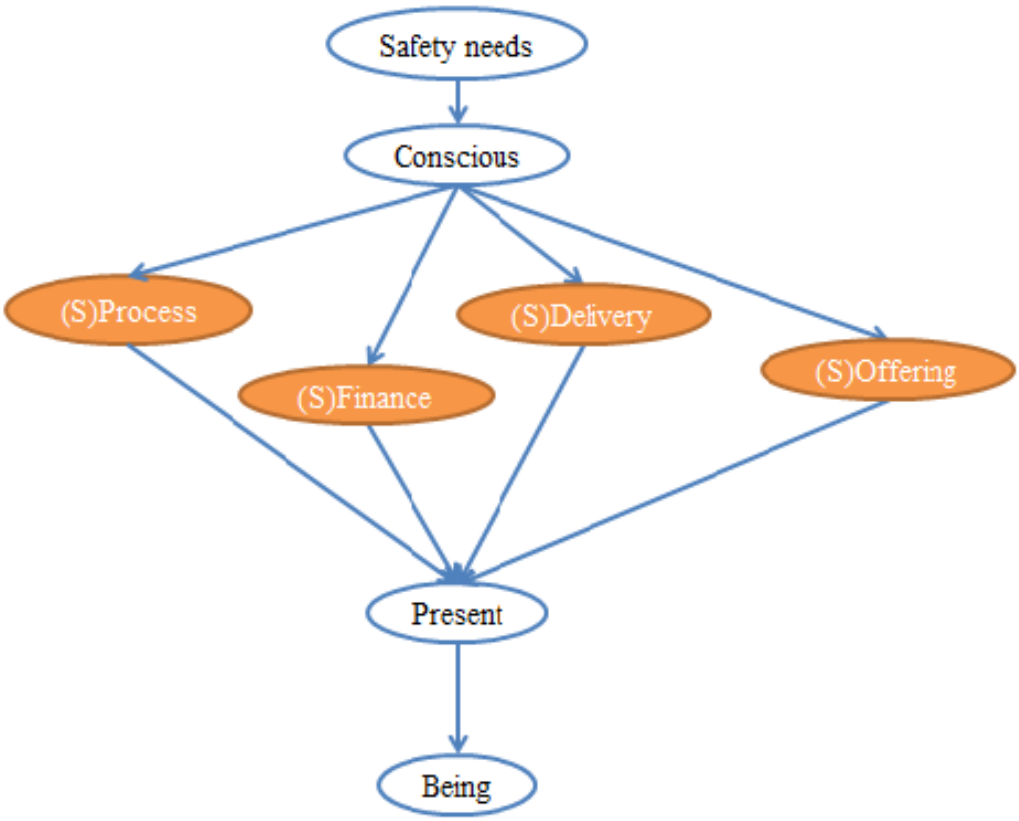

Figure 4.17 The story framework of Safety needs' PEFSM

Figure 4.18 is the story framework for the SMEs who belong to the Love Needs of Maslow's Need-Hierarchy Theory. Similarly, there are five paragraphs: First, the story situation depicts the protagonist who belongs to Love Needs, and then describe what resources the protagonist receives and attempts to use these resources in the Obtaining state. The reason why we choose the element "Obtaining" as the one part of the states is that we consider that the person who belongs to the Love Needs requires the People of the community's supporting. Because of the supporting from other people, the protagonist could have more positive attitude than the SMEs who belong to the Safety Needs (for the reason of Understanding state which is classified as the activity part in 16 types of Dramatica (Figure 4.13)). So, after the turning point (the SIT state), the protagonist who belongs to the Love Needs could actively understand the correct approach and learn something from

others in the final Learning state.

In addition, the Obtaining, Understanding and Learning all are classified to the activity part in Figure 4.13. Actually, only one of the 10 types which we choose among the 16 types is classified to the “fixed attitude” (is less active then the other three parts (activity, manipulation, situation)) in Figure 4.13.Because we consider that the positive attitude has more incentive as we mention before, we use more positive element to build the story instead of the less active elements.

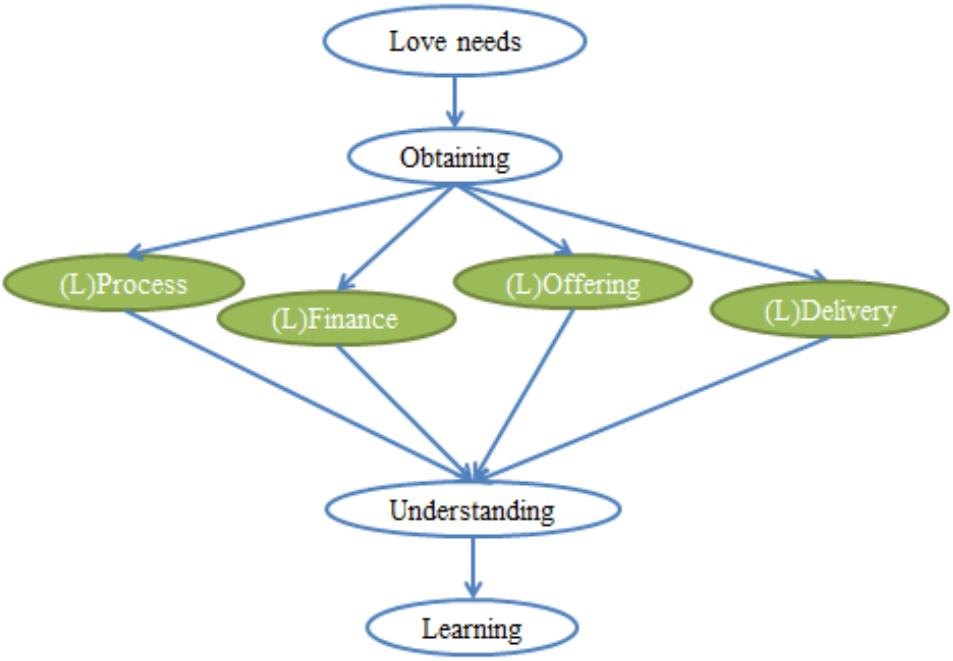

Figure 4.18 The story framework of Love needs’ PEFSM

Figure 4.19 is the story framework for the SMEs who belong to the Esteem Needs of Maslow’s Need-Hierarchy Theory. There are also five paragraphs: depicting the situation about the protagonist who is positioned the Esteem Needs first, and then picture how they attempt the mistake from their newly understanding. Similarly, after the sticking point (the SIT state) has trigged, the protagonist will do something correctly. Finally, the protagonist will make some changes and turn into the ideal model in the Becoming state.

Here, we can clearly find that the story framework of the Esteem Needs have more positive types of Dramatica than the Safety Needs, because we believe that the person who belong to Esteem Needs are more active than the Safety Needs. In addition, we use the Becoming which belongs to the manipulation category as the final state as does by the Safety Needs which also use Being that belongs to the manipulation category as the final state. Beside the Love Needs which want to show more about the relationships, the Esteem Needs and Safety Needs which use the manipulation as the final (the category of Figure 4.13) want to emphasize the practicing part. Comparing with the story framework of Self-Actualization Needs shows later, we have more confidence with the people belong to Self-Actualization Needs in the fulfilling part relatively.

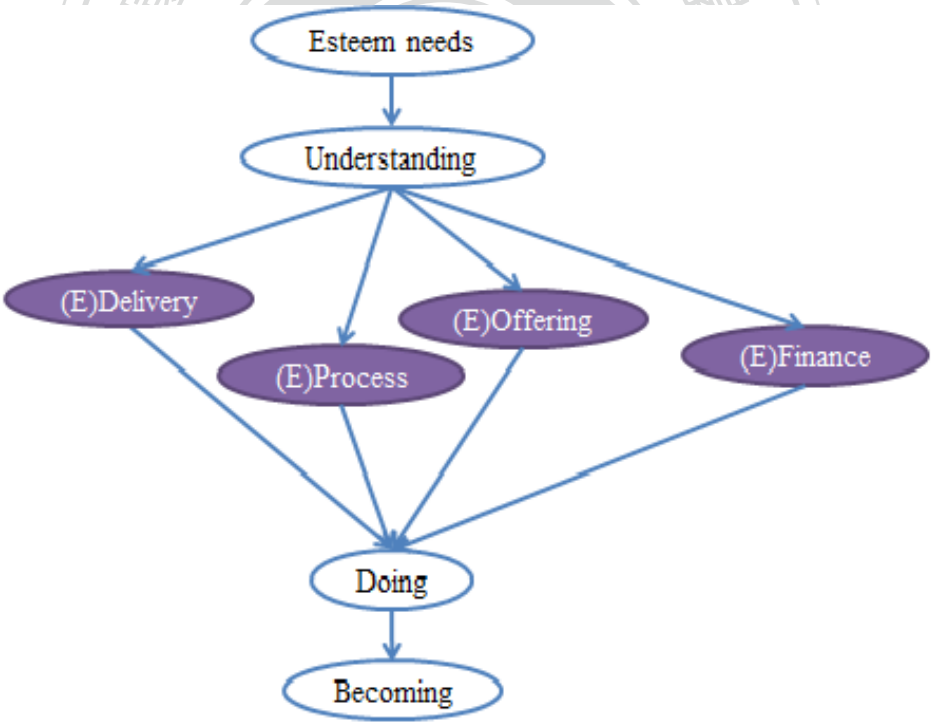

Figure 4.19 The story framework of Esteem needs' PEFSM

Figure 4.20 is the story framework for the SMEs who belong to the Self-Actualization Needs of Maslow's Need-Hierarchy Theory. Similarly, there are

five paragraphs: At the beginning, we use the element which is positioned in the active category of the Dramatica's 16 types, Doing state, to represent the protagonist who belong to the Self-Actualization Needs wants to improve their business very vigorous. Although the protagonist does some effort very hard, the degree of improvement is ineffective. After the SIT state's favorable turn, the protagonist implements the strategy in the correct way in the Becoming state and shows the perfect blueprint in the future.

And then, there are two choices (in here, we use the probabilistic FSM's mechanism to make the different choices). The first way is executing the Progress state first, and then to the final state: Future state. The other way is executing the Future state directly. The first way is executing Progress state which could describe more details about how to implement this perfect blueprint provided in the Becoming state, and then connecting to the Future state to elaborate what vision would bring to this change. The other way is elaborating the vision directly. The purpose of these two options is that the user of the Self-Actualization Needs seems needs more diverse advertising-like story and more describing on the glorious future for persuading. Instead of damaging the architecture of three act structure, both ways increase the interesting and diversity by weaving the glorious future in the conclusion.

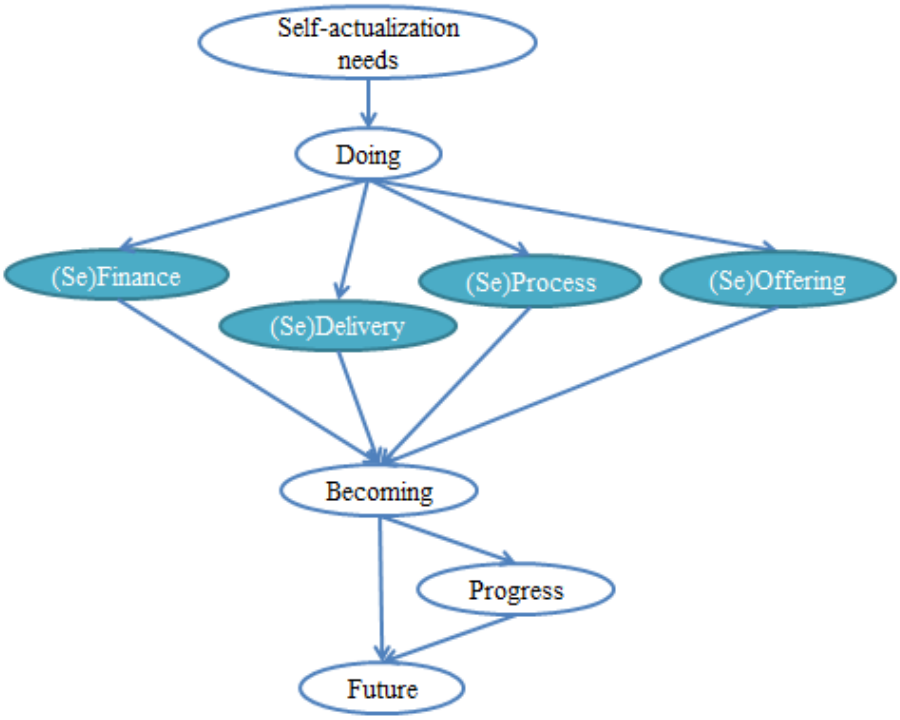

Figure 4.20 The story framework of Self-actualization needs' PEFSM

Combining with the concept of PEFSM we mentioned above, Story Framework Identification Module will generate incomplete story paragraph. Figure 4.21 is an example of Story Framework Identification Module, which belongs to safety needs story framework and learning story plot. Figure 4.20 can learn clearly about the incomplete story paragraph. The vacancy E_1, E_2, E_3, E_4 and A are the uncertain part of the story paragraph, that's the reasons why we need Story Element Suggestion Module to fill this vacancy.

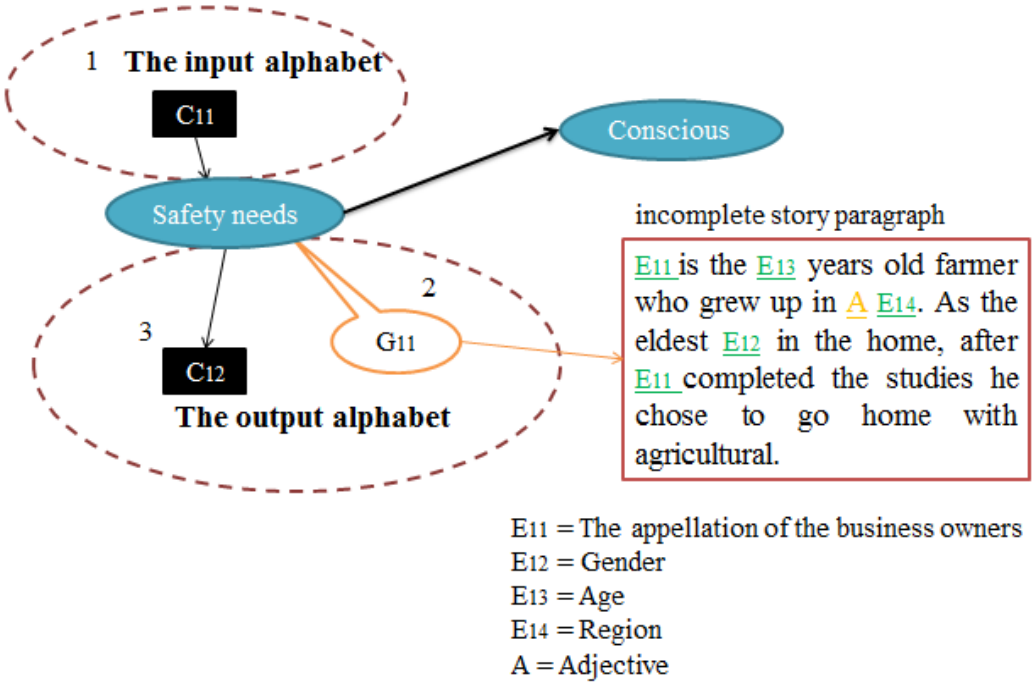

Figure 4.21 The example of Story Framework Identification Module

It is noteworthy that Story Framework Identification Module assigns the appropriate story framework by the information output of SMEs Classification Module. However, for the integral system process (ImageCons), before user fills in their personal information, Story Framework Identification Module assigns the story framework randomly for promotion. The using occasion of the mechanism will be described in Section 4.4.3.

