Chapter 4

Innovation Generation Model

4.1 General

Knowledge elicitation is the process of getting the data needed for knowledge modeling. (G. Schreiber et al., 2000) Knowledge elicitation can be seen as providing the material for knowledge modeling. The elicitation comprises a set of techniques and methods that attempt to elicit knowledge of expert. An expert is a person who possesses knowledge about solving the application task. Elicitation should be focused and structured, however as open as possible. It is the task of knowledge modeling to convert the elicited material into a more formal description of the reasoning process. Methods of expert knowledge elicitation have been addressed by several authors. The objective of most methods has been the development of conceptual designs and models.([David N. Ford and John D. Sterman,1997)   For example, Nonaka and Takeuchi (Nonaka and Takeuchi,1995) combined the elicitation of tacit knowledge and its transformation into explicit knowledge with three other knowledge conversions to generate organizational knowledge for developing product concepts. They propose three steps to make tacit knowledge explicit: describe system knowledge with metaphors, integrate metaphors with analogies and model the resulting product concepts. Among methods of knowledge elicitation, the interview is the most commonly and well-known used knowledge-elicitation and takes many forms, from the completely unstructured interview to the formally planned, structured interview. Interviews allow knowledge engineer as interviewer to ask the expert questions related to a specific topic (G. Schreiber et al., 2000) The interview can be separated into two classes: unstructured and structured interview.

4.1.1 Unstructured interview

Unstructured interviews have no agenda or at least no detailed agenda set either by the knowledge engineer or by the expert. This does not mean that the knowledge engineer has no goals for the interview. The advantages of this approach are as follows: Firstly, there are no formal barriers to the discussion. Secondly, knowledge engineer can get a board view of the topics easily. Thirdly, the expert can describe and discuss topics that are considered important based on the expert's viewpoints. The disadvantages are clear as follows: The lack of structure can lead to inefficiency. The expert may exaggerate by concentrating on topics considered important. The data acquired may be difficult to integrate, either because the data do not form a unity, or because there are inconsistencies.

4.1.2 Structured interview

The structured interview is a formal version of the interview in which the knowledge engineer plans and directs the session. (G. Schreiber et al., 2000) The structured interview has the advantage that it provides structured transcripts that are easier to analyze than unstructured one.

G. Schreiber et al. (2000) also explained the distinguish feature of structured interview that it is particularly beneficial is the knowledge refinement stage, in which the knowledge bases need to be filled. The probes direct the search for missing knowledge pieces. The structured interview also provides useful information about key concepts and relations. A good guideline is to tape every structured interview and to create a transcript from it.

The elicitation technique used in this research is structured interview approach. Based on the CommonKADS's template knowledge model as described in Chapter 3, structured interview is considered appropriated. The structured interview is especially useful to elicit expert knowledge to search for missing knowledge pieces in knowledge refinement stage. The four steps of interviews which comprise scoping meeting, knowledge capturing meeting, case study meeting, and validation meeting are used to elicit knowledge from experts. All output from the interviews are taped in order to create a transcript from it. The interview can be separated into four meetings.

a) The scoping meeting

The purpose of this meeting is to clearly inform the expert regarding the project research objectives, the four meeting objectives, scope of critical tasks of project research, schedule of interview including time and places, identification of who are responsible for target task. In this research, SME Owners are the experts who are interviewed.

b) The knowledge capturing meeting

The purpose of this meeting is to identify who are interviewees. This research, the interviewees are SME Owners who have critical role in operating businesses. Also the other purpose is to clearly inform the expert covering the project research objectives, the four meeting objectives, scope of critical tasks of project research, schedule of interview including time and places, identification of who are responsible for target task. The overview of knowledge capture is provided to the expert for 15 minutes before the interview starts.

c) The case study meeting

In this meeting, the interviewees are explained about the objective of case study meeting together with 15 minutes overview on case study. The other purpose is to validate task knowledge (how to and why) by asking the experts to provide case study in order to confirm knowledge captured in knowledge capture meeting. Output of the meeting is that the expert expresses their lessons learned through case study.

d) The validation meeting

This final meeting is aim at validating the knowledge model obtained from the previous meetings. Agenda of the validation meeting comprises project objectives, validation meeting objectives, task teach back, input resources teach back, process teach back, output teach back and knowledge base teach back.

4.1.3 Background of Experts

Expert #1 Owner and CEO of Wealth Management Systems Co., Ltd. (WMS)

Established in 1995, Wealth Management Systems Co., Ltd. (WMS) is registered with capital of 1 million Baht in a warehouse space covering just 10 square meters. Prior to the WMS set-up, Mr. Somkiat was head of Citibank Private Bank's investment Advisory Unit. For the first five years, WMS invested in research and development on core software product namely, "Bonanza Investment". WMS was managed carefully, with little spending during the first couple years. In 1998, the year after the financial crisis, WMS was awarded a big project by the Government Saving Bank, to provide treasury and asset-management systems worth 34 million Baht. This project fed WMS for a couple years and helped them to concentrate on the research and development of Bonanza Investment. The innovative product, Bonanza Investment, was finally completed and introduced to the market in 2000.

Bonanza Investment supports a wide range of decision tools to strengthen decision-making and investment performance. Investors can stimulate portfolios and check the limits via a compliance system. The system can help fund managers, dealers, compliance officers and back-office operators to manage investment portfolios more effectively, systematically and smoothly. Along development with the development of WMS's core product, Mr. Somkiat also hires experts in software development standards to establish the best practices of software improvement. In 2004, WMS achieve Capability Maturity Model (CMM) level two, an international recognition of a software company's maturity. Now WMS receives CMM level three and is in the process of applying for level five.

WMS is the only local player in this market competing with global financial software suites, but WMS is still the market leader in Thailand. These days, many global financial firms use WMS's products & services including Citibank, Standard Chartered Bank, Deutsche Bank, AIG, Siam Commercial Bank, TMB Bank, UOB, Bank of Ayudhya, GE Capital, SME Bank, and Thai Life Insurance etc. WMS is highly recognized in the market with many awards.