4.4.3 Story Element Suggestion Module

The function of Story Element Suggestion Module is to arrange suitable story elements to the story framework and make out advertising-like story more vivid and inspirer, formed by the three parts, including the SMEs personal element, the System random element and the Adjective database. The main purpose of Story Element Suggestion Module is to find out each user's appropriate element table in the database. The SMEs personal element database which is generated by SMEs

Information Module and gathers the user's information as mentioned in the Section 4.3.

The purpose of System random element database is to generate the story element of protagonist which is similar with the purpose of SMEs personal element database as mentioned in Section 4.3. The different point of these two databases is that the element of SMEs personal element database is generated by user, but the System random element database is not. The reason why we construct the two kinds of database is the different timing for the integral system (ImageCons). Before we demonstrate the System random element database, we present the two timing for the integral system first.

Because the motivation advertising generator plays two roles in ImageCons; (the promotion instrument and the motivation tool), SMEs personal element database and System random element database need to be interchangeably adopted based on the different cases. When a new user who begins to use ImageCons or only hears about the ImageCons, the motivation advertising generator plays as a promotion instrument; depicting a vision to the new arriving person. At this moment, user usually observes the new system and don't fill in their information; therefore, that's the reason why we need System random element database to generate a "virtual protagonist" and coordinate with the randomly story framework which is generated by Story Framework Identification Module.

On the other hand, after user is familiar with the function of ImageCons, they will fill in their information and register the web. We will then have user personal data and could use this data to generate the personal like story. However, because the imagery creative process is lengthy, it needs a function which plays a role of an instruction manual which lets user to check anytime in order to avoid missing the orientation of the system, this is, the motivation tool part of the motivation

advertising generator.

Figure 4.22 is the coding of the System random element database. U'_i means the virtual protagonist in our system and E'_{ie} means each virtual protagonist's story element. In addition, V'_e means the value of the element. Basically, the structure of System random element database is similar with SMEs personal element database.

U'_i = The virtual protagonist in our system.
(i = each virtual protagonist)
E'_{ie} = Each virtual protagonist's story element.
(i = each virtual protagonist, e = the number of the element)
V'_e = The value of the element.
(e = the number of each element)

Figure 4.22 The coding of the System random element database

Table 4.4 The example of the System random element database

U'_1	V'_e
E'_{11}(The appellation of the business owners)	Mary
E'_{12}(Gender)	Male
E'_{13}(Age)	28
E'_{14}(Region)	Hualien

Table 4.4 is the example of System random element database which contains the background of virtual protagonist. The virtual protagonists emerge randomly by the system.

The other part of Story Element Suggestion Module is the Adjective database, which contain adjectives describing the people, environment and affair. It can be subdivided in the describing of the people, including characterize SMEs and delineate customers. The purpose of the Adjective database is to add emotional side

to the story, consisting of where the SMEs' local culture and the inspiration part to depict the feel of the customer after the SMEs innovate successfully.

Figure 4.23 is the coding of the Adjective database, including ADJ_c, ADJ_{sme} and ADJ_{af} the three kinds of adjective. Table 4.5 is the example of the Adjective database.

ADJ = Adjective.
ADJ_c = The adjective which describes the customer.
(c = the number of the customer's adjective)
ADJ_{sme} = The adjective which describes the SMEs.
(sme = the number of the SME's adjective)
ADJ_{af} = The adjective which describes the environment and affair.
(af = the number of the environment and affair's adjective)

Figure 4.23 The coding of the Adjective database

Table 4.5 The example of the Adjective database

ADJ		
ADJ_c	ADJ_{sme}	ADJ_{af}
Satisfied	Traditional	Touching
Happy	Stable	obvious
	Positive	profound

On the other hands, Figure 4.24 is the pseudo code of Story Element Suggestion Module, demonstrating the finally output about the Story Element Suggestion Module.

Story Element Suggestion Module

The input:

U_i = The user in our system.

(i = each user)

E_{ie} = Each user's story element.

(i = each user, e = the number of the element)

Step1 : Find U_i's the E_{ie} in **SMEs personal element database**.

IF there are no U_i

Then Return the table E'_{ie}

IF the i in U_i = the i in E_{ie},

THEN Return the table E_{ie}.

Step2 : Return the appropriate table E_{ie} or E'_{ie}.

Figure 4.24 The pseudo code of Story Element Suggestion Module

4.4.4 Matching Module

Matching Module is the mechanism between Story Framework Identification Module and Story Element Suggestion Module. The major function of Matching Module is coordinating the incomplete story framework and the appropriate story element, which come from the SMEs personal element, the Adjective and the System random element.

After implementing the mechanism of each state (comparing the trigger conditions and the context table), the paragraph of incomplete story framework is generated. The purpose of Matching Module is finding the appropriate story element from the Story Element Suggestion Module. Figure 4.25 is the pseudo code of Matching Module. First, Matching Module finds the suitable table E_{ie} with each user, and inspects each paragraph of incomplete story framework. If there are E_{ie} (Each user's story element) in G_{ig} (The paragraph of the story), then filling the V_e (The value of the element) in G_{ig}. With the same point of view, Matching Module

maps the whole incomplete story paragraph step by step.

Matching Module

Beforehand :

E_{ie} = Each user's story element.

(i = each user, e = the number of the element)

V_e = The value of the element.

(e = the number of each element)

Gig = The paragraph of the story.

(i = each user, g = each paragraph of the story.)

IF the G_{ig} is generated

Step1 : Check the table E_{ie} or E'_{ie} in **Story Element Suggestion Module**.

Check the E_{ie} in $G_{ig.}$

IF there is E_{ie} in G_{ig},

THEN Return the V_e.

ELSE Break.

Step2 : Check the table ADJ in **Adjective database.**

Check the ADJ_c, ADJ_{sme}, and ADJ_{af} in Gig.

IF there is ADJ_c in G_{ig},

THEN Return ADJ_c = random ADJ_c .

IF there is ADJ_{sme} in G_{ig},

THEN Return ADJ_{sme} = random ADJ_{sme} .

IF there is ADJ_{af} in G_{ig},

THEN Return ADJ_{af} = random ADJ_{af} .

ELSE Break.

Step3 : Return G_{ig}.

Figure 4.25 The pseudo code of Matching Module

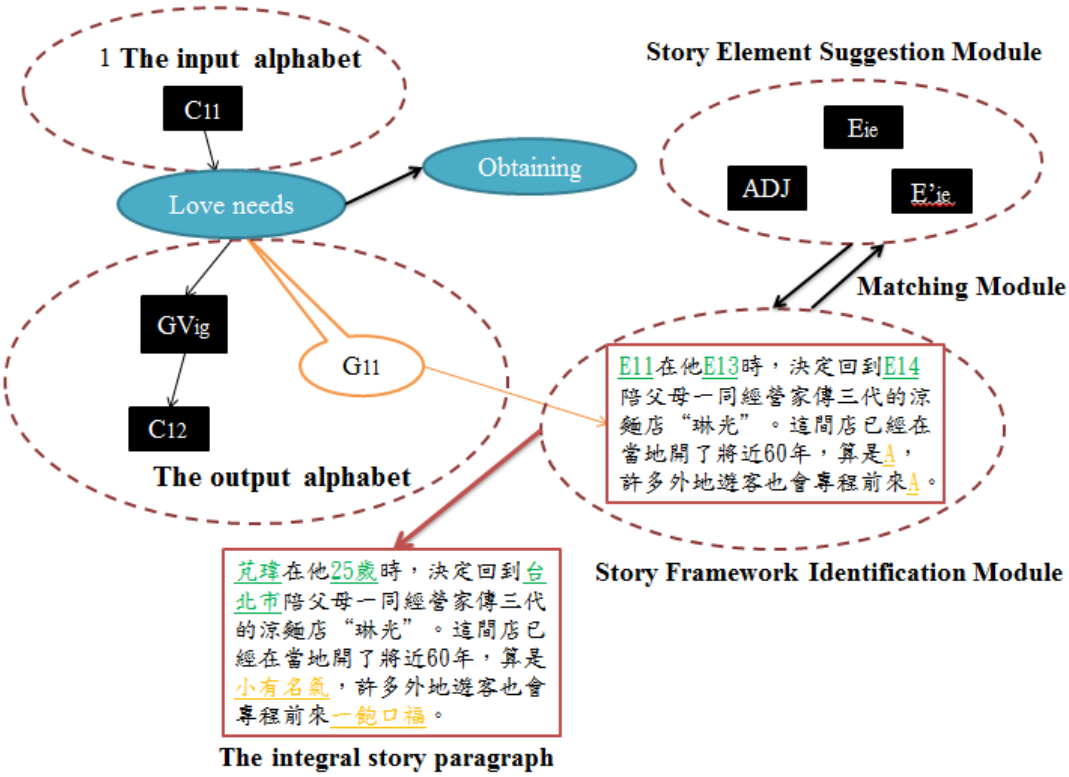

Figure 4.26 The corrected example

Coordinating the example of SMEs personal element (Table 4.2), the System random element database (Table 4.4) and the Adjective database (Table 4.5), there is a corrected story paragraph (G_{11}) example in Figure 4.26. In addition, Figure 4.26 is also an output example before one state move to next state.

First, if the context table (C_{11}) conforms to the state's (the love needs state) triggering condition, and then will output the incomplete story paragraph (G_{11}) (generated by Story Framework Identification Module). This incomplete story paragraph assembles the appropriate story element which is generated by the Story Element Suggestion Module through Matching Module, and engenders the integral paragraph of whole the advertising-like story. Finally, the integral paragraph will generate the GV_{ig} (the addition value) and rewrite the context table as the C_{12}.

For the Love needs state, the input alphabet is the C_{11}, and the output alphabet are the G_{11} and C_{12}. The context table C_{12} will be the input alphabet of the

Obtaining state, and the same mechanism will be iterating.

In this chapter, we illustrated the six modules including SMEs Information Module, Probabilistic Extended FSM Module, SMEs Classification Module, Story Framework Identification Module, Story Element Suggestion Module and Matching Module to achieve our ultimate goal; generating the stimulating mini customized advertising-like story to encourage SMEs to put service innovation practice in their business.

It's worth noting that the classification of users classified by the SMEs Classification Module is not for marking the users as good or bad. For example, a user who is classified into the love need level doesn't express he/she is poor than a user classified into the self-actualization need. The reason why we want to classify these users is to recommend an appropriate story framework (composed by the Story Framework Identification Module) to each user. This is analogous to situation that the advertising usually defines their target customers in marketing. That is, each level of Maslow's need hierarchy is assumed to be motivated by some specific story content, and the purpose of the classification is to give each level of users some favorable excitation after our customized story for each user is generated by the elements propose by the Story Element Suggestion Module.

In next chapter, we will descript the application context and provide a system journey of the application for a demonstration.

CHAPTER 5 APPLICATION SCENARIO

Guiding an explicit direction of service innovation to our target SMEs and stimulating them to achieve it are our ultimate goal encouraging them to put service innovation into practice. In the previous chapters, we have presented the whole system architecture idea about the mechanism of the customized advertising-like mini story generator and the content of the story. This chapter attempts to demonstrate the application context and the service journey of the application in order to embody the proposed mechanism in a concrete example. It's worth noting that this chapter also serves as one of evaluation approach as specified in IS research framework in Figure 1.1.

5.1 An overview of application context

The main focus of this study is to stimulate SMEs to do service innovation which takes advantage of ImageCons to create their own imagery for packaging their business, providing inspiration and attracting travelers. Before creating the corresponding imagery for each SME, they need to provide much personal information to system for thorough analysis of their cultural background, personality and daily life activities. Based on these inputs, ImageCons will calculate and provide the appropriate unparalleled imagery for each of them. Finally, utilizing the above input information and the imagery, the system will provide a prototype to instruct user about how to put this idea into practice. Put another way, in addition to providing the imagery to each user, the system will depict the actual possible practice to help them construct their business to express the imagery.

However, filling in personal information is a tedious matter and easy to give up in halfway when user can’t comprehend the effectiveness of the system. On the other

hand, although ImageCons demonstrates the innovative idea which uses imagery to package their business and attract travelers, there is a need for an external promotion window to popularize this idea. Therefore, the aim of this study is to provide an explicit and understandable story which lets user to understand their standpoint of using ImageCons and offer them an intention to accomplish the system journey.

In order to achieve the above function in the forms of a guideline and an advertisement, this study attempts to figure out a systematic way to automatically generate the customized story to stimulate SMEs. Each user could find a personal like protagonist who makes some changes which got this inspiration from ImageCons and receive the positive reciprocation. This system serves as a bridge to connect the idea of ImageCons to the SMEs and furnish intention to them.

5.2 The system journey of the application

In this section, we will demonstrate the integral service journey of the ImageCons and then focus on the motive driven story generation.

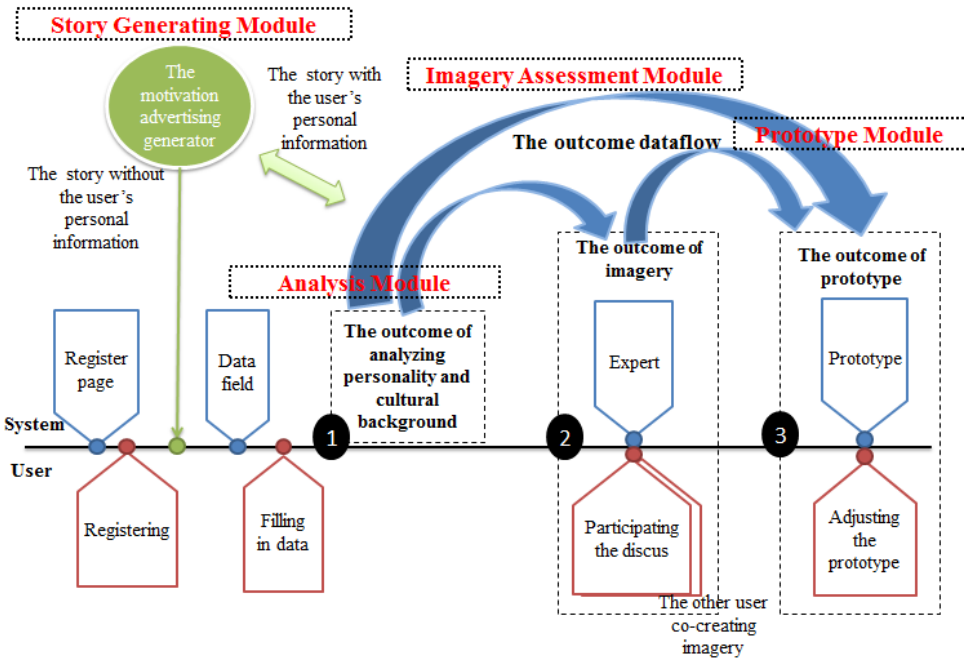

Figure 5.1 The system journey of the user

Figure 5.1 demonstrates the system journey of the ImageCons. The user will start from registering in the ImageCons platform and fill out a form specifying some fundamental information (i.e., company name, address, e-mail, etc.). Next, the system will ask user to fill in their background information and personality data collected by series of aptitude questions. Based on their basic information and the response of the aptitude question, the system will analyze which personality traits suit for the user. After let user understand their personality traits and some tips of these personality traits, it will move to the stage 2. The stage 2 is the platform which provides the expert to co-create the imagery with the user (user A) and the other user (maybe user B, C, or many more). It is a brainstorming idea about the stage 2. In addition to the interpreter experts connected by the system, this part also encourages user to co-create the imagery for the other user. These different perspectives could help SMEs to build imagery integrally. Finally, the aim of last stage in ImageCons is to demonstrate the prototype which guide user to put imagery into practice and user can do minute adjustment about the prototype. After the above journey, user will comprehend their personality traits, imagery of their business and the prototype, and can put this innovation into their business to create the different future.

On the other hand, the motivation advertising generator plays a unique role in ImageCons: being the promotion instrument and the motivation tool. As shown in Figure 5.1, the system will show the story without the user's personal information before the user fills in their information. In this period, the role of the motivation advertising generator is the promotion instrument, aiming to popularize the idea of ImageCons. After user fills in the form, the system will show the story with the user's personal information and play a role of motivation tool. The motivation advertising generator is like an instruction manual which lets user to check anytime in order to

avoid missing the orientation of the system. The system journey of the motivation advertising generator showed as Figure 5.2.

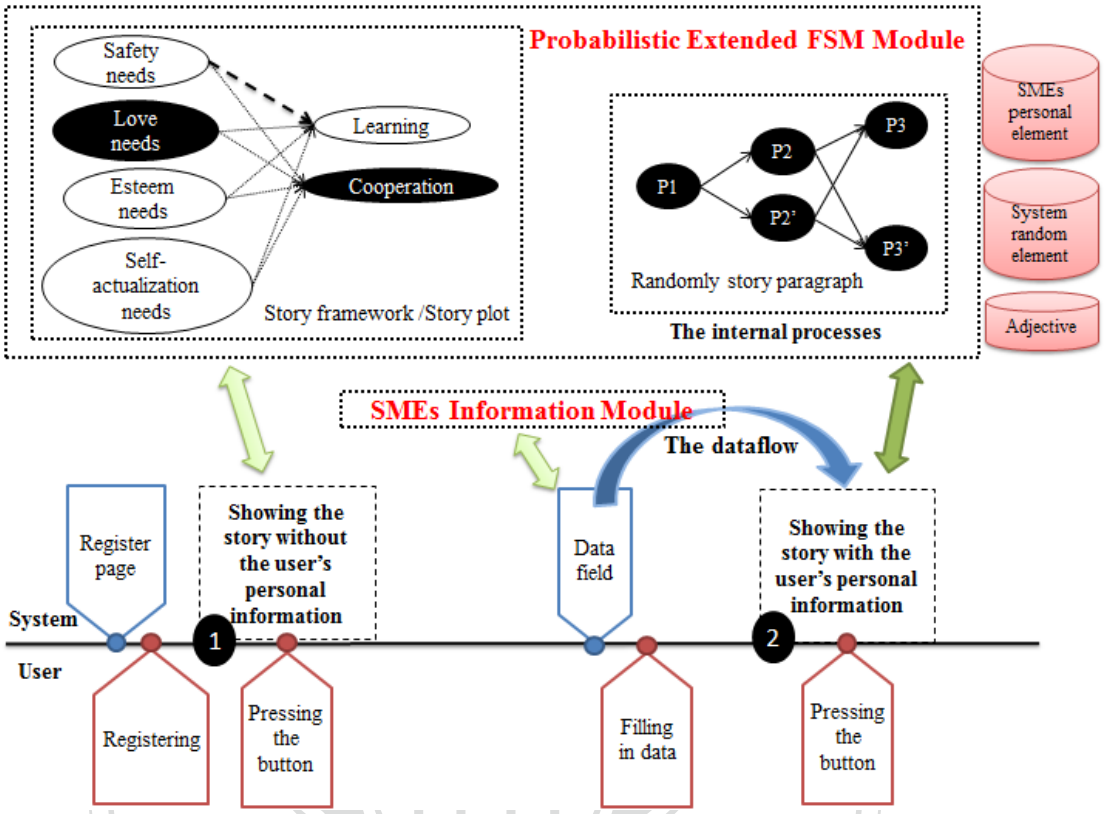

Figure 5.2 The motivation advertising generator journey and internal process

There are two stages of the motivation advertising generator journey: with and without the user's personal information. Except the distinctive story elements; the previous one uses the system random data and the latter one uses user information as the story element, the choice of story framework and story plot are also different in the latter one. Before the user filling in their information, the system couldn't determine which story framework and story plot is corresponding to the user. For the reason that in the stage 1 the story framework and story plot will randomly show the element of the story generated by the system (Figure 5.3).

Figure 5.3 The stage 1 story without the user's personal information

On the other hand, in the stage 2 the user already filling in their information in questionnaire input (Figure 5.4), the system will select a suitable one for each user (as Figure 5.2 shows that the suitable story framework and story plot is "Love need/ Cooperation") and the story content showed in Figure 5.5.

Figure 5.4 Questionnaire inputs

As we mentioned in the previous chapter, SMEs Information Module showed the

questionnaire page for the purpose to gather the user personal information. And then, based on the user input (shown in Figure 5.4); the sum value (the values of the opposite position with other competitors, the satisfaction of the demand for the innovation and the operating conditions) which user selected is 8; SMEs Classification Module would select suitable story framework and story plot to the user. From the mechanism shown in the Figure 4.12 (the pseudo code of SMEs Classification Module), we can understand that if sum value equal 8 then the story framework is Love need. On the other hand, the value of the willingness to cooperate is 3 (Figure 5.4). Based on the mechanism shown in the Figure 4.12, the story plot will be showed randomly (Learning/Cooperation).

Figure 5.5 The stage 2 story with the user's personal information

The above is the system process which the user contacts with and the internal process coordinate with different modules. And then Figure 5.6 indicate the practical operation circumstances of PEFSM which show how it generate the first paragraph. (Appendix 3 show the integral story templates of this example.)

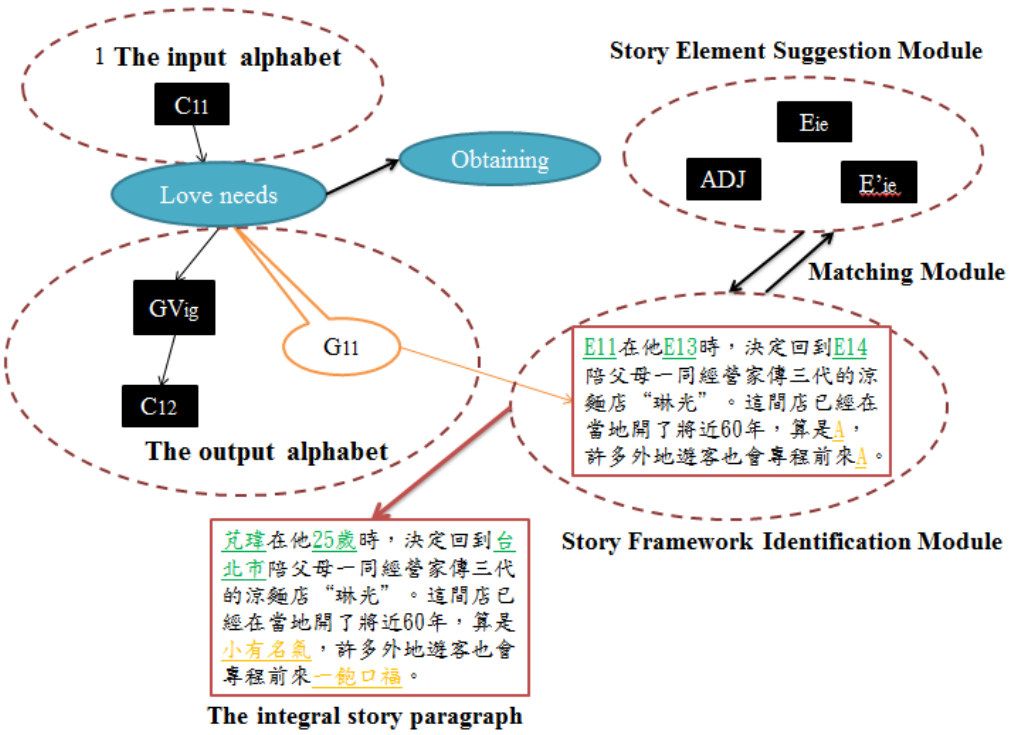

Figure 5.6 The practical operation circumstances of PEFSM

It's worth noting that after user fills in the questionnaire input (Figure 5.4), the information will be transformed into context table and SMEs personal element as the Table 5.1 and Table 5.2 which we mention in Chapter 4.

Table 5.1 The context table

C_{11}	V_a
A_1(The appellation of the business owners)	芃瑋
A_2(Gender)	女
A_3(The opposite position with other competitors)	2
A_4(The satisfaction of the demand for the innovation)	3
A_5(The operating conditions)	3
A_6(Age)	25
A7(Region)	台北市

A_8(The willingness to cooperate)	III
A9(The condition)	0
A_{10}(The user behavior)	Y

Table 5.2 The SMEs personal element

U_1	**V_e**
E_{11}(The appellation of the business owners)	芃瑋
E12(Gender)	女
E13(Age)	25
E_{14}(Region)	台北市

After the user presses the button “next page”, this user behavior conform the trigger condition, the system will choose the conformable story framework (based on the information analyzed by SMEs Information Module shown in Figure 5.2) and randomly demonstrate the first story paragraph which coordinates with Probabilistic Extended FSM Module (First, Story Framework Identification Module will choose the suitable incomplete story framework and story plot (Figure 5.7 showed the incomplete story framework and story plot with the encoding element) based on the data of SMEs Information Module, and then Story Element Suggestion Module will gather the user interrelated data and adjective (Figure 5.8 showed the table of user interrelated data and adjective) data. Finally, Matching Module will combine the story framework and story plot which are generated by Story Framework Identification Module with the story element chosen by Story Element Suggestion Module to come up with a complete paragraph of story (Figure 5.9)). The whole process is shown in Figure 5.6.

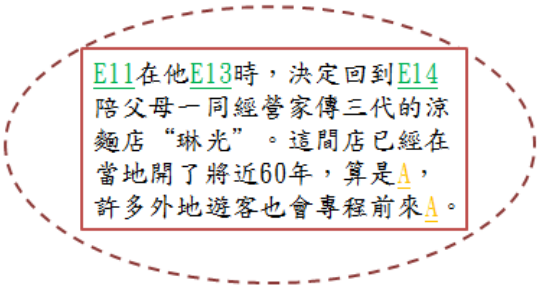

Figure 5.7 The incomplete story framework and story plot with the encoding element

Figure 5.7 is the incomplete story framework and story plot with the encoding element which also is shown in Figure 5.6. It's generated by Story Framework Identification Module which can select the suitable encoding story paragraph for user.

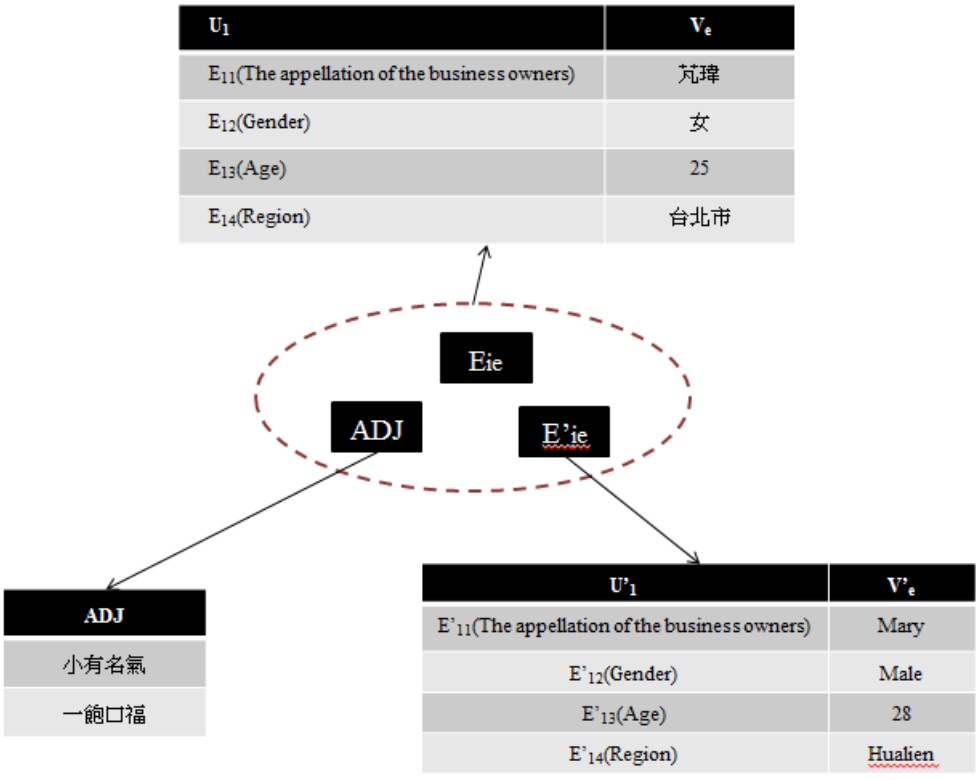

Figure 5.8 The table of user interrelated data and adjective

Figure 5.8 is the table of user interrelated data and adjectives which are generated by Story Element Suggestion Module.

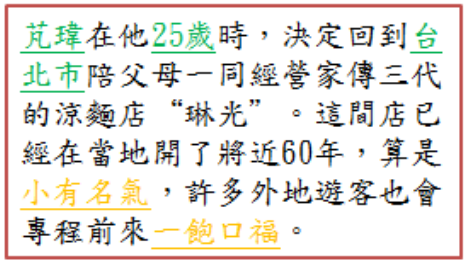

Figure 5.9 A complete paragraph of story

Figure 5.9 shows the ultimate complete paragraph of story which is generated by Matching Module. It integrates the incomplete story framework of Figure 5.7 and the user interrelated data and adjective of Figure 5.8 to create the complete story paragraph for user.

Besides, the context table will be rewritten (plus the adding value as shown in Table 5.3, the value of attribute A_9 from 0 to 1) and move to next stage. These kinds of mechanism will continuously move on until the user press the “I don’t to read anymore” button or the end stage of story.

Table 5.3 The modify context table

C_{11}	V_a
A_1(The appellation of the business owners)	芃瑋
A_2(Gender)	女
A_3(The opposite position with other competitors)	2
A_4(The satisfaction of the demand for the innovation)	3
A_5(The operating conditions)	3
A_6(Age)	25
A7(Region)	台北市
A_8(The willingness to cooperate)	III

A_9(The condition)	1
A_{10}(The user behavior)	Y

After the whole process which user experienced, system will show the integral story as shown in Figure 5.10. After reading this kind of story, user perceives that something is not the same anymore and has more confidence in his business. He/She has more interests about the ImageCons system and look forward to the novel and useful things which he didn't know.

Figure 5.10 The integral story

In this chapter, we have demonstrated the role of proposed mechanism in the motivation advertising generator platform. In the next chapter, the evaluation part of the proposed mechanism is provided.