Expert # 2 Owner and CEO of Bathroom Design Co., Ltd.

During the past 12 years, Bathroom Design continually expanded its business. Its swirling bathtub product "Together I-SPA' won "IF Product Design Award 2007" from Germany. This award is well recognized worldwide. The registered capital increased from only one million Baht to 30 million Baht in 2002. Bathroom Design's business is in manufacturing and selling bathroom products, focusing on innovation in design and management, technology and functionalities. The company was highly successful with exports of bathroom products to over 30 countries in Europe and Asia. Its products are popular and widely-accepted, with proof of recognition in the many national and international awards.

The company's vision for 2020 is to be the leading innovator, among the world's Top Five, through emphasis on design, technology and usability. The company adheres to the corporate governance rules and the concept of sufficiency economy. In working towards sustainability, the company continually enhances value for consumers, employee, society, and the environment. Innovation: *Bathtub with various functions for customers.* The company received many awards locally and internationally.

Expert #3 Owner and CEO of CT Asia Co., Ltd

CT Asia (CTA) is a Thailand' leading Small and Medium Enterprises (SME) focusing on Customer Relationship Management (CRM), Contact Center and Smart Card solution development. The company also provides seamless integrated multifunctional solution, front-end systems, CRM solution, IT services, IT-enable services and system integration services. Since the establishment in 1997, CT Asia has successfully undertaken various Contact Center projects for many leading mid-sized and large enterprises across industries from banking, financial services, insurance, health care, and telecommunication.

The areas of expertise are as follows: Contact Center architecture & technology, CRM, Knowledge Management, Web Collaboration and front-end

customer service solutions, PBX integration, Computer telephony integration, IP telephony, Fax-Email-SMS integration, application development and related technical support and maintenance services, Smart Card application development for enterprise. With specialized technical know-how, creativity and innovative solutions combined with an uncompromising commitment, CTA also provides quality application software to customers globally.

In addition, CT Asia is also a manufacturer of robots and develops the first commercialization in Thailand and ASEAN region. The focus is on service robots in home service, restaurant, taking care of children and old people. In the following, an example of the questions and answers in the model validation of CT Asia Co.,Ltd. is shown.

## Expert #4 Owner and CEO of HiGrimm Environmental and Research Co., Ltd.

Established in 1992, the company (HiGrimm) has maintained its constants rapid growth by providing full support of environmental solutions to varieties of industries in domestic and overseas markets. Since 2006 HiGrimm has joined with Faculty of Environment and Resource, Mahidol University to make several researches in order to develop the most appropriate and effective technology for various environment impacts. The company has been supported by National Science and Technology Development Agency (NSTDA) and collaborated with National Center for Genetic Engineering and Biotechnology (BIOTEC) at Thailand Science Park.

HiGrimm's goals are a high environmental competent company in this region, to encourage the environmental quality. HiGrimm, therefore, is known as one of the leading environmental consulting companies in Thailand. The company aims to innovate, research, develop and produce green products, which cover numerous types of industries, to meet the need of current environmental conservation demand. Other services are wastewater management in petrol stations and oil rigs, industrial waste water management, cleaning greasy heavy machines and equipments etc.

4.2 Model Synthesis

4.2.1 Configuration (Propose and Revise) Template

The Configuration (Propose and Revise) is classified as synthesis task template. A task template forms a common type of a reusable combination of model elements. This task   template supplies the knowledge engineer with inferences and tasks that are typical for solving a problem of a particular type (G. Schreiber et al., 2000). The template shown below in figure 4.1 is applied to develop an Innovation Generation Model. In the research, the "requirement" in the template is the occurrence of innovation.
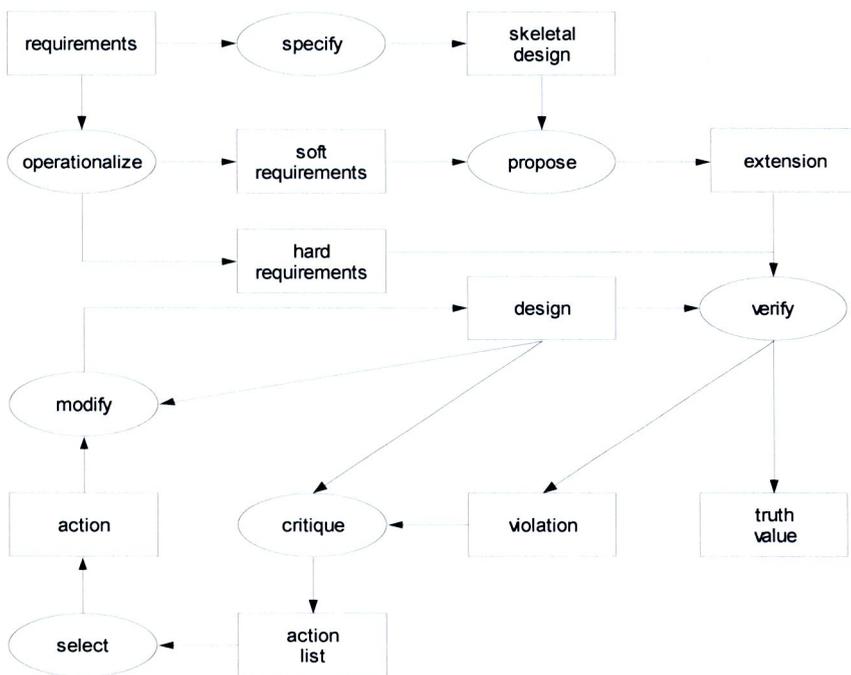
Figure 4.1 Configuration (Propose and Revise) Template

4.2.2 Knowledge Capturing Interview

According to the Configuration Design Template, the following questions are designed.

Question 1: What are the elements that potentially foster the occurrence of
innovation?

Question 2: What are the possible constraints against the occurrence of innovation?

Question 3: How do you solve such problems?

Question 4: How do you set criteria to justify that the innovation has occurred?

Question 5: What do you do when some criteria are not fulfilled?

The above-mentioned questions are imposed on the experts. In knowledge capture interview, two cases have been used to elicit knowledge from experts. Those two experts are Mr. Somkiat Chinthammit, owner and CEO of Wealth Management Systems Co.,Ltd. and Mr. Watcharamongkol Benjathanachart, owner and CEO of Bathroom Design Co.,Ltd. Presently, both companies have become the well-known SMEs in the country. Scripts and transcripts from Knowledge Capturing of expert #1 (Mr. Somkiat) and of expert #2 (Mr. Watcharamongkol) are shown in the appendices.

In the following, an example of knowledge capturing interview is shown through the case of Wealth Management System Co.,Ltd.

Question 1: What are the elements that potentially foster the occurrence of innovation?

Answer 1: The elements that potentially foster the occurrence of innovation are many. The team of staff needs to have common passion. In order so, it has to begin with the appropriate selection of each new recruit. Only those with positive attitude can join the team and thus lessen negative mentalities. But positive attitude alone will not be enough as situation and condition constantly changes, as such is the need for perpetual self-learning of the owner and staff. With each person ready to take on the mission, the owner must provide the team with the concept and vision, through direct and effective communication, in order for all to make joint commitment as a team. The team can only thrive in the supporting culture which the staff is not only appreciative of being continuously well-coached but they very much feel they are treated like family member. At workplace, clear operation guidelines are provided. The staff has the freedom on ideas and expression and they find the working

atmosphere fun and cordial. There are constant learning and knowledge sharing opportunity. The staffs are motivated as their good works are recognized and rewarded. At all levels in the organization, everyone possesses the entrepreneurial mindset. They can spot the business opportunity and they do not hesitate to take risk in the execution of required tasks, with relentless creativity and the efforts to make product differentiation. The owner and the team make use of their work experiences and network in the synergy that gives their organization the edge on business competency.

Question 2: What are the possible constraints against the occurrence of innovation?
Answer 2: Lack of financial support and lack of knowledge.

Question 3: How do you solve such problems?
Answer 3: The first constraint is lack of financial. Our company established with initial capital of 1 million Baht. The company was managed carefully, with little spending during the first couple years. The first five years were spent in researching and developing core software products. Initial source of funds come from co-founders, closed friends, family members and the group holding company. Wealth Management System is financially supported by Group Holding company which invested mostly in food companies (Khong Kaeng Sugar/Thai Flour Industry), real estate (Boathouse Hua Hin) and etc.

Based on our company's vision to be one of the best software development for bank and financial sectors, our company manages the lack of knowledge constraint by hiring consultants from outside to strengthen our teams. We also employ experienced staffs. Our Managing Director has more than 15-year experiences in banking sector. Besides, we focus on recruiting high-caliber graduates in computer software development areas both from local and international universities such as Sirindhorn Institute of Technology, Thammasat University.

Question 4: How do you set criteria to justify that the innovation has occurred?

Answer 4: Innovation requires novelty and commercialization. It is usually taken a period of time, mostly long term, to complete a new product therefore sufficient knowledge and financial support is critical to our achievement.

Question 5: What do you do when some criteria are not fulfilled?

Answer 5: When we fail to generate the innovation, here are our actions. Company education is essential before any change program is rolled out. Additional Education is as much about mindset as it is about skills. Shape the way employees see the world, and their actions will be changed. If there is KM but it is a bland KM there is no use to it. Between our staffs, if there is no knowledge sharing that means there is no friendship ongoing. There has to be strategies, activities and trainings to forge such caring attitude. We put all the knowledge there is in our web portal that is frequently viewed by our staff. When they are assigned new project, they can shortcut to the knowledge through this web portal. Plus there are a number of good trainings in there. That is the KM we set up. In the beginning we had to devise strategies to attract them to the portal. In the first years we only put in few such as 40% of content, another 70% through discussion in some forum or over coffee session. Once they start to get used to it then we gradually add more content, but also with added activities to entice them to be caring and sharing their knowledge.

The closer our company gets to its customers, the easier it is for us to the commercialization. Orientation to bring workers closer to customers is an important action. Our company can speed up a sluggish start the transition_nominating a few potential champions at the successive levels. The designated champions can then be sent out their experience firsthand some of the problems that face our company's customers. This results in a bottom-up leadership from those closest to the customers. . Good orientation for new staffs will reduce more than half of the turnover. The Thais do not give importance on this point. Good orientation is to tell them on what our company believe in, what are the 3 pillars of Wealth, how can we grow together, why would they be proud in joining us and what s the corporate culture. Some of senior staffs take turn on stage to tell about their knowledge and knowledge sharing become the norm of our company. We spend two days on orientation. We want the right culture, the right standard, the right practice. Every

piece of work has our brand on it, as such it needs to be reliable. If you want to build up culture, you need to be the story teller over and over. This is the duty of CEO.

Staff challenging is next action which promote creativity and innovation generation. For example, our staffs do not follow on what has been agreed, thus no best practice. In this case, my first suggestion is that supervisor has to build up their merit to bring their subordinates to respect them. If supervisor can do all of these, subordinates will follow supervisor's goal. Next is on teaching on the job. Supervisors have to build up good relationship with subordinates. If not, they will not believe in supervisors no matter how supervisors teach subordinates. This is a challenging task particularly for staffs at supervisory levels.

Next action is expert outsourcing. Most importantly, outside help can help us surface and challenge assumptions that may be invisible to the rest of the organization. I always encourage my staffs through optimistic viewpoints. I also tell staffs that it will not be easy to compete on international basis, however, do not afraid to fail. In other words, the sooner one fails, the faster the one will reach success. Thus, we need people who have the 'Can DO' attitude.