CHPATER 6 EVALUATION

In Chapter 6 we provide a series of experiments utilized to inspect the mechanism proposed in Chapter 4 and to work in concert with the research objective and contributions which enumerated in Chapter 1. To reiterate once more, the purpose of this research was to develop a systematic approach that can automatically generate customized advertising story in order to inspire SMEs to fellow the steps of ImageCons system to help them to do service innovation as we mentioned in the previous chapters.

Research questions summary addressed in the study were:

(a) What mechanism can be designed to generate touching advertising like story automatically and recommend each unique user appropriate customized one?

(b) What kind of human-computer interactions behavior can be utilized to measure the utility of the advertising like story?

This chapter serves as the part of evaluation in research framework we mentioned in Figure 1.1 (Information System Research Framework (Hevner et al., 2004)) and presented in four sections. There are seven guidelines mentioned in the IS Research Framework, Design as an Artifact, Problem Relevance, Design Evaluation, Research Contributions, Research Rigor, Design as a Search Process and Communication of Research. The artifacts from well-designed evaluation then are able to contribute the theories refinement through the entire rigor process. The goals of this research aim to propose a value network design approach based on related theories and implement a service system for demonstrating the evolution in SME cluster. Therefore, IS research framework provides a foundation to test the artifact seriously from the implemented service system.

In the precious chapters, we defined the environment from the SME's point of view, and then combined the foundation theories and methodologies to design and build the system artifact to help the SMEs to get the turnaround from the current predicament. Mentioned in the IS research, the utility, quality, and efficacy of a design artifact must be manifested rigorously via well-completed evaluation methods. Evaluation is a pivotal constituent of the entire research process (Hevner et al., 2004). Following the guidelines of the IS research, we need to justify and evaluate our service system in the next step.

The following are the four sections: In the first section we depict some propositions which respond to the research questions proposed in the Chapter 1 and will be verified in this research. Next, the assumptions and details of experimental data and the related propositions will be provided in the second section. The third part capitalizes on the result of the experiments to optimize the parameters of the system mechanism and answer the research questions presented in the Chapter 1. In the final section, we will provide the summary of the experimental results and conclude with some discussion.

6.1 Propositions

This section we will be based on the IS research framework to design the evaluation methods. The scholar summarized five evaluation methods which use methodologies available in the knowledge base, and proposed that the postgraduate who need to evaluate the new artifact must select the appropriate evaluation methods which match with the designed artifact and the selected evaluation metrics (Hevner et al., 2004). The summarized five evaluation methods as fellow: Observational, Analytical, Experimental, Testing and Descriptive. Owing to two research questions, the accuracy of the recommended advertising mini story and the effectiveness of the

advertising from the entire system's point of view, we can start with two evaluation methods to take on the examination. First, based on the general recommender system we can use the traditional methods to test the accuracy of the recommender system, followed by observing the human-computer interactions to examine the effectiveness of the advertising. The above-mentioned directions include two evaluation methods concluded by Hevner (2004): Observational and Analytical. Based on the observation of field study we take some statistics to do analysis and support our thesis argument. The reason why we eliminate the other three methods is that it's not an important issue in this thesis about the Testing (the point here is the validity of the system, not the data flow (White Box) and the web security (Black Box)), Experimental (the major test object of the recommender system is people, so we can't simulate the reaction from people inspired by the advertising) and Descriptive (the statistics analysis and field study are more convincing than the scenarios way).

As noted in previous chapter, we want to construct a mechanism which can recommend appropriate advertising mini story to the opportune user, and stimulate user to coordinate the entire ImageCons system's procedure to help them to do service innovation pass through this step. Hence, we can simply put our advertising mini story automatic generator system into the recommender system. And then, according to the method which is taken to examine the effectiveness of the recommender system, we take the same way to test and verify the advertising mini story generation recommender system to ensure the story can be designate to the suitable person to achieve the incentive function.

Recommender systems are intelligent applications designed to identify the interesting products or services of each user and support them to make decision in the era of information explosion (Ricci & Werthner, 2006). There are two phases of constructing recommender system: user-model construction and recommendation

generation (Ricci & Werthner, 2006). The user-model construction part utilizes the collection of previous user-system interactions to construct the structured description of user's demand and preference, and then the recommendation generation part based on this structure model to make the recommendation (Ricci & Werthner, 2006).

Similarly, the original intention of advertising mini story generator system is to recommend distinctive story frame to each suitable user and customer-made in the detail of story for each user as mentioned before. Therefore we may be able to classify our system as one kind of recommender systems. Following the two phases of constructing recommender system, first we need to build a user-model structure to describe the need and preference of different types of user. Instead of using the collection data from the database as the traditional recommender system way, we use the Maslow's Hierarchy of Needs to model users. Because the "service" which we want to recommend is the incentives advertising story, we couldn't only base on the human-computer interaction to judge which story is suitable for them. In other words, we couldn't only observe what they purchased in the past (as did by many recommender systems) to determine their hierarchy of needs to make the most appropriate excitation. On the other hand, we base on the Maslow's Hierarchy of Needs to create the advertising mini story as we mentioned before. Therefore, we decide to replace the traditional way with the Maslow's Hierarchy of Needs way to construct the first phases of constructing recommender system. Thus, we have the first proposition formed.

- Proposition 1: The SMEs Classification Module of advertising mini story generator system which was developed based on the Maslow's Hierarchy of Needs could be used to construct the user-model structure as the recommender systems.

Reviewing the mechanism of the SMEs Classification Module of advertising

mini story generator system in the Chapter 4, the classifying way of SMEs Classification Module is based on the SMEs' input information which is about their operating conditions, the opposite position with other competitors and the satisfaction of the demand for the innovation. Based on this information, we give each SME one score to classify. In other word, the SMEs Classification Module establishes its function based on the user's behavior. In this idea, we need to test and verify the level of this score which we give to SMEs to make classify whether the level of score conform the Maslow's Hierarchy of Needs. We then have the following propositions.

- Proposition 1-A: It is reasonable and feasible to establish the user-model which is based on the Maslow's Hierarchy of Needs to model the user's behavior and information.

After confirming the advertising mini story generator system is a recommender system in a certain extent, we can inspect the effectiveness of the system's recommended from the recommender system's point of view. Because of the position of advertising mini story generator system in the ImageCons, the most important thing is to examine the SMEs' moving degree to make sure our user will coordinate with the procedure of ImageCons to help them to do service innovation. The following propositions have formed as well.

- Proposition 2: The recommendation from the advertising mini story generator system could encourage SMEs to follow the procedure of ImageCons, based on the user-model construction which construct by the Maslow's Hierarchy of Needs.

The proposition of above-mentioned is from the system's point of view to inspect the effectiveness of the advertising mini story generator system. On the other, based on the theory we mentioned in the previous chapter, the conjunction between the similarity of the story and the degree of incentive. The interrelated plight is an

important element when someone wants to persuade other (Rogers, 1962). The proposition for this issue is put in the following.

- Proposition 3: The SMEs will have more incentives when there are more their own related elements in the story.

In the next section, it outlines the assumptions made for revealing the limitations of the mechanism and the presupposition based on some theory as well as the experimental data set to test the propositions depicted in the previous section.

6.2 Assumptions and Experiment Design Details

There are two parts in this section. First, we address the limitations of this study before the experiments are performed, and then depict the experimental data set by the theory to inspect the propositions.

6.2.1 Assumptions

There are several assumptions should be addressed.

- Assumption 1: The background of the advertising mini story is limited in Taiwan. Considering the culture background of the testers and the first actual on-line area, we composed the story content with the space-time background in nowadays Taiwan. Correspondingly, we used Chinese as the medium of communication, too. On the other hand, the story subject-matter is more limited, depending on the degree of the author's vision breadth. If we want to translate Chinese statement into English, the performance of language translation API is the important considerations. However, if the statement is too complex, then the quality of translation would not good enough.

- Assumption 2: On the other hand, the aim of the research evaluation is to examine the effectiveness of the architecture which we mentioned above, based on the Maslow theory and Dramatica to construct to moving story structure to incite SMEs to do service innovation. However, the reading inclination of the testers will be influenced by the writing content. In other words, it's not only to the story structure but also the writing content's problem that would affect the testers whether to want the continued reading.

- Assumption 3: As we mentioned in the previous chapter, if want to convince other to do innovation; the homogeneity is an important element (Rogers, 1962). On the other hand, Rogers also suggested that if we want to convince other to do service innovation, we should start from the past experiences. Based on the above theory, the most outstanding feature of the story automatic generator proposed by this research is it can utilize personal information to establish the story protagonist. For the automatic purpose we need to encode the user's information; however, this will cause the customized not enough and the lower correlation. From another direction to think about this phenomenon, the position of this research's mechanism is the advertisement to convince (not the advertisement to disseminate) the SME, therefore, the lower correlation is acceptable.

6.2.2 Experiment Design Details

Given that it's important to test the incentive behavior before the system is put into practice. However, the incentive behavior involves with human psychological motivation factors which can't measure by the computer program. Alternatively, we examine the effectiveness by country field investigation in the Mt. Pillow

Recreational Agriculture Area in Ilan County. For the purpose of testing the propositions, two different dimensions should be dilated: the system UI process and the experimental subject.

- **System UI Process**

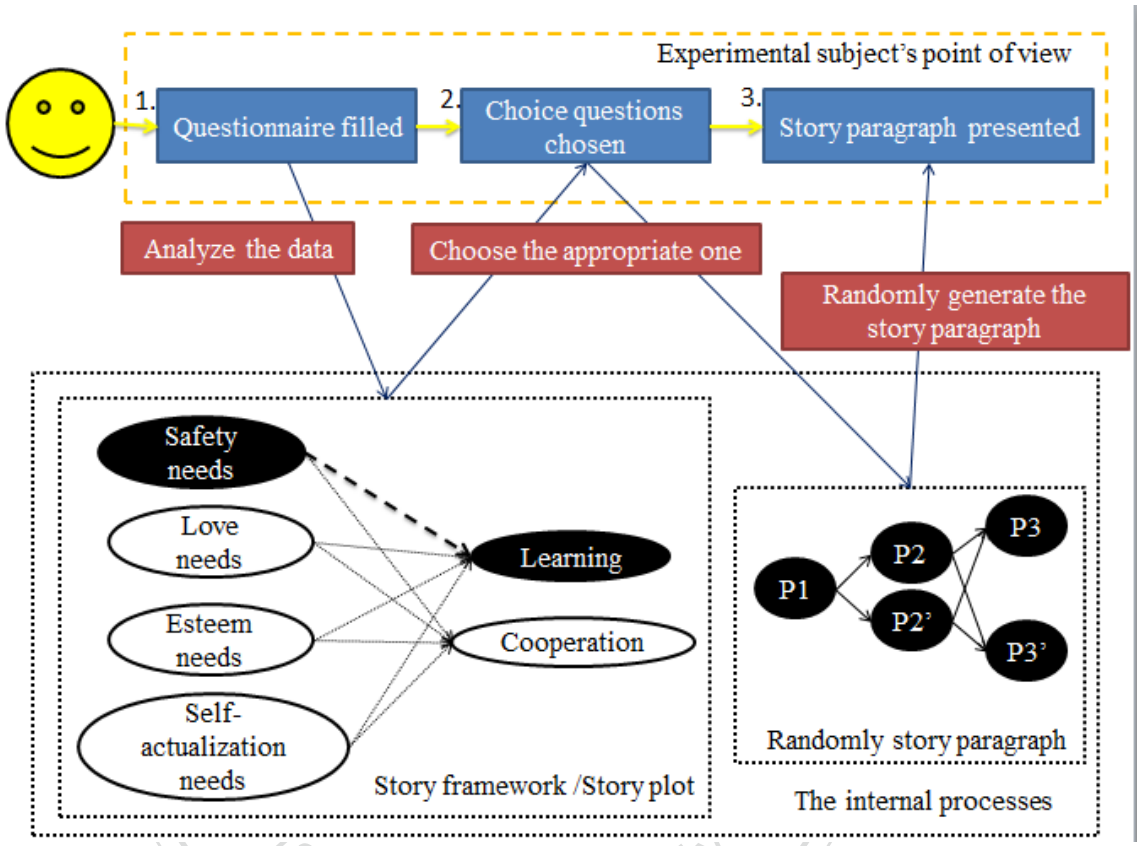

Figure 6.1 The system UI process and internal process

Figure 6.1 is the system UI process and internal process. Form the experimental subject's point of view; there are several steps after they join the mini advertising story generator system. First, they need to administer the questionnaire and let the system to analyze their background information and choose the appropriate story framework and story plot for them. As we mentioned in the previous chapters, there are four story frameworks (Safety needs, Love needs, Esteem needs and Self-actualization needs) and the story plot divided into two types (Learning and Cooperation).

After the system recommends the experimental subject the most suitable one, the experimental subject will have two choices, with the relevant background situation or not relevant. The previous selection will allow user to become the story protagonist, and the name, age, birthplace, etc. of the protagonist are as same as the experimental subject. The other select then let user read the other person's story.

The last step presents the randomly generated story paragraph to the experimental subject, and based on their free will to select if they want to move on or not. On the other hand, there are several random paragraphs written by the advertising designer who works in the advertising industry in the internal processes, and utilize random manner to decide which paragraph will be showed.

- **The Experimental Subjects**

In addition to the system UI process, the other significant test element is the experimental subjects. As mentioned in the previous chapters, this research takes the Mt. Pillow Recreational Agriculture Area in Ilan County as the study area. Mt. Pillow Recreational Agriculture Area is the first leisure agriculture area in Ilan which was established in 2000. The geography location includes four villages in which the Pillow Village is the main planning area, and it covers an area about 78 hectares. The distinguishing feature of the Mt. Pillow is the luxuriant natural resource which is the largest fruit-producing areas in Ilan, mainly in the fruiter cultivation and including more than 30 kinds of fruit that provide fruit picking service. Because the unique natural ecosystems and environmental resources making the Mt. Pillow Recreational Agriculture Area develop rapidly, embracing the various types of experience farm and the B & B restaurants with different themes can provide tourist with the experience the colorful rural life.

Owing to the operators of leisure agriculture being SMEs whose human resources and management experience are deficient and incomplete, they are bound to

face many operational problems. This research chooses Mt. Pillow Recreational Agriculture Area in Ilan County as a case study area. Through interview and observations, this study aims to understand the SME operators of leisure agriculture to and their problems of the current status in the leisure agriculture business and regional development. The interview process by the dictation way and the interview content include two parts; demonstrating the system and collecting the opinion and reaction from the ownerships. Based on the opinions and reaction conveyed by the ownerships, we intend to seek out some evidence to confirm the truth to support our propositions. The following table shows the details of interview which are the background of every experimental subject and the type of interview.

Table 6.1 The details background of every experimental subjects

Number	Name	Business Type	Business Content
1	**Subject 1**	Food Processing Industry; Food and Beverage Industry	The main business is Chinese dessert making new, but attempts to do the transition to the Chinese dessert DIY teaching.
2	**Subject 2**	Bed-and-Breakfast Industry	The business is Bed-and-Breakfast running. The selling points are the beautiful scenery and the night scenes. The other principal occupation is providing vegetables to convenience stores and McDonald's.
3	**Subject 3**	Bed-and-Breakfast Industry	The main business is Bed-and-Breakfast running, and have the garden café constructed based on the ownership's interest of art. The garden café is great but they still continue to improve it.
4	**Subject 4**	Complex-Experienced Leisure Farms	The main business is pear planting, tourist picking fruit experience, tourist teaching of fruit growth process and DIY branches insects teaching.
5	**Subject 5**	Complex-Experienced Leisure Farms	The main business includes kumquat and red guava planting, the tourists picking fruit experience, fruit ice cream DIY and fruit ice cream selling.

Table 6.1 is the details background of every experimental subject. After field observation, we found that the principal industry of Mt. Pillow Recreational Agriculture Area in Ilan County is Compound Experienced Leisure Farms and Bed-and-Breakfast Industry. For the above reason, the principal business type of experimental subject which we chose focus on the Compound Experienced Leisure Farms and Bed-and-Breakfast Industry. In connection with these five experimental subjects we took the focus group interview and in-depth interview to comprehend them from various angles deeply. Table 6.2 shows the details of the interview process from these two perspectives: focus group interview and in-depth interview.

Table 6.2 The type of interview

	Definition	**Interview Situation**	**Experimental Subject**
Focus Group Interview	Focus group is a form of qualitative research in which a group of people are asked about their perceptions and opinions. The researchers introduce the subject of interview, and encourage the membership of small group participate in the discussion without the researchers themselves. The shortcoming of the focus-group interview is that the reaction of each membership is not independent and it's easily affected by the dominant group member (Henderson & Naomi R, 2009).	We gathered three experimental subjects to do the focus-group interview. First, we illustrated the research objective and vision, and then demonstrated the system process and let them to go through the integral system process. After they experience the system process, we ask some simple question and let them discuss.	**Subject 1** **Subject 2** **Subject 4**

In-Depth Interview	In-depth interviews are useful when you want detailed information about a person's thoughts and behaviors or want to explore new issues in depth. Interviews are often used to provide context to other data (such as outcome data), offering a more complete picture of what happened in the program and why (Boyce & Neale, 2006).	We respectively go to each experimental subject's store to do the interview in this part. The master activity is asking them some questions related to our research object, and let them to answer these questions.	**Subject 1** **Subject 2** **Subject 3** **Subject 5** **Subject 4**

Table 6.2 is the type of interview which we used in this dissertation; focus group interview and in-depth interview; the interview details, experimental subjects and the definition are recorded. The following show the design principles and experiment details for every proposition. In addition, we also show the details interview questions one proposition by another.

(a) **Design principles and experiment details for Proposition 1**

The Proposition 1 is "the SMEs Classification Module of advertising mini story generator system which was developed based on the Maslow's Hierarchy of Needs could be used to construct the user-model structure as the recommender systems". The objective of Proposition 1 is to make sure the classification of recommender systems is efficacious and could achieve the advertisement's goal. To make the experiment result to be easy to understand and convincing, we intend to utilize the desire of follow-up reading to confirm if the classification is correct or not. If it is reasonable and feasible to establish the classification of recommender systems by the user's behavior and information, users will get attracted by the story content. On the other

hand, the main idea of this experimental design is to understand the experimental subjects' intention of reading the advertisement which triggered our system to verify if the classification of the recommender systems is efficacious. If the classification is efficacious, the experimental subjects' intention of reading will stronger then the inefficacious one.

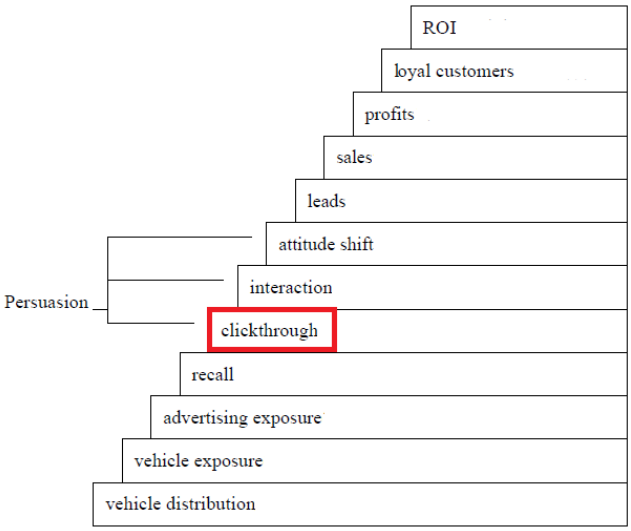

Figure 6.2 ARF Model Expanded for Interactive (to 12 levels)

From this perspective, the most basic evaluation is examining the effectiveness of the advertising story and focus on the internet advertising. Harvey (1997) proposed the ARF model expanded for interactive (Figure 6.2) including twelve levels in which three levels (Clickthrough, Interaction, and Attitude Shift) of the twelve levels are regarded as the persuasion stage. Harvey considered that the "Clickthrough" is an effective indicator in the persuasion stage.

On the other hand, Novak and Hoffman (1997) deliberated that standardizing the Web measurement process is a critical first step on the path toward the successful commercial development of the Web and advanced two indicators to measure: exposure and interactive. The interactive indicator which is recording the interactive behavior between user and the web pages measures the effectiveness of advertising.

Based on the mentioned theories, we divided the story into five sections and used 30 people to do the basic test (Figure 6.3). After the user finish filling their basic information, the web page will show the first paragraph of the story. User can choose if they want to read the next page or not by the “next” or “leave” button and the interactions will be recorded. The starting value is 0. If user moves on the next section, the value will be plus 1. (The highest score is 5 and the lowest score is 1).

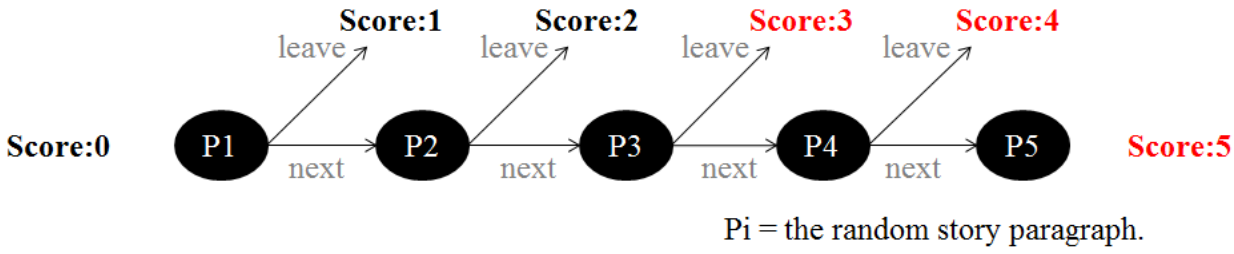

Figure 6.3 The text process with five sections

Figure 6.4 Questionnaire input

Figure 6.4 is the system screen which displays the questionnaire of the system. After pressing the enter button, the first paragraph of the story will be displayed with two selection buttons that let user chooses whether they want to go next page or leave

the system (Figure 6.5).

Figure 6.5 The web page shown as one of story paragraph

It's worth noting that the 30 experimental subjects we chose are the MBA graduate students and may become SME's owners in the future to test the system preliminary. To make sure the integrity and correctness of this verification, we also coordinate the interviewing directly with Ilan local SMEs which we mentioned before to support the verify results.

In addition, the three click rule proposed by Zeldman (2001) means that a user of a website should be able to find any information with no more than three mouse clicks (otherwise, they will leave the site). On the other hand, Moriarty (1983) considered the effects of advertising are manifested by education, perception and persuasion. Hence, we select 3 as an effect threshold, which means if user interacts with the site more than three click times, they think the content is useful for them which could be called the effect of advertising. Concluding, if a user's click times (the score) is more then 3, we can then say it's an efficacious advertising. Based on this result, we can deduce that if user be attracted by the story content, which indirectly means the

classification is correct and utility the user behavior and information to establish the user-model which is based on the Maslow's Hierarchy of Needs is legitimate.

Table 6.3 The interview questions for Proposition 1

	Focus Group Interview	In-Depth Interview
Habits and Customs	None	1. How many times do you turn off the page if you have no interest about the contents in your daily reading habit? And describe the situation. 2. Do you click the page when the title is not attracting you and why yes or why not?
System Related	None	None
Time	2012.05.23	2012.06.08

Table 6.3 shows the in-depth interview question of the Proposition 1. The purpose of these questions wants to ask the habits and customs about the experimental subjects to support the computer using behavior which is used to test the effectiveness of internet advertising. The aim of the above question is to understand the relationship between the using behavior and interest to ensure the premise of our test is credible (If user has inclination to click the web page, then we can say they think the content is useful for them and could say it is effect advertising). The conclusion will be given in

the Section 6.3.

The following are another 2 tables (Table 6.4 and Table 6.5) describing the interview questions for the other propositions and have the same format as Table 6.3. Each of table has two dimensions of the question type (habits and customs of the experimental subjects and system related), two dimensions of interview type (Focus Group Interview and In-Depth Interview) and the interview time shown in the table below. In Section 6.3, we will use these three tables to encode the interview data, and that's the reason why we explain the table format first.

(b) **Design principles and experiment details for Proposition 2**

The Proposition 2 is "the recommendation from the advertising mini story generator system could encourage SMEs to follow the procedure of ImageCons, based on the user-model construction which construct by the Maslow's Hierarchy of Needs". The aim of the Proposition 2 is to test and verify the effectiveness of the advertising by observing the user's aspiration of using the ImageCons which publicize by the advertising content. It means that we want to connect the experimental subjects' opportunity of innovation and change to the advertisement provided by our system. By imitating their past experience which prompts the experimental subject to do conversion in their business or daily life to make a new advertisement to our system to stimulate them to do service innovation (another new conversion). From another perspective, this is a validation method which through observing the past experience of the experimental subject to speculate that if they will be motivated by the advertisement of our system or not.

On the other hand, in this part we will demonstrate some test advertisement and inquire about their willingness of using ImageCons or not. Through the habits and customs of the experimental subjects and the actual test of the system, there is some

interview question related to the Proposition 2 shown in Table 6.4.

Table 6.4 The interview question for Proposition 2

	Focus Group Interview	In-Depth Interview
Habits and Customs	None	1. What's your opportunity to do the transition? 2. You said that the government has conducted some class to guide you to do transformation. Please describe the class which you told us to give advice of the business transition. **3.** Do you reference the operation model from the other similar and successful trade and describe it? **4.** Do you get influenced after you reference the other model example and describe it? **5.** What's the reason to make you to use the internet to publicize your business?
System Related	1. Do you want to use ImageCons after you read a story about a sheep shepherd who used this system and have some great effect? 2. If the system will not take up too much of your time and will get some great effect, do you want to use it?	1. How do you think about the ImageCons which we demonstrate last time?
Time	2012.05.23	2012.06.08

There are two types of questions in the two interviews; habits and customs of the experimental subjects and system related; in Table 6.4. The aim of the system related question of Proposition 2 wants to understand the experimental subjects' willingness to use ImageCons, and the habits and customs question want to connect the daily habits of experimental subjects with the story plot to speculate if the advertising is efficacious or not (for the reason that we ask the question which focuses on the transformation motivation process of the experimental subjects, like: stimulated by government class or the other trade). The completion will be discussed in the Section 6.3.

(c) **Design principles and experiment details for Proposition 3**

On the other hand, the Proposition 3 is "the SMEs will have more incentives when there are more their own related elements in the story". As same as Proposition 2, Proposition 3 could be proved through observing the reaction of the experimental subject: SMEs. The authentication methods of Proposition 2 focus on the interview of their attitude of daily life, but the Proposition 3's interview process unfolds by experimental subjects use the system by themselves and observing the reaction of experimental subjects during the using period. There are two selections in the system process in Proposition 3: with the personal related element and without the personal related element. Based on the determination of experimental subjects making choices about which ones do they want to read, the inquiries about how they feel about this test will then be conducted.

Figure 6.6 shown after the questionnaire page (Figure 6.4) is the system screen demonstrating two choices that let user make a selection; with the personal related element or without the personal related element. After user determines which one does they prefer, system will show the page based on their choice and record to

support Proposition 2

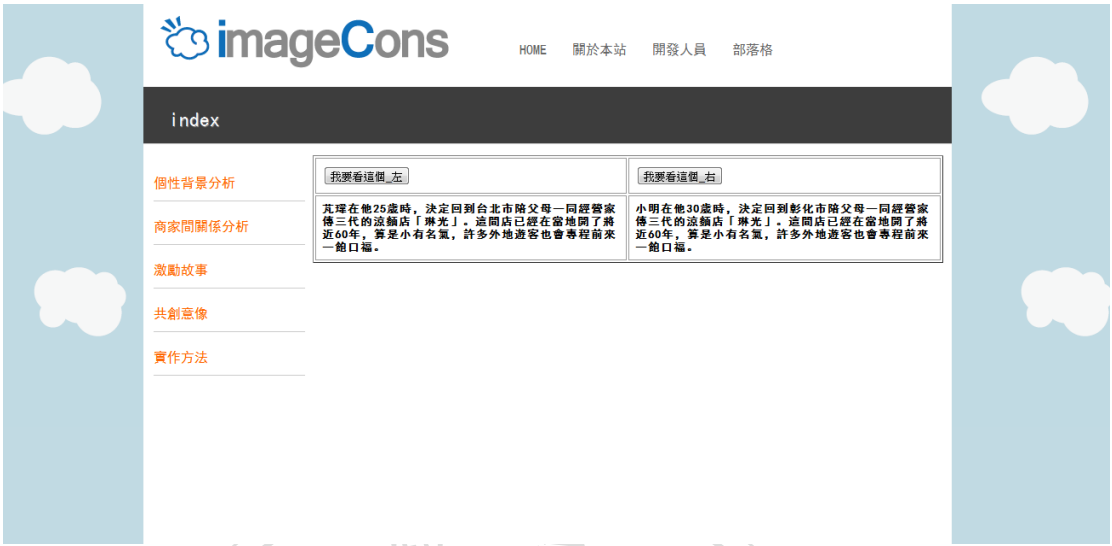

Figure 6.6 An exemplar of the two choices

Table 6.5 shows the interview questions for Proposition 3, which are separated in two parts as did for Proposition 2; habits and customs of the experimental subjects and system related. In addition to ask the experimental subjects directly which one they like, personal interrelated element story or not? We also find some daily habits to support our Proposition 3 as their reading habits and purchasing habits. The results will be shown in the Section 6.3.

Table 6.5 The interview question for Proposition 3

	Focus Group Interview	In-Depth Interview
Habits and Customs	None	1. What kind of industry do you want to observe? 2. Do you particularly pay attention to their industry-related news? 3. Please describe your attitude of an uncertain situation.

		4. Please describe a selling process situation that you do not accept. 5. Are you risk aversion or risk seeking? Please give me an example.
System Related	1. Why do you want to choose the personal interrelated element story? Or why not?	2. Which story do you like more, with personal related element or without the personal related element? Why?
Time	2012.05.23	2012.06.08

The above questions (Table 6.3, Table 6.4 and Table 6.5) are the main interview questions leading principles and were adjusted by the circumstances at the time. Through the several case interview to help to understand the other similar object and industry in order to popularize our system to the other SMEs in the different Recreational Agriculture Area. To strengthen the validity of the examination, we establish the case study database which content interview recording and transcripts to support the examination.

6.3 Experiments and Results

In this part, we will discuss the propositions which are supported by the statistical test and the interview data. Before we begin to discuss the propositions, we delimit the encoding of interview data first which we will use to test and verify the propositions. The following is the encoding example of the encoding interview data.

"The response of the experimental subject will be shown in the double quotes area."

[(Preliminary Codes 1, Preliminary Codes 2 and so on), Final Code]

[Table number (which enlists the interview question), Interview type (which we introduce in Section 6.2), Question type (which we introduce in Section 6.2), The name of the experimental subject, interview date].