Innovation begins with an eye toward the future. CEO takes the foresight to look the future of your industry and the right risk attitude to act on his insight. Starting from vision, mission, and strategy down to strategy implementation, which is different from Work program and budgeting. There is also risk management embedded in the Work Program so that it does not fail. This is made into the goal of each department. If we have a clear work program, the project management will also comes out clearly and easy to do risk management. This makes it easy to do document evaluation at the end of the year.

Next action, core competency revision is taken There are a lot of knowledge within our company, but we want only the knowledge that will increase our competitive edge. We took in the requirement from over 500 customers who are all very smart fund managers. Those customers have given the idea for our team of

consultants, leading to our research and development. These requirements from customers became the innovation of our company.

4.2.3 Case Study Interview

The case study interview question is given below:

Question: Please tell us about the case that you think it creates high impact to the innovation generation.

Here is the script obtained from the same expert – Mr. Somkiat Chinthammit, owner and CEO of Wealth Management Systems Co.,Ltd.

Answer: The customer may make some complaints but we must be willing to listen. It is the customer who leads us to innovation. Innovation does not come on our own. Therefore, we should involve the customer as soon as possible. The old business model no longer works. Better to get the customer involved as early as possible, either in the development stage or to co-develop. In the software business, if I perceive that this is the smartest customer in this field, I will invite them to co-develop the project, initiating on a software program.

Some of the programs that came from the customer by Ms.Warang - Thai Life Insurance Co.,Ltd. She already has the bonanza program, upon the first click the status is shown, she wishes to have further program to make the second click on the market risk of the portfolio. At the third click she should be able to tell what is the credit risk of her portfolio. This took us over a year and a half to design the program. What we did was to make the second click runs to Communication Authority of Thailand, which has the financial statement of all the listed companies, past and current, including credit risks plus many other data. These data then comes back to our customer via internet. As mentioned, innovation comes from customer. Innovation can come to whoever discovers the need of customer. Customer is the source of innovation.

From the experience, we learnt that in producing software there will always be loss in production cost which is undetected. No industry can survive if there is too much loss in its production line. We should not forget that 70-80 % of the costs are expenses on prevention, search and improvement of BUG. Therefore, the key is to manage on cost of quality. Our production process must reduce BUG, or remove BUG soonest once found, in order to survive. For sustainable problem-solving, the only option to have the least cost loss is to build on software standard. Nowadays, it is highly necessary for the Information and Technology industry to look for best practice. On the part of WMS, we believe that the standard of CMMI (Capability Maturity Model Integration) of the SEI Institute-Carnegie Mellon University is the best model to reduce loss in production cost, at the same time enable increased bonus to the production team. CMMI standard will make the framework more systemized, increase competitiveness and enhance the market value of the product.

4.2.4 Validation Meeting

List of questions of the validation meeting are as follows:

Question 1

Here is the question to confirm on the process to create innovation. We will start with key factors for innovation creation namely: Common Passion, Personal mastery, Shared Vision, Culture, Entrepreneurial Mindset of Owner and Workers and finally Business Model and Skill.

Would you confirm on these elements?

Question 2

To create Common Passion, would you need to have in place appropriate selection of workers, and for them to have positive work attitude

Question 3

Is Perpetual Self-learning of Owner and Staffs vital to the attitude on personal mastery?

Question 4

On the process of Shared Vision, does it need to start with the Conception of Vision by Owner, and Effective Communication of Owner's Visions to Staff?

In order to have shared vision, would there have to be Owner and Staff Commitment?

Question 5

To build a culture that is conducive to innovation creation, do you have to make your staff feel as if they are part of your family, that they have freedom and joy in their work, that they are part of knowledge-sharing, and that they are motivated and inspired by being given recognition and award ? Does the Head need to have Clear Operation Guidelines and doing Coaching alongside?

Question 6

When talking about Entrepreneurial Mindset of Owner and Workers, do you have to consider on the business opportunity, of which those persons have to dare to implement and bare risk?

Question 7

When talking about Entrepreneurial Mindset of Owner and Workers, is it necessary to have creativity and to think about Differentiation at all times?

Question 8

Are the work experiences of the owner and staff both help in forming the Business Competency leading to Skill? Do you take into account that the Business Networks are important to Innovation creation, especially to push for Commercialization?

Question 9

To create innovation, there are two key obstacles: Lack of financial support and Lack of knowledge. To overcome Lack of financial support, this can be done by borrowing from family business, co-founders and commercial banks. To overcome Lack of Knowledge, this can be done by hiring consultants form outside, hiring experienced

staffs as senior staffs and hiring new and high-caliber graduates. In this regard, please verify if my understanding is correct?

Question 10

Do you agree that innovation creation actually takes place when there is novelty and commercialization? In the case that it does not fall in that category/pattern, should there be improvement/adjustment to lead towards innovation creation by adopting these methods: additional education, orientation to bring workers closer to customers, staff challenging, expert outsourcing, encouragement through optimistic viewpoints, access risk in work program and revision of core competency?

The validation questions and answers with the same expert – Mr. Somkiat Chinthammit, owner and CEO of Wealth Management Systems Co.,Ltd., to validate the knowledge model are shown below:

Question 1

Here is the question to confirm on the process to create innovation. We will start with key factors for innovation creation namely: Common Passion, Personal mastery, Shared Vision, Culture, Entrepreneurial Mindset of Owner and Workers and finally Business Model and Skill. Would you confirm on these elements?

Answer

Yes. I confirm that those factors mentioned above are critical to start innovation creation. In my opinion, each element has its own importance to generate innovation. Among all other elements, "Common Passion" is more prominent than the remaining ones.