That is, the *[ ]* area expressed the preliminary codes of the interview note which is the jottings of the interview raw data (providing a transitional link between the raw data and codes) and the final code. On the other hand, the [] area refers to the interview question details related to the interview data shown in the double quotes area.

The followings are divided into three parts to investigate the results of three propositions.

Experiment and results for Proposition 1

Before the statistical test, we discuss the phenomenon we observed to test and verify the three click rule (Zeldman, 2001) from the interview. We found that there is the three click rule in the everyday life of the experimental subject.

"If I have no interest in this content when surfing the web, I will quit within two or three pages. On the contrary, supposing this content makes me feel interesting, I will read them all no matter how multitudinous pages it has."

[(LEAVING WITH NO INTEREST, CONTINUING WITH INTEREST), THREE CLICK RULE]

[Table 6.3, In-Depth Interview, Habits and Customs, Subject 2, 2012/06/08]

For the reason that we know we can measure the level of interest by the willingness of reading and the three click rule is the useful theory (by the coding of *THREE CLICK RULE*). Next, we are going to examine the effectiveness of the

recommendation system by using the statistical test. As we mentioned before, we choose 30 people (who are MBA graduate students and may become SME's owners in the future) to test the system. First, a SME enters their personal information. Based on their input information, we will classify them into the appropriate Maslow's Hierarchy of Needs (APPENDIX 3). After that, the system will recommend a story which suits for the Maslow's Hierarchy of Needs' level where he is associated with and customize the story for the SME. According to the testers' own feeling to decide going on or not, and the system will record the score. The hypothesis is "If a user's click times (the score) is more then 3, we can then say it's an efficacious advertising".

H_0: μ <=3, this advertising is invalid.
H_1: μ >3, this advertising is effective.
μ = population mean.

Figure 6.7 The proposition testing

Figure 6.7 is the null hypothesis and alternative hypothesis, and based on these two hypotheses to do One-Samples T test. The reason why we choose One-Samples T test as the method of statistical tests is simple random sample, n (the number of sample) >= 30 and the unknown σ (population standard deviation). In addition, we want to use the sample mean (x bar) to estimate the population mean (μ), that's the reason why we choose One-Samples T test rather than Z test. Figure 6.7 shows the hypothesis of the effectiveness of advertising, which is used to sample mean to tests the population mean is greater than the score 3 (the score which we define previously) or not. On the other hand, Figure 6.8 is the mathematical symbols integrated table which is used to establish the formula later.

n = The number of sample.
x bar = Sample mean.
s = Sample standard deviation.
μ = Population mean.
σ = Population standard deviation.
α = Significance level.
p-value = The probability of obtaining a test statistic at least as extreme as the one that was actually observed. On the other hand, it means "the probability of error".
df = Degree of freedom, n-1.

Figure 6.8 Mathematical symbols

On the calculation way, we take advantage of the statistical software SPSS (Statistical Product and Service Solutions) which supports many functions like statistical analysis of computing, data mining, predictive analysis and so on and there are Windows and Mac OS X versions to be the consideration. As the Figure 6.7, we set H_0 as μ <=3, means this advertising is invalid (The population mean score of advertising effectiveness is less than 3); H_1 as μ >3, means this advertising is effective (The population mean score of advertising effectiveness is greater than 3). The following is the statistical results.

Table 6.6 Descriptive statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Value	30	1.00	5.00	3.5000	.24330	1.33261	1.776
Valid N (listwise)	30						

The results of descriptive statistics and One-Samples T test as Table 6.6 and Table 6.8. From Table 6.6 we can find the sample mean score is 3.5, the Std. Error is 0.243 and s is 1.333. This part has already reached a level of significance which

means "If a user's click times (the score) is more then 3, we can then say it's an efficacious advertising" this proposition has significant difference. On the other hand, there is the formula and interpretation of the One-Samples T test.

Table 6.7 The formula and interpretation of the One-Samples T test

(1 – tailed) $H_0 : \mu <= \mu_0$ $H_1 : \mu > \mu_0$ $\mu_0 = 3$	**Formula**	**Interpretation**
Critical value method	$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$ $c = t_{\alpha, n-1}$	if $t > c$, then reject H_0 $t_0 <= c$, accept H_0
Confidence interval method	Lower bound (a) = $\bar{x} - t_{\alpha, n-1} * s/\sqrt{n}$	if $\mu_0 < a$, then reject H_0 $\mu_0 >= a$, accept H_0

Table 6.8 is the One-Sample T test consequence which uses the SPSS software with the 95% confidence interval (means $\alpha = 0.05$), and we will coordinate with Table 6.7 and Figure 6.9 to get the conclusion of the null hypothesis and alternative hypothesis.

Table 6.8 One-Sample T test

One-Sample T test						
	Test Value = 3					
	t	df	Sig. (1-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Value	2.055	29	.0245	.50000	.0024	.9976

df	0.05	0.01	0.001	df	0.05	0.01	0.001
1	12.70	63.65	636.6	26	2.056	2.779	3.707
2	4.303	9.925	31.59	27	2.052	2.771	3.690
3	3.182	5.841	12.92	28	2.048	2.763	3.674
4	2.776	4.604	8.610	29	2.045	2.756	3.659
5	2.571	4.032	6.869	30	2.042	2.750	3.646
6	2.447	3.707	5.959	31	2.040	2.744	3.633
7	2.365	3.499	5.408	32	2.037	2.738	3.622
8	2.306	3.355	5.041	33	2.035	2.733	3.611
9	2.262	3.250	4.781	34	2.032	2.728	3.601
10	2.228	3.169	4.587	35	2.030	2.724	3.591
11	2.201	3.106	4.437	36	2.028	2.719	3.582
12	2.179	3.055	4.318	37	2.026	2.715	3.574
13	2.160	3.012	4.221	38	2.024	2.712	3.566
14	2.145	2.977	4.140	39	2.023	2.708	3.558
15	2.131	2.947	4.073	40	2.021	2.704	3.551
16	2.120	2.921	4.015	50	2.009	2.678	3.496
17	2.110	2.898	3.965	60	2.000	2.660	3.460
18	2.101	2.878	3.922	70	1.994	2.648	3.436
19	2.093	2.861	3.883	80	1.990	2.639	3.416
20	2.086	2.845	3.850	90	1.987	2.632	3.402
21	2.080	2.831	3.819	100	1.984	2.626	3.390
22	2.074	2.819	3.792	200	1.972	2.601	3.340
23	2.069	2.807	3.768	500	1.965	2.586	3.310
24	2.064	2.797	3.745	1000	1.962	2.581	3.300
25	2.060	2.787	3.725	∝	1.960	2.575	3.291

Figure 6.9 Value of t_{α}

First, we start from the critical value method. In Table 6.8 we can understand that t = 2.055 and c = $t_{\alpha, n-1} = t_{0.05, 29}$ (α = 0.05) = 2.045 (From Figure 6.9). The t is greater than c, H_0 is then rejected which means H_1 is established (means most of the users click more than 3 times, so the advertising is effective).

Second, from the confidence interval method, a (in Table 6.7) is 3.0024. In Table 6.8, the lower part of the 95% confidence interval of the difference is 0.0024 (means ($t_{\alpha, n-1} * s/\sqrt{n}$) – mean difference (which is 0.5 in Table 6.8)). Therefore, the ($t_{\alpha, n-1} * s/\sqrt{n}$) = 0.4976, and a is 3.0024. Because μ_0 (3) <= a (3.0024), H_0 is then rejected.

Finally, Sig. (1-tailed) in Table 6.8 means p-value. The meaning of p-value is that if α > p-value, then it reaches the level of significance and H_0 is rejected. As we mentioned before, α = 0.05 and p-value = 0.0245 (α> p-value) and H_0 is then rejected.

Therefore from the one-sample T test we can understand that H_0 is rejected and accept H_1. Based on our proposition, we can say that the advertising which the most of user read is an effective one. Based on this result we found that most user want to continue reading more than 3 sessions, we can say that the user-model structure which constructed by the Maslow's Hierarchy of Needs is feasible in the complete recommender systems. Even more, we can say it is reasonable in our system that classifies Maslow's Hierarchy of Needs by the computer interactive behavior and information of user. Because most of our users have interest with the stories recommended by the system, we speculate that our recommend model is efficacious.

The following is the actual interview situation and show the different attitudes toward the five pages web by the experimental subjects. There is experimental subject (Subject 2) express that she has no interest and wants to turn off the web pages within three pages. On the contrary, most of experimental subjects indicate that they want to read them (There are three owners in our focus interview groups, and two of them indicate that they have strong desire to read; Subject 1 and Subject 4 showed in Table 6.2). Concerning the reason why the experimental subjects want or do not want to continue reading, we will discuss them in the Proposition 3. In this section we understand the behavior of the experimental subjects and test and verify the proposed proposition by statistical test. Concluded that the most of experimental subjects have inclination to reading (the recommendation system is efficacious), and it is reasonable and feasible to establish the user-model which is based on the Maslow's Hierarchy of Needs to model the user's behavior and information.

Experiment and results for Proposition 2

The Proposition 2 investigates the willingness to use the ImageCons through the propagandizing of the advertisement to inspect the validity of the advertisement. First,

we demonstrate the system which automatically generates the advertising story to the experimental subjects in the focus group interview, and then inquire about each of their willingness in the in-depth interview deeply.

"Yes, I want to use this instrument if it can improve my business just like the protagonist of the advertisement. But the emphasis is how to use it, the old-fashioned person like us has a great obstacle in using computers."

[(WANT TO USE IMAGECONS, BARRIERS TO ENTRY OF COMPUTER), TECHNOLOGY ACCEPTANCE]

[Table 6.4, Focus Group Interview, System Related, Subject 1, 2012/06/08]

"If I can get some inspiration without wasting a lot of time, I will use this system. Everyone wants to have a good inspiration for their own products, and create some exposure rate to help his own business. But, the most important thing is that I need some free time to learn; the work is very busy. On the other hand, is it easy to use is another important thing."

[(EFFICIENCY IS IMPORTANT, WANT TO USE IMAGECONS, EASY TO USE OR NOT), TECHNOLOGY ACCEPTANCE]

[Table 6.4, In-Depth Interview, System Related, Subject 4, 2012/06/08]

During the interview process every experimental subject expressed that they would like to use the instrument which could help them figure out new business prospect, but with a prerequisite that the IT must be easy to use. In order to test and verify this hypothesis, we divided this topic into two parts to investigate. First of all, we investigated the attitude towards the technology acceptance (by the coding of above data; *TECHNOLOGY ACCEPTANCE*), and then discussed and observed the attitude of accepting the new things. After the two parts observed we can better understand the effectiveness of advertising and acceptance of ImageCons.

From the above interview record we found that it is important about the system is

easy to use or not. On the other hand, the function is helpful or not is another influencing factor of accepting IT. This consequence of the interview conform the Technology Acceptance Model (TAM) proposed by Davis (1989). It is an information system theory that models how users come to accept and use a technology.

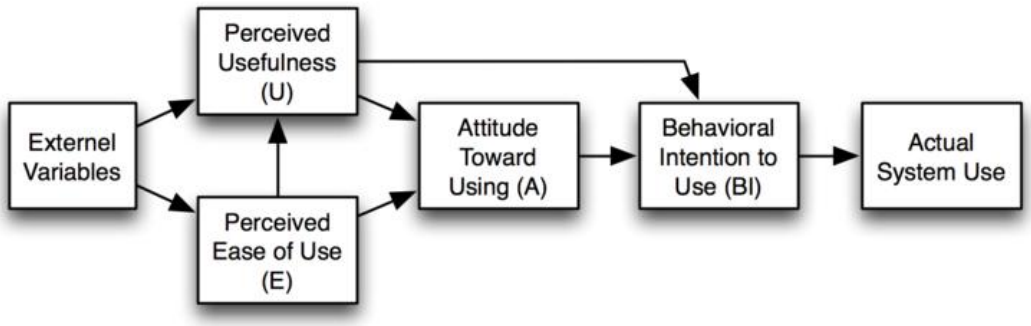

Figure 6.10 The Technology Acceptance Model (TAM) (Davis, 1989)

Technology Acceptance Model suggests that there are a number of factors influence their decision about how and when they will use it, when users are presented with a new technology; perceived usefulness (PU) and perceived ease-of-use (PEOU). The perceived usefulness means the degree to which a person believes that using an unusual system would enhance his/her task performance and the perceived ease-of-use is the degree that using a particular system would be free from endeavor (Davis, 1989). From Figure 6.10 we can understand that the perceived ease of use is the prerequisite of accepting the IT. The following is the responses of the experimental subjects.

"I think the function of your system is useful, but we need time to understand slowly. By the way, the step by step process of the system is instrumental for the learning. "

[(USEFUL, NEED TIME TO LEARN, THE PROCESS IS GOOD), COMMENTARY OF IMAGECONS]

[Table 6.4, In-Depth Interview, System Related, Subject 4, 2012/06/08]

"I think the process is complex, otherwise it is a great idea."

[(COMPLEX, GREAT IDEA), COMMENTARY OF IMAGECONS]

[Table 6.4, Focus Group Interview, System Related, Subject 1, 2012/05/23]

After we demonstrated the whole system process to them, they agreed that the innovation idea is useful but the degree of difficulty to use the system will reduce their willingness of using (As the coding of *COMMENTARY OF IMAGECONS*). From the Technology Acceptance Model's point of view to inspect our system, the perceived usefulness is the added value side of using but perceived ease-of-use side will greatly reduce the intention. Because the motivation part of the ImageCons is the main window to persuade SMEs that the system is easy to use, we must reduce the complexity of the process of interactive advertising in order to enhance the intention.

On the other hand, in order to reduce the complexity of the process to affect the using motivation, we still can connect the daily life attitude of the experimental subject to get more insight in the content of the advertisement. In this part (the in-depth interview) we discuss the attitude of acceptance innovation to connect with the advertising content which we want to use to convince SMEs. To make short of the matter, we want to replicate the SMEs' behavior of accepting new things as a model to juxtapose with our advertisement content.

"The reason that prompts me to do the transformation is that the case study illustrated in our classes of Recreational Agriculture Area. They explain some success cases as a reference of thinking about what I can do next, and they guide some serviceable instruments like Internet, package and marketing. Through these successful cases I think that not only transformation but also the serviceable instruments are helpful method for me."

[(SUCCESSFUL CASE STUDY, SERVICEABLE INSTRUMENTS FOR

BUSINESS, TRANSITION, HELPFUL), SUCCESSFULLY PARAGON CASE]

[Table 6.4, In-Depth Interview, Habits and Customs, Subject 1, 2012/06/08]

"The reason why we invested money to the internet marketing like the government homepage, internet advertising and online ordering is that one of my neighbors got good performance of their business by using the internet marketing. That's pushing me to do the same thing."

[(OPPONENT GOT GOOD PERFORMANCE, THE MOTIVATION OF USING INTERNET), SUCCESSFUL PARAGON CASE]

[Table 6.4, In-Depth Interview, Habits and Customs, Subject 2, 2012/06/08]

"We always observe the related industries to find some good to learn and improve. Last time I got some impact from the Lavender Cottage (a successful garden café in Taiwan), and I want to do some change for becoming as successful as them."

[(OBSERVE THE OTHER RELATED OWNER, LEARN AND IMPROVE, THE MOTIVATION OF CHANGING), SUCCESSFUL PARAGON CASE]

[Table 6.4, In-Depth Interview, Habits and Customs, Subject 2, 2012/06/08]

"I observed other bed-and-breakfast case; I found that there are not only lodging but also eating and playing place. I think it is a great idea, that's the reason prompt me to do some change."

[(FOUND IDEA FORM THE OTHER OWNER, DO CHANGE), SUCCESSFUL PARAGON CASE][Table 6.4, In-Depth Interview, Habits and Customs, Subject 3, 2012/06/08]

"I used to be a simple farmer. However, the situation is changed after I observe the other's modus operandi and had some idea about my business' future orientation. Hence, I start the business with DIY and tour guide."

[(FOUND IDEA FORM THE OTHER OWNERS, DO CHANGE), SUCCESSFUL PARAGON CASE]

[Table 6.4, In-Depth Interview, Habits and Customs, Subject 4, 2012/06/08]

There are common features of the above conversations; they all follow a successfully paragon case to figure out what they can do more else in their business (As the coding of *SUCCESSFUL PARAGON CASE*). Following the same line of reasoning, contradistinguishing our story from this model is to generate a successful model derived by ImageCons in order to help them to do service innovation and ameliorate their own business. From this perspective, the experimental subjects will be persuaded after reading the advertisement, and they will have more intention to use ImageCons to help them to do service innovation. From the Technology Acceptance Model's point of view, the perceived usefulness factor will be strengthened after they read the model advertisement. On the other hand, the other factor of the Technology Acceptance Model, perceived ease-of-use, is the weakness of our system. For that reason, the urgent priority is to reform the complexity presented by the advertising. After renovating this drawback then we can say the motivation effect would become more convincing about this recommendation system.

Table 6.9 The summary of the Proposition 2

	System Related		**Habits and Customs**
	Perceived Ease-of-use	Perceived Usefulness	
Subject 1	Expressing that the system is complicated and need time to learn. However, he express that he is old-fashioned person who has a great obstacle in using computers.	Considering that the system is useful to help them improve their business as the protagonist in the story.	The transformation reason is the case study illustrated in the classes of Recreational Agriculture Area. The success cases serve as a reference of thinking and give them some innovation idea.

Subject 2	None	Considering there is some advantage of the system, it can increase the exposure frequency.	The reason let the owner use the internet advertising is that her neighbor got good performance by using these things.
Subject 3	None	None	He observed other bed-and-breakfast case and got the conversion idea.
Subject 4	Expressing that the most of important is that the system process being step by step, it is a motivation to make him have willingness to learn but need times.	Considering that the system is a great idea to tell them how to do service innovation.	He observed the other owner's modus operandi.
Final Code	TECHNOLOGY ACCEPTANCE	COMMENTARY OF IMAGECONS	SUCCESSFULPARAGON CASE

Table 6.9 is the summary of the Proposition 2, and we find that the factor of the system related; Perceived Ease-of-use; has some uncertain attitude like they are busy and has a great obstacle in using computers (by the coding of TECHNOLOGY ACCEPTANCE). However, there are some positive response on this factor, one of the experimental subjects said that the system process is step by step, and it is an appealing part (by the coding of COMMENTARY OF IMAGECONS). On the other hand, from the Perceived Usefulness's viewpoint, almost every experimental subject expresses that the function of the system shown in the advertisement is great and have

willingness to use it excluding the computer problem (by the coding of TECHNOLOGY ACCEPTANCE). Final, the last part discusses the habits and customs of experimental subject and reveals that their innovation pattern or conversion pattern is following a successful model (by the coding of SUCCESSFULLY PARAGON CASE). That's what our advertisement of the system is to do, creating a successful model and a successful protagonist relevant to the user (we will discuss in the part of Proposition 3). Integrating the above arguments we can say the advertisement is useful from the daily behavior and the response after reading the advertisement.

Experiment and results for Proposition 3

In Proposition 3 we investigate if the advertising content involves the personal related element such as name, age, background, industry and so on, the constituency will feel more recognizable or not. About this topic we discussed a lot before, and most of the scholars considered that it is easy to succeed if the persuasive who have analogous background with the persuaded one. Based on this idea, we construct a framework to write the customized advertising which aims to create a personal like protagonist to achieve the purpose of persuasion.

In order to get further comprehension, we demo the beta version system to the SMEs and let them make a choice; with personal like protagonist or not. In the interview grope we receive two distinct reactions. The following were based on these two choices to make the in-depth discussion.

Don't want to choose the personal like protagonist one:

Below shows the response of the experimental subject who don't want to choose the personal like protagonist advertisement, and explore the reason.

"I think this is strange to read a story with my name, background and so no, but not hundred percent similar with myself. There is still some information not really similar with me and may not do this decision-making like the protagonist. It is more attractive if the story is on the premise that any other person is the protagonist then I will continue reading."

[(STRANGE, NOT HUNDRED PERCENT SIMILAR), THE REASON: N]

(THE REASON: N expresses the reason why the choice of experimental subject is no.)

[Table 6.5, Focus Group Interview, System Related, Subject 2, 2012/05/23]

"I think I am a person who is conservative, so I don't like to determine my own destiny right away. For that reason, I like to reference many other peoples' stories to improve myself tardily instead of ameliorating promptly by one simple guideline story. I don't like the uncertain situation."

[(CONSERVATIVE, NEED TO DEEP EVALUATE, REJECT THE UNCERTAIN SITUATION), THE REASON: N]

[Table 6.5, In-Depth Interview, System Related, Subject 2, 2012/06/08]

The above experimental subject considered that she doesn't want to put herself into an uncertain situation (from the above two dialogues) (by the coding of *THE REASON: N*); in other words, she doesn't like to take a risk on her daily life. It seems the consequence of interview against the Proposition 3 that when the background of the story protagonist is similar with the persuaded person, he/she will more easily be persuaded. However, we can analyze the psychological state of the experimental subject more deeply about the above dialogue. The reason why the experimental subject doesn't want to take a risk even after reading a story is that he/she doesn't want to read anything negative happen to him/her.

"I am a person who is conservative and don't like to take a risk. I am afraid that the big change will suffer some failure."

[(CONSERVATIVE, HATE RISK), THE REASON: N]

[Table 6.5, In-Depth Interview, System Related, Subject 2, 2012/06/08]

This ratiocination is in accord with the positive psychology we mentioned before: The positive emotions can expand people's awareness and encourage innovative, but the negative emotions will lead to a narrow survival behavior (Seligman & Csikszentmihalyi, 2000). People will evade any negative list about themselves, and the experimental subject doesn't want take a risk to see the uncertain and maybe the negative story about her. Therefore, the factors which could affect the Proposition 3 are not only the relevant story elements but also the level of accepting a risk.

On the other hand, the other experimental subjects indicated that they want to choose the stories with their own interrelated element and the interview data is shown below.

Want to choose the personal like protagonist one:

The following is the interview data which the experimental subjects express that they want to choose the personal like protagonist one and the reason.

"I prefer to understand how much I can change. The other person's story will not necessarily provoke my ambition."

[(THE OTHERS HAVE NO MOTIVATION), THE REASON: Y]

(THE REASON: Y expresses the reason why the choice of experimental subject is yes.)

[Table 6.5, Focus Group Interview, System Related, Subject 1, 2012/05/23]

"First of all I want to comprehend other person's story as my reference, but I still need to read the story from my own point of view to find out what can this product

improve my business."

[(OTHER'S STORY IS REFERENCE, NEED TO GET DIRECTIVE FROM RELATIONAL STORY), THE REASON: Y]

[Table 6.5, In-Depth Interview, System Related, Subject 4, 2012/06/08]

The above experimental subjects (Subject 1 andSubject 4) clearly indicated that they want to choose the story written from their point of view in order to comprehend what else they can do (by the coding of *THE REASON: Y*). Even if there is uncertain and mutative future happens to the protagonist which is the portrayal of the experimental subjects, they still want to take a risk. As we mentioned before, the factors which could affect the Proposition 3 are not only the relational story elements but also the level of accepting a risk. The following we discuss what the reason could affect the level of risk accepted.

The above two distinct attitudes towards the risk manifested by the experimental subjects induce us to study the background of these experimental subjects deeper. We found that the experimental subjects who have more willing to take a risk in planning future have less satisfied with their current life compared to the low willingness one.

"Instead of depending on running the Bed and Breakfast for a living, I just run for seeking the happiness. I am a person who pursues a stable life and not the risk one."

[(NOT FOR LIVING, SEEKING HAPPINESS, STABLE LIFE), ATTITUDE]

[Table 6.5, In-Depth Interview, Habits and Customs, Subject 2, 2012/06/08]

The principal occupation of this experimental subject (Subject 2) is providing vegetables to convenience stores and McDonald's, and the Bed and Breakfast part is dispensable not guaranteed (Table 6.1). On the other hand, they said that they will travel abroad in their standby time. Comparing with the other two experimental subjects (Subject 4 and Subject 1), the living standard of the previous experimental

subject is better than others (by the coning of *ATTITUDE*). At the same time we can learn from the following dialogue that the other two experimental subjects (Subject 4 and Subject 1) have more willingness to take a risk.

"If there is some idea which could help me to do transition, I am willing to take a risk to do this even if there are hazards."

[(WILLING TO TAKE A RISK), ATTITUDE]

[Table 6.5, In-Depth Interview, System Related, Subject 4 and Subject 1, 2012/06/08]

On the other hand, the following is the early period in-depth interview with Subject 5, the aim of this early period in-depth interview is want to understand the actual local demand and one of the experimental subjects (Subject 5) expressed that the life of Bed and Breakfast is better than the agriculturist:

"The operating condition of Bed and Breakfast is relatively wealthy in our Mt. Pillow Recreational Agriculture Area in Ilan County."

[(B & B IS WEALTHY), CIRCUMSTANCES]

[In-Depth Interview, Understand the demand, Subject 5, 2011/11/24]

Based on the prospect theory proposed by Daniel Kahneman and Amos Tversky (1979), people make decisions based on the potential value of losses and gains rather than the final outcome, and people evaluate these losses and gains using interesting heuristics which violate with the expected utility theory of tradition economics. There are many applications extended from the prospect theory which is like the reversing of risk aversion/risk seeking in case of gains or losses (termed the reflection effect) (Tversky & Kahneman, 1981). They pointed that the preference of the gaining and loss is asymmetric to the human. There are risk seeking tendency of the individuals if they are in the loss condition, and more risk aversion tendency when they are in the profits condition.

The development of prospect theory is rapidly and extended to other domains. Many scholars used prospect theory to explain the decision-making of the election, and found that different contexts may have different election results. In general, when people feel optimistic about a country's economic, they will incline to the status quo. In order to ensure the status quo, people usually choose a more conservative rulers or policy. On the contrary, when the economic recession or face a major threat, people will tend to gamble and accept the bold or radical policies and candidates. In conclusion to say, if someone lives in more affluent environment, they will tend to content with things as they are. On the other hand, if someone lives a more difficult environment, they will more willing to take risks.

Connecting the above theory with the observations of the interview, we found it is reasonable phenomenon of these two responses of the experimental subjects. The experimental subject who don't want to see any uncertain future happen to him/her, because he/she lives in a more abundant existence. Or we can say he/she is more satisfied with the current status. Inversely, the experimental subjects who have intensive willing to take the risk have more dissatisfied with the status quo.

In order to exclude the level of accepting risk factor about the Proposition 3, we inquire about the experimental subjects' habits and customs.

"I usually concern the relevant industry news from television program, newspaper and books."

[(RELEVANT INDUSTRY), RELEVANT INFORMATION ACCEPTANCE]

[Table 6.5, In-Depth Interview, Habits and Customs, Subject 1, 2012/06/08]

"Comparing with the foreign programs, I'd like to enjoy the Taiwan native serial drama no matter the character of foreign programs is Chinese or not. For example, I love to watch the travel program to find some inspiration of my business, but still have high priority with the Taiwan region."

[(TAIWAN NATIVE SERIAL DRAMA, TAIWAN REGION), RELEVANT INFORMATION ACCEPTANCE]

[Table 6.5, In-Depth Interview, Habits and Customs, Subject 2, 2012/06/08]

"Once, a salesman wanted to sell us a food package which doesn't conform to the local culture; consequently I don't accept this."

[(DON'T ACCEPT A UN- CONFORMING CULTURE PRODUCT), RELEVANT INFORMATION ACCEPTANCE]

[Table 6.5, In-Depth Interview, Habits and Customs, Subject 3, 2012/06/08]

"We usually hold the farmers' visiting group to learn the skill of operation, and there are more interesting in visiting the related industries. I can find some useful recommendation and suggestion from the other owner of related industries."

[(RELATED INDUSTRIES), RELEVANT INFORMATION ACCEPTANCE]

[Table 6.5, In-Depth Interview, Habits and Customs, Subject 4, 2012/06/08]

From the above dialogue we can understand that human will easily be attracted and influenced by the analogous culture, industry and background (by the coding of *RELEVANT INFORMATION ACCEPTANCE*). It is corresponding with the Proposition 3; the persuaded one is easier to receive the new things and new product from the similar persuasive. In conclusion, deducting the risk taking level factor, the SMEs will have more incentives when there are more their own related elements in the story.

Table 6.10 is the summary of the Proposition 3. We can notice that the attitude towards risk is related to the choice (the experiment subjects who choose the personal like protagonist had the tendency of risk seeking and vice versa) (by the coding of THE REASON: N, THE REASON: Y, and ATTITUDE) and we can get some endorsement from the experimental subjects' habits and customs (by the coding of RELEVANT INFORMATION ACCEPTANCE).

Table 6.10 The summary of the Proposition 3

	Choose the personal like protagonist one or not	**Risk** Risk aversion	Risk seeking	**Habits and Customs**
Subject 1	yes		v	He usually concerns the relevant industry news from television program, newspaper and books.
Subject 2	no	v		She likes Taiwan native serial drama no matter the character of foreign programs is Chinese or not.
Subject 3	None			She won't choose the food package which doesn't conform to the local culture.
Subject 4	yes		v	He like the farmers' visiting group which visit the related industries instead of the completely irrelevant ones.
Final Code	THE REASON:N THE REASON:Y	ATTITUDE CIRCUMSTANCES		RELEVANT INFORMATION ACCEPTANCE

6.4 Discussion of Findings

The goal of this study is to provide a motivation advertisement to promote SMEs to do service innovation and investigate how to increase the effectiveness of the advertisement. The experiments have provided a general support for our proposed propositions, and revealed some possible explanation for the results.

At the beginning, we inspect the user click behaviour to understand the reading willingness of the experimental subjects, and then, we speculate the effectiveness of the recommendation system through the reading willingness. We got the above inference from the following: if the experimental subjects have strong reading willingness, then we can say the recommendation mechanism is effectiveness (because each of them enjoys the story which the system recommends for them). After get the inference which the recommendation system is effective, then we can discuss the classification of the recommendation system further. At the previous chapters, we demonstrated the SMEs Classification Module which is constructed by the Maslow's Hierarchy of Needs to model the user's behaviour and information. If the recommendation mechanism is effectiveness, then we can say that we use user input information to do the classification of Maslow's Hierarchy of Needs is reasonable and feasible. The aim of the Proposition 1 wants to test and verify the justifiability of the recommendation system, and the above outcome showed a positive value for our research and supporting data also support our proposed idea.