Question 2

To create Common Passion, would you need to have in place appropriate selection of workers, and for them to have positive work attitude

Answer

Yes. Common Passion requires Appropriate Selection of Staffs. Staff recruitment must be executed with utmost care. Selected staff must be competent and able to blend with our culture. Each staff's personal passion is appropriately aligned with

organizational objectives. Common Passion also comprises of Positive Attitude of Staffs. The motto representing our attitude, 'It may be difficult but it is possible' is posted on the announcement board on the seventh floor of our office. It is unsurprising that people who never become are those who live by the attitude, 'It may be possible but it is too difficult'. Selected staff must be competent and able to blend with our culture. We therefore require staff with 'can do' attitude. To foster the staff's positive attitude, emphasis is made through new staff orientation which we make it a two-day program, to drill into them this essential attitude from the very beginning.

Question 3

Is Perpetual Self-learning of Owner and Staffs vital to the attitude on personal mastery?

Answer

Yes. I myself as owner and each staff are encouraged to make progress to acquire new knowledge for self development and, in turn, to give back to society with joy. I would say that the Perpetual Self-learning is important to the attitude on personal mastery.

Question 4

On the process of Shared Vision, does it need to start with the Conception of Vision by Owner, and Effective Communication of Owner's Visions to Staff?

In order to have shared vision, would there have to be Owner and Staff Commitment?

Answer

Yes. Shared Vision needs to start with the Conception of Vision by Owner, and Effective Communication of Owner's Visions to Staff. As owner and CEO, I am the motivator and conductor. The vision is to be the best in research and development in software development. I give guidance and outline my expectation, but I do not manage them. I convert the intangible into tangible. SME owner has an important task to turn staffs' personal vision into common goal, in line with the vision of the enterprise. This requires effective communication of owner's visions to staffs. The owner must align staff attitude towards owner's inspiration.

Definitely, in order to have shared vision, there have to be Owner and Staff Commitment. We build commitment between owner and staffs by crating trust. Owner and staffs commitment is originated by the right mind set and trust between both parties. One of our staffs who now become supervisor expresses his sense of belonging by making a DVD story about Wealth Management Company starting from the start-up. The content of the story describes how the company develops and progresses until now.

Question 5

To build a culture that is conducive to innovation creation, do you have to make your staff feel as if they are part of your family, that they have freedom and joy in their work, that they are part of knowledge-sharing, and that they are motivated and inspired by being given recognition and award ? Does the Head need to have Clear Operation Guidelines and doing Coaching alongside?

Answer

Yes. As owner, I always interact with staffs in such a way like family members. "Like-Family members" treatment makes our staffs fell working at their homes. Staffs are pleased to help each others when someone needs assistance. Senior staffs are ready to teach junior ones. Corporate culture is called "Wealth 39 Professional Practice", which is modified from best practice of CitiBank. The corporate culture is used in coaching our staffs. Working atmosphere is classified as freedom and fun. Staffs have freedom to express their opinions and suggestions in meetings and are proud working with our company.

Well-known experts are invited to share knowledge with staffs at all levels to sharpen their skills at works. Project managers take turn to be project leaders. Each manager shares their experiences. There are various projects to foster knowledge sharing among staffs e.g. Senior staffs teach junior ones, Friends help Friends, Wealth Library, Blog and Web.

One interesting activities called "Sapa Gafair". Staffs are free to talk about anything. CEO inserts contents initially 30% and then marginally increase the

contents so that issues discussed is useful for their work operation. Staffs take turn to teach each others. "Teacher of the Year" award is set up to motivate staffs. I as CEO is the first one who gets the award.

Staffs earn rewards e.g. special bonus when they completed a project as member of project team. Some staffs are honored to be guest speaker at universities e.g. Chulalongkorn University on behalf of the company. The Head also need to have Clear Operation Guidelines and doing Coaching alongside. I as CEO must provide clear guidelines of operation to all staffs levels Focus is on corporate culture, "Wealth 39 Professional Practice". Work ethics are also included in the culture. Final expected output is that staffs process their works in line with operation guidelines.

Question 6

When talking about Entrepreneurial Mindset of Owner and Workers, do you have to consider on the business opportunity, of which those persons have to dare to implement and bare risk?

Answer

Yes. I myself as Owner and staffs must always look for business opportunities. All customers are fund managers who are knowledgeable and smart. Ideas and suggestions received from the customers are valuable and useful. The information is used to improve the company's software and services, bringing to innovation finally. I must be decisive on how to move company in the direction, which is appropriate for company regarding innovation. The company must be prepared to sustain in long term as occurrence of innovation usually takes a long period of time. In other words, we must bear business risk during the period of time. That is execution by taking risks.

Question 7

When talking about Entrepreneurial Mindset of Owner and Workers, is it necessary to have creativity and to think about Differentiation at all times?

Answer

Yes. Creativity drives innovative processes and outcomes. The failure to cultivate creativity leads to the failure to innovate. Creativity requires each staff to have the

capacity to visualize new and different products and processes. Therefore creativity requires the ability to think differently, to continuously learn, to discover and discern ambiguous patterns, to draw inferences and form conclusion in new and different ways.

Question 8

Are the work experiences of the owner and staff both help in forming the Business Competency leading to Skill? Do you take into account that the Business Networks are important to Innovation creation, especially to push for Commercialization?

Answer

Yes. I believe the right mindset is extremely important in getting the organization moving in the right direction. Based on my past experiences as Head of Citibank Private Bank's investment advisory unit, here our definition of wealth has 3 'P' aspects: People, Process and Professional Best. We taught staffs mind map and let them in a contest, with attractive rewards and display their work in the office. Thus, our new staff and those who came before them are well-versed in management, as before they can come up with the mind map, they have to have to first read the whole document, and then convert the policy into tactic such as an outing or contest. Any team that win first place will get the prize but they have to be on stage to present what are their inspiration. The hidden agenda here is that we get them to really understand the whole picture. Once our staffs get it, together with their accumulated past work experiences (E6.1), they are able to set the goal with the staff in their team that what are the priority of the day, or use it as tool to evaluate the staff. and to achieve company's goals.

I also always take into account that the Business Networks within the Business Model is important to Innovation creation, especially to push for commercialization. Through our good Business networks with financial and non-financial organizations e.g. National Science and Technology Development Agency (NSTDA) and Science Park, help our company to expand our products to various customers.

Question 9

To create innovation, there are two key obstacles: Lack of financial support and Lack of knowledge. To overcome Lack of financial support, this can be done by borrowing from family business, co-founders and commercial banks. To overcome Lack of Knowledge, this can be done by hiring consultants form outside, hiring experienced staffs as senior staffs and hiring new and high-caliber graduates. In this regard, please verify if my understanding is correct?

Answer

Yes. Sources of funds come initially from co-founders who are family members. It is necessary to have this fund in the early stags. We then gradually increase funds from our operations. At the start-up, Wealth only had a registered capital of one million Baht, with 4-5 staff, working in an old warehouse. From where I was then, I told myself I would keep this company going for several years, until I find out on the software industry. I was only a banker. Software was entirely new to me. The growth was gradual. I kept emphasizing on this to our staff every year, and on what we should do. We have to be clear on our goal, and let it cascade to staff.

To overcome the lack of knowledge, these following actions have been taken. Due to our products closely link with rules and regulation of commercial bank and Bank of Thailand, we hire consultants from outside to strengthen our teams. In addition, we employ experienced staffs, for example, our Managing Director has more 15 years experiences in banking sector. New and high-caliber graduates from well-known universities e.g. Sirindhorn Institute of Technology, Thammasat University intend to work with us due to our good reputation in the software market.

Question 10

Do you agree that innovation creation actually takes place when there is novelty and commercialization? In the case that it does not fall in that category/pattern, should there be improvement/adjustment to lead towards innovation creation by adopting these methods: additional education, orientation to bring workers closer to customers, staff challenging, expert outsourcing, encouragement through optimistic viewpoints, access risk in work program and revision of core competency?

Answer

Yes. I agree that innovation creation actually takes place when there is novelty and commercialization. It is usually taken a period of time, mostly long term ranging from 3-5 years, to complete a new product and make it commercial therefore sufficient knowledge and financial support is critical to our achievement.

When the criteria of innovation generation are not fulfilled, the followings actions are taken. Company education is essential before any change program is rolled out. Additional Education is as much about mindset as it is about skills. Shape the way employees see the world, and their actions will be changed. The closer our company gets to its customers, the easier it is for us to the commercialization. Orientation to bring customer close to customer is an important activity. Staff challenging particularly for staffs at supervisory levels is an essential action. I myself as owner am responsible for identifying improvement opportunities, while line mangers are trying to run business. This caused a great deal to tension within the company. And although tension is often thought of as undesirable, however this debate and discussion unleashed creativity in our company.

Expert outsourcing is next action which is taken. Our company needs to go out and find help in those areas where we have insufficient expertise – for example, with the techniques of change management. Most importantly, outside help can help us surface and challenge assumptions that may be invisible to the rest of the organization. As CEO, I always encourage my staffs through optimistic viewpoints The role of the CEO, besides being the lighthouse shining the way, we have to also be the battery or the motivating factor. CEO tells staffs that it will not be easy to compete on international basis, however, do not afraid to fail. The sooner you fail, the faster you will reach success. This attitude is posted on the 7th floor of our office. "It may be difficult but it is possible. The revision of core competency is an important action, which is taken nearly a year. Without our core competency, we have no way of knowing, which is the vital knowledge for our company.

4.3 Model Validation

In order to validate the Innovation Generation Model, the two cases, CT Asia Co.,Ltd. and HiGrimm Environmental and Research Co.,Ltd. are chosen. Owners and CEOs to be interviewed are Mr. Chalermpon Punnotok as expert # 3 and Mr. Watsan Ariyaphuttarat as expert # 4 respectively. Scripts of CT Asia Co.,Ltd. and HiGrimm Environmental and Research Co.,Ltd. are shown in the appendices. It should be noted that the set of questions used in the validation meeting for knowledge elicitation are applied here as well. In the following, an example of Model Validation interview is shown through the case of CT Asia Co.,Ltd.

Question 1

Here is the question to confirm on the process to create innovation. We will start with key factors for innovation creation namely: Common Passion, Personal mastery, Shared Vision, Culture, Entrepreneurial Mindset of Owner and Workers and finally Business Model and Skill. Would you confirm on these elements

Answer

Yes. All above elements are essential to generate innovation in our company. Everything that is about innovation must start with something new. To have something new, there has to be great desire. But merely desire is not enough, there has to be passion, and lots of it, to differentiate with others. Not to forget that at this very same time, there are new things happening around the world. Competing on innovation is no only among 60 million Thais, but altogether among 3 billion world population.

Question 2

To create Common Passion, would you need to have in place appropriate selection of workers, and for them to have positive work attitude?

Answer

Yes. Common passion is the first key essence. It is the philosophy or common passion. This passion is the one that drives us to make greater things and continue at

it. Appropriate selection of workers is very important. As for my company, I intended to make it diverse, starting with myself as Marketer, I searched for outstanding engineers, those that can bring my dream to life. I treat this as crucial, as without them, there is no development. And only the best ones will do, not just any engineers. We need those that will enter the battlefield with us side by side. In my company, I hold 50% stake and the engineers another 50 %. That was how we set up an SME company. The way this company was built is how the Head is, that's how the followers are. We all prove ourselves. Another important dimension is about SME. Most SMEs only has one, or at the most two, highly-capable people. And most of these people are in the same line of work, such as engineers with friends in their same fields. Thus, it is the lack of diversification. Common passion also consists of positive work attitude. In the organization structuring, we have to understand this concept. Oftentimes we see that in SME business, there are quarrels and disagreements between them. But in my case there was none. When we started, we were clear on what we wanted to do and we believe that we can do. I have all the dreams but if without the excellent engineers, I would not start on it.

Question 3

Is Perpetual Self-learning of owner and workers vital to the attitude on personal mastery?

Answer

Yes. The attitude on personal mastery relies on perpetual self-learning of owner and workers. I will clear the works that are operational issue and I will not handle any of them but to form a team to do. I have to free up myself to be visionary, to do networking with other important players and partners. I treat it as important mission. No one will tell me this, I have to brainstorm by myself on how do I start and with whom. We need to use our brain – go talk to people, attend seminars, read – to make it saturated. At that point, we see it all and here we go.

Question 4

On the process of Shared Vision, does it need to start with the Conception of Vision by Owner, and Effective Communication of Owner's Visions to Staffs?

In order to have shared vision, would there have to be Owner and Staff Commitment?

Answer

Yes. First is the conception of vision by owner. After reading a lot on the future, when I come to take up on robot, I have to brainstorm on the future and of the industry in Japan, as I have earlier analyzed to you. I need to see how great, how popular it is. When I read that Bill Gate say "one home- one personal computer", what I say "one home- one robot". This kind of saying is the vision. It is the future (not yet happening) It will happen, only we do not know when and who will be the inner there. There is no definition. That is my duty. thinking on innovation and finding the moment of vision.

Next, communication of owner's vision to staffs must be effective. It is as if you are the reigning king. You need to tell your troupe how you will be fighting with your enemy. Everyone wants to fight, but we need to tell them what the goal is, and build up the joint goal for the shared purpose. I could be looking very far ahead but when I talk to my team I digest this goal for them.

In order to have shared vision, there would have to be Owner and Staff Commitment. There is a teacher at the Kasetsart University, he wants to do the robot's hand that can shake hand, he has made it to the certain level and he has a Ph.D. Therefore, about our vision, when we set it up there are other factors that enhance and speed things up. Then we do the blueprint. In simple words, we orchestrate all things, internal and external, to make it reaches the goal. No one can do it single-handedly. They are pleased with me too because they have never thought what could be the use of their invention. But when it combines with ours, we create the stage where they can shine.

Question 5

To build a culture that is conducive to innovation creation, do you have to make your staff feel as if they are part of your family, that they have freedom and joy in their work, that they are part of knowledge-sharing, and that they are motivated and

inspired by being given recognition and award ? Does the Head need to have Clear Operation Guidelines and doing Coaching alongside?

Answer

Yes. The "like family members" concept is used for knowledge transfer in our company. I use coaching method when I teach my staffs. Next is "Freedom and Fun". My employees and I are crazy people. We head to the same direction. Our craziness is a mutual hypnotization. We will make it rise and both CT ASIA and Thailand will be proud of it. There is no politics in this organization. Once it was crazily said that our robots will beat Mosimo (robot produced by a Japanese company). When it has become like this, the environment has its own momentum. Then it is natural to receive new ideas. Knowledge sharing is executed through on the job training like brother to brother practice. On staff motivation by rewarding, we give company's shares to the key mans. Let them hold the property. We also give regular salaries and bonuses to the other employees though. The last is "clear operation guidelines". We don't have a balanced score card nor sigma nor anything similar. I see it as being too formal. I don't want it to be a hurdle. My team is like a special combat unit. We raid and win. We don't do formal stuff like the military headquarters.

Question 6

When talking about Entrepreneurial Mindset of Owner and Workers, do you have to consider on the business opportunity, of which the SME himself has to dare to implement and bare risks?

Answer

Yes. I consider on the business opportunity and execution by taking risks. There are two factors that affect the pace of future business – our team and our competitors. Most of our competitors are giants. So, what we need to be capable of is to read the competitors' mind. Don't be afraid. The bigger the competitors are, the more weaknesses they have. Everyone has weakness. It depends on whether we can find it. That is business opportunity. However we have to face with business risks due to uncertainty.

Question 7

When talking about Entrepreneurial Mindset of Owner and Workers, is it necessary to have creativity and to think about Differentiation at all times?

Answer

Yes. We need creativity and differentiation at all time. Every organization has innovation which is normally generated by the leader, like Steve Jobs or Bill Gates. These people must be able to read the future and translate it. How were these people born and how do they have high creativity? For me, it started by being good at drawing. When I entered a competition, I had to think within 2 hours what the topic was and what to draw. I needed imagination. I was commented by some senior artists that I should not draw with meanings. The real artists aren't like this, but I am. So, creativity is not hard to be generated. What matters is whether you practice it. This refers to creativity and product differentiation.

Question 8

Are the work experiences of the owner and staff both help in forming the Business Competency leading to Skill? Do you take into account that the Business Networks are important to Innovation creation, especially to push for Commercialization?

Answer

Yes. Work experiences of owner and workers in including Business networks help us develop Business Competency. I worked at headquarter of GE Capital which is considered the best enterprise in the world. Thus, I was the one who saw best products first. Then the idea of a call center popped up. Which product should I have produced first? What I found at GE initially was the call center management science which includes how-to, processing, and software. What I brought back was how to run them all in total solutions. That's what we call Innovation. Our first product was know-how. I don't just sell software, but I sell a consulting-approach solution for customers and educate them how to operate a one-stop customer service center. .That was our first software which is called Infocentric. It was trendy at the time and was exciting by its concept since there was no such a solution before in any organization no matter how big it is. In the first period, the features were the connection with the PABX booth. The connection was in terms of data – about how many incoming calls and awaiting calls. These data were shown as graphics on screen. The achievement is also

resulted from our staffs' experiences. Business networks are much helpful for us to successfully sell our products to customers since the first version until now. . I have to free up myself to be visionary, to do networking with other important players and partners. I treat it as important mission.

Question 9

To create innovation, there are two key obstacles: Lack of financial support and Lack of knowledge. To overcome Lack of financial support, this can be done by borrowing from family business and co-founders. To overcome Lack of Knowledge, this can be done by hiring consultants form outside, hiring experienced staffs as senior staffs and hiring new and high-caliber graduates. In this regard, please verify if my understanding is correct?

Answer

Yes. The set-up fund comes from myself and my friends as co-founders. When I started a company, I invited my rich friends to be the owner. They established the company and build the software. "You pay, and I work." They are the first guinea pigs who did a real-estate information service center. I built CT ASIA for them to be our customers. What did I get? First – customers, Second – a company, and Third – software. I got three at the same time. .We lost over 200,000 baht during the first year but started to make some profits since the second year due to our new project. For Thai people, I was the first who operated a call center. I never borrow from a bank. I circulated the cash from my projects. I didn't finance my project by any capital. I didn't wait until the software was fully developed to sell it. I sold and developed it at the same time. That's how we didn't need any help from a bank.

Our product is just simply better and cheaper. The only issue s that they didn't trust that Thai people could do it well. So we proved ourselves by collecting track record. In the third period, the product was highly developed. It was the era of being international. Then I talked with the public sector. If you want to see Thai products going international, you must be supportive. I was funded by SIPA and Department of Export Promotion. I was the first who told them to open the enterprise software category. Then I was funded by the government for 3-4 million baht a year. Now I

have 10-20 companies in total. The offices in Ho Chi Minh and Tokyo have been established. It has become internationalized. And that's where we are now.For lack of knowledge on engineering, we usually solve the problem by hiring high-caliber graduates. I have all the dreams but if without the excellent engineers, I would not start on it.

Question 10

Do you agree that innovation creation actually takes place when there is novelty and commercialization? In the case that it does not fall in that category/pattern, should there be improvement/adjustment to lead towards innovation creation by adopting these methods: Additional Education, Orientation to bring workers closer to customers, Staff Challenging, Expert Outsourcing, Restudy The Organization guideline, Encouragement through Optimistic Viewpoints, and Reshuffling Staffs to Match The Identified Problems ?

Answer

Yes. I agree. Innovation generation occurred when there is novelty and commercialization. In the case when the criteria of innovation generation are not fulfilled, we executed the actions as follows.

Firstly, "additional education" is provided for our staffs by attending training courses usually at Software Parks. For "Orientation to bring workers closer to customers", our staffs are trained to observe and find out problems and new requirements from customers. This is very good inputs for new ideas and creativity, which could be developed too new products. Next is Staff Challenging. To challenge staffs, brochure of new challenging product i.e. serviced robot, is done in order to make it become visible as if it already exists. If there are only words, staffs can not figure out what it is going to be like. It is a brochure so it can be seen, s if they saw it at a store. However, the real ones have not existed yet. It is the strategy to make innovation happened. We used expert outsourcing when our staff in our company has not such knowledge. Next, we encourage our staffs through optimistic viewpoints. No Thai company has ever thought to compete with "Osimo" robot of Japan. Our staffs now recognize that we can do. The revision of core competency is

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an essential action for innovation generation. Based on the revision, we find out what knowledge is critical to new product development.

4.4 Innovation Generation Model

The knowledge elicitation process results in the following knowledge map which represents the innovation generation model.
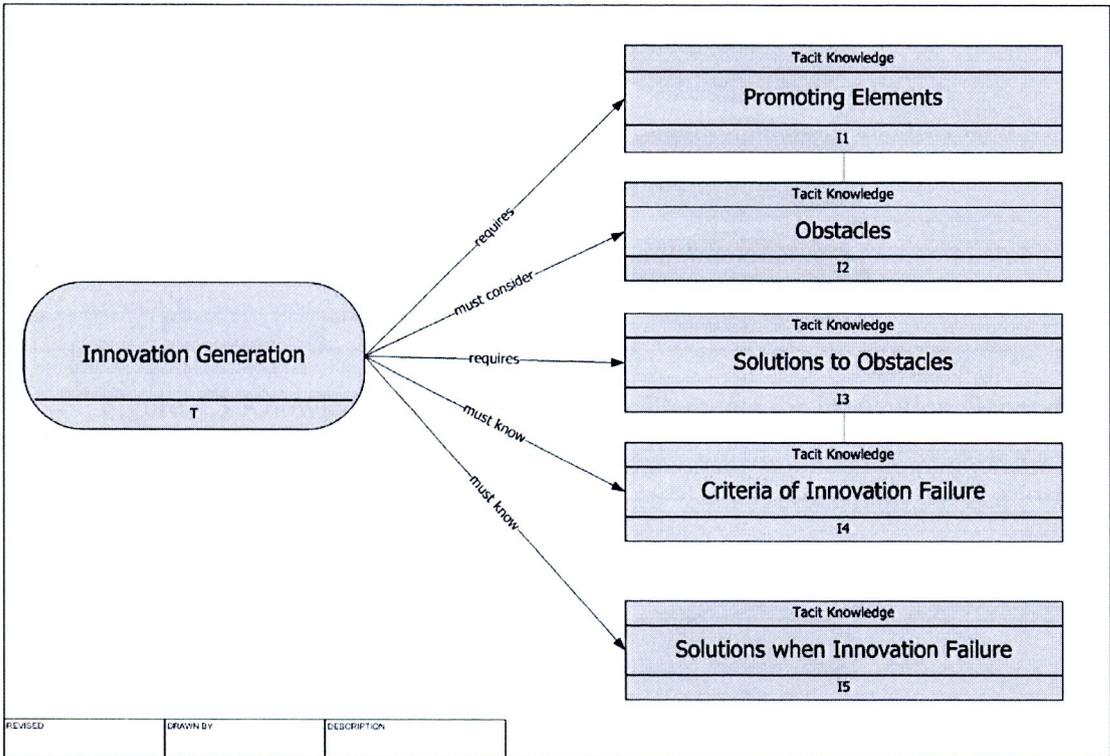