Secondly, the aim of Proposition 2 is to examine the advertisement's convincing degree which popularizes the ImageCons. In this part we start from the most direct way: let experimental subjects read the advertisement and inquired about their ambition. We got the positive response consistently which expressed that the system is believed to be useful but the level of easy using computer is the factor of barriers to entry. In order to discuss this proposition in depth, we divided this part into two topics; first of all, we investigated the attitude towards the technology acceptance, and then discussed and observed the attitude of accepting the new things. The previous one we reference the Technology Acceptance Model (TAM) (Davis, 1989) to talk over and there are two perspectives to discuss the IT acceptance: perceived usefulness (PU) and perceived ease-of-use (PEOU). After the interview, we get some conclusion in the

technology acceptance part. Most experimental subjects indicated that the ease-of-use of the computer system has negative attitude, but the usefulness of ImageCons is the positive part. However, there is one experimental subject say that the step-by-step process is the positive force and make him has more motivation to use.

Moreover, from their daily habits and attitude, we found that they always be urged by the successful paragon. No matter using new product or initiating new career direction, they all follow and reference the footsteps of successful model. Similarly, the spindle of our advertising story also creates a successful protagonist who used ImageCons and become more competitive. That's reasonable why most of experimental subject read this kind of story and want to use ImageCons. From the above two perspectives; IT acceptance and the innovation acceptance, we can say the Proposition 2 is established.

In the last Proposition 3, we present two choices to the experimental subjects to inspect which kind of story is better to trigger the interest of the reader; the personal like protagonist one or not. We found that there are two distinct choices, and based on these differences we investigate the reasons behind. The most plausible explanation is prospect theory which discussed the risk seeking and risk aversion in case of gains or losses. The situation of our experimental subjects fits this theory; the dissatisfied with the status quo one has more willing to take the risk then the satisfied one and this circumstance will affect the choice. On the other hand, we discover the daily habits of the experimental subjects showed that they usually concerns the relevant news, TV program and farmers' visiting group or won't choose the food package which doesn't conform to the local culture. From the above habits and customs we can understand people usually easily be attracted by the analogous factor or situation.

Here are some results are worth of summarizing:

1. User information is a strong factor to get classified into Maslow's Hierarchy of Needs, and this classification module can make an efficacious recommendation.
2. Deducing the computer barriers to entry, SMEs will attempt to use a tool which help other owner create a successful business, and will be motivated by the successful case story.
3. The background will affect the choices; like to read the relevant protagonist story or not; and it can extend to investigate the attitude of risk. However, connecting to the habits and customs we found actually people will be fascinated by the analogous factor or situation.

The consequence of the experiments has shown supportive data for all of our propositions. These finding convince us that based on the recommendation system user will be persuaded by the appropriate advertisement and have willingness to use ImageCons. In addition, the user who is not satisfied with life now is easier to be attracted by this advertisement, because they are willing to assume the risk. However, the computer barrier to entry is a factor which reduces the willingness to use. In order to reduce the barrier to entry, it can start from the advertisement part of ImageCons, because it is a primary point of contact for the user. On the other hand, if the system provide step-by-step instruction manual, it will also increase the willingness to use.

In the next chapter, the research implications, conclusions and future directions are provided to conclude this thesis.

CHPATER 7 CONCLUSION

This research presents a recommendation service system to motivate SMEs to coordinate with ImageCons to do service innovation and publicize what the ImageCons wants to do (to co-create the imagery and provide a prototype to the user). Through this system process, SMEs could get some insight to change their business.

For reaching an agreement of above keynote, this research is initiated with three broad research questions. The first question is related to designing a new mechanism to coordinate with user's individual information to achieve the aim of service innovation motivation. The second one investigates the story content for the purpose of motivation. The remaining one is to understand the assessment method to inspect the incentive degree of the SMEs form different perspectives. The results have been presented in details in Chapter 6.

This chapter summarizes the research contributions first. Next, the managerial implications of the research are discussed. Finally, the limitations of this study, future research and conclusions are presented.

7.1 Contributions

(1) The designed story generator recommendation system

For the motivation purpose as mentioned in the previous chapter, we design the story generator mechanism to automatically construct the story and recommend the suitable one to the user. First, we take advantage of Maslow's Need-hierarchy theory to construct this recommendation system. Based on the Maslow's Need-hierarchy theory, the system classifies SMEs by using their behavior in web process (Section 4.4.1). As a result of the verification of Chapter 6, we found that it is rational to model this recommendation

system with the Maslow's Need-hierarchy theory using user behavior data of web process. And then, we build the story content by using the element Dramatica and SIT, and assemble them by the structure of Three-act Structure to achieve the motivation purpose (Section 4.4.2). Finally, the story structure will be integrated together with the user interrelated information to create a customized story and accomplish the aim of the research; stimulating SMEs to do service innovation. Based on the experiment results in last chapter we have successfully demonstrated a recommendation service system to motivate SMEs to follow the step of the story's protagonist to co-create imagery with ImageCons.

(2) Psychological factors of innovation

This research discuss about the motivation of innovation, and we found that the motivation ultimately start from the psychological factors. That is the reason why the mechanism of recommendation system starts from the Maslow's Need-hierarchy (Section 4.4.1). In addition to the mechanism, we also investigate the different phenomenon of the system user and combine them into the psychological. From the innovation acceptance process to the incentives assessment (Chapter 6), we investigate the influence of the psychological and use this phenomenon to adjust our story content direction. Through the interview, we can understand that user can accept this kind of innovation information which starts from the psychological.

(3) Applying the prospect theory

Prospect theory is the theory of behavioral economics, and we extend this theory into the decision-making of innovation acceptance process (Chapter 6). From the interview process, we found that the user's background will affect the choices and it can be extended to investigate the attitude of risk. The

subjects who have more willingness to take a risk in future planning are less satisfied with their current life compared to the low willingness one. We got this phenomenon from our in-depth interviews process which discussed the perspective of risk and this phenomenon corresponding to the prospect theory; people are risk seeking tendency of the individuals if they are in the loss condition, and more risk aversion tendency when they are in the profits condition.

7.2 Managerial Implications

(1) Stimulating SMEs to co-create imagery with ImageCons

The aim of this research is to encourage SMEs to do service innovation via ImageCons. Because the journey of the co-creating imagery is complicated and lengthy, it is necessary that having some incentive mechanism in the midway of the system process. The paramount assignment of the story generator recommendation system is to incite SMEs coordinate with the system process of ImageCons and to construct their own exclusive imagery to bring some different to their business. The result of the experiment in previous chapter illustrated that user will be stimulated by the content of the story and have enough motivation to use ImageCons.

(2) Stimulating SMEs to do some things different via reading the story of the recommendation system

In addition to stimulate SMEs to co-create imagery with ImageCons, the other purpose of the story generator recommendation system is to incite some intrinsic motivation of SMEs and let them think from the different perspective. After reading the story, the subjects might express that they want to be a successful owner like the protagonist of the story (Chapter 6). It

brings sufficient intention to actuate SMEs to do transformation in their business. At least from the psychological they want to be different and it's a good beginning.

(3) Using the same story to motivate their staff

The principal users of ImageCons are the owners of the business. After the owner obtains the exclusive imagery from ImageCons, he/she must want to implement the imagery in their business. However, in addition to the hardware facilities, the environment needs to reform to conform the imagery, and the personnel are another emphasis to put imagery into practice. This is another occasion to take advantage of the story which can encourage thinking different to incite their staff and establish the vision of the business.

7.3 Limitations and Future Works

We note several limitations to our work that should be taken into account when leveraging our approach. First, the background of the advertising mini story is limited in Taiwan. Correspondingly, we used Chinese as the medium of communication, too. It is a limitation to popularize this system into the other countries, because the grammatical structure is so different in every different language. The encoding method must be change if we want to publicize this system into the other languages of national. Although we can use the language translation API to translate Chinese statement into English or another language, the performance will be limited to the quality of language translation API.

Second, for the purpose of convincing, the most outstanding feature of the story automatic generator proposed by this research is it can utilize personal information to establish the story protagonist. However, for the automatic purpose we need to encode the user's information, and it will cause not enough customization and

the lower correlation. If we want to strengthen the level of customization, we must to figure out another way to establish the coding method which organizes the story structure to compose the user relational story element and the incomplete story framework.

Third, the principal assignment of the advertising mini story generator is popularizing ImageCons and encouraging them to continue coordinate with the system process. However, it can also be used to popularize the other service innovation not focusing on the ImageCons. Practically, it is a popularizing mechanism to persuade people from the psychological way.

Finally, as the summary of above-mentioned limitations, the future research could move beyond the initial development of the proposed mechanism to integrate language translation API and popularize the mechanism into the different countries. Also, based on the mechanism of language translation API, it can change the encoding way of the user's relevant information. Finally, it can be advanced into a technical persuading mechanism for any function or purpose. Future research may extend the focus to across regions level or even national level.

7.4 Conclusion Remarks

In this paper, we address the problem of how to motivate SMEs to service innovation with a psychological mechanism of the advertising mini story generator. By leveraging the Dramatica and SIT, the mechanism assembles them by the structure of Three-act Structure, and the system coordinate with the relevant information of user as the element to construct the integral story to achieve the motivation purpose. Through this mechanism, SMEs are able to get some inspiration about the transition and innovation.

We also offer a system scenario and experiments for this method to show its

practicability. We believe the method can achieve the purpose of encouraging SMEs to do some transition, and getting some inspiration of innovation.

APPENDIX 1

The content of the pre-interview which get the insight to this research:

*The not public recordings of the field research interviews, [ ] means the time of the recording file.
* Mrs. Yu is a farm owner who plants the red guava (a special cropper growing in the Mt. Pillow Recreational Agriculture Area in Ilan County in Taiwan) and leads the local resident to learn the new things.

[02:17~02:23]
Mrs. Yu: Because the peasantry didn't understand packaging and have no story marketing, their products let the customer fell rough.

[01:06:58~01:07:09]
Mrs. Yu: The historical backgrounds of every farmhouse are not the same, so the every story could be written very vivid just about their experiences.

[01:20:41~01:22:58]
Mrs. Yu: We expect the story packaging about our product.
ImageCons: Are there poor business, but have no idea about how to improve?
Mrs. Yu: Yes, there are. At the beginning, we are the same in the agricultural leisure area, but then someone who has good capability will progress, the other still the same. We are the youngest farmhouse in here, the other is older and do not know what is the features about themselves.

[01:32:22~01:37:24]
ImageCons: What is the motivation about the resident come to the learning class? Is there any incentives?
Mrs. Yu: The mug (or the other articles for daily use) and lunch box. There are must some incentives to encourage to class in the countryside and avoid the good day about the weddings, funerals and the busy farming season time. On the other hand, the large company requests the electronic billing, and this is the motivation to go to the class, too.

[01:49:08~01:49:51]
Mrs. Yu: The other farmers are more vulnerable. The have perfect cropper and lovely scenery, but they can't give these a meaningful touching package for customers.

APPENDIX 2

The questionnaire of SMEs Information Module:

Please fill in the following basic information:

Question:	Note:	Answer:
Last Name		
Region	Taiwan-based.	
Age		
Gender		
The opposite position with other competitors by self-Assessment	From 1 to 5, 1 means the lowest satisfaction with this options, and 5 means the highest	
The Satisfaction of the demand for the innovation by self-Assessment		
The operating conditions by self-Assessment		
The willingness to cooperate with other owner	From 1 to 5, 1 means the lowest willingness with this options, and 5 means the highest	

APPENDIX 3

Story templates

+name+： 名字
+age+： 年齡
+address+： 地址
+gender+： 性別

Story paragraph 1	+name+在他+age+歲時，決定回到+address+陪父母一同經營家傳三代的涼麵店「琳光」。這間店已經在當地開了將近 60 年，算是小有名氣，許多外地遊客也會專程前來一飽口福。	
Randomly selected story paragraph 2	雖然店裡收入相當的穩定，但主修是企管與行銷的+name+決定要大膽創新，希望能將周圍商圈整合，不但可以共同打造在地商圈特色，也能夠增進店家們彼此的關懷與互動。	由於店裡的收入相當穩定，在學校主修行銷、喜歡創新而且總是充滿新奇點子的+name+於是開始構想，如果能將附近更多的店家優點介紹出去，不但可以共同打造在地商圈特色，也能夠增進店家們彼此的關懷與互動。
Randomly selected story paragraph 3	在 ImageCons 產業成長平台上做了各種的分析與探討之後， +name+決定創造一個美食天堂。	於是，+name+開始在 ImageCons 產業成長平台上做各種的分析探討，最後發現自己可以創造出一個美食天堂。
Randomly selected story	根據 ImageCons 的建議+name+集合了附近的商家設計出一套消費集點的促銷方式，讓顧客在不同店家都能累積點	+name+根據 ImageCons 的建議，邀集附近紅茶店、雞排店、蔥抓餅店等店家老闆們一起碰面討論，設計出一套消費集

paragraph 4	數，集滿點數以後就能以更優惠的價格來購物。	點的促銷方式，讓顧客在不同店裡消費都能累積點數，而且集滿點數後就能以優惠價格購買東西。
Randomly selected story paragraph 5	這套促銷方式立刻造成風潮，整個商圈的生意變得更好了。而在同時+name+也和結盟的商家變得更友好，共存共榮地攜手建造整個商圈！	這套促銷計畫一實施後立刻獲得了消費者的歡迎，許多顧客會拿著集點卡到合作店家裡進行消費；另一方面，+name+也與這些結盟的商家們成為好朋友，大家約定好之後有任何商機一定會互相分享，促進整個商圈的繁榮！

APPENDIX 4

The raw data of proposition 1:

	Gender	Comparing with competitors	Innovation capability	Operating conditions	Willingness to cooperate	Maslow's Hierarchy of Needs	Plot	Value
1	女	2	3	3	3	Love need	learning	3
2	女	4	4	4	3	Self-actualization need	cooperation	5
3	男	4	3	4	5	Esteem need	cooperation	5
4	男	4	5	4	3	Self-actualization need	cooperation	5
5	女	3	5	2	5	Esteem need	cooperation	2
6	男	5	5	3	5	Self-actualization need	cooperation	2
7	女	5	3	4	3	Self-actualization need	cooperation	5
8	男	4	5	2	3	Esteem need	cooperation	5
9	男	2	2	3	3	Love need	learning	5
10	男	4	2	4	1	Esteem need	learning	5
11	男	4	5	4	4	Self-actualization need	cooperation	5
12	男	3	2	3	5	Love need	cooperation	3
13	女	4	3	4	1	Esteem need	learning	5
14	女	2	2	2	1	Love need	learning	3
15	女	2	5	3	3	Esteem need	learning	5
16	男	2	1	1	5	Safety need	cooperation	2
17	男	2	1	1	2	Safety need	learning	3
18	男	1	2	2	3	Safety need	learning	1
19	女	2	3	4	5	Esteem need	cooperation	3
20	女	2	2	3	2	Love need	learning	3
21	男	4	3	2	3	Esteem need	learning	4
22	男	1	2	1	1	Safety need	learning	3
23	女	4	4	3	4	Esteem need	cooperation	5
24	男	5	5	5	5	Self-actualization need	cooperation	4

25	男	5	5	5	5	Self-actualization need	cooperation	4
26	男	2	3	3	2	Love need	learning	2
27	男	2	2	2	2	Love need	learning	2
28	女	5	4	5	5	Self-actualization need	cooperation	2
29	男	3	2	1	2	Love need	learning	2
30	女	2	2	3	1	Love need	learning	2

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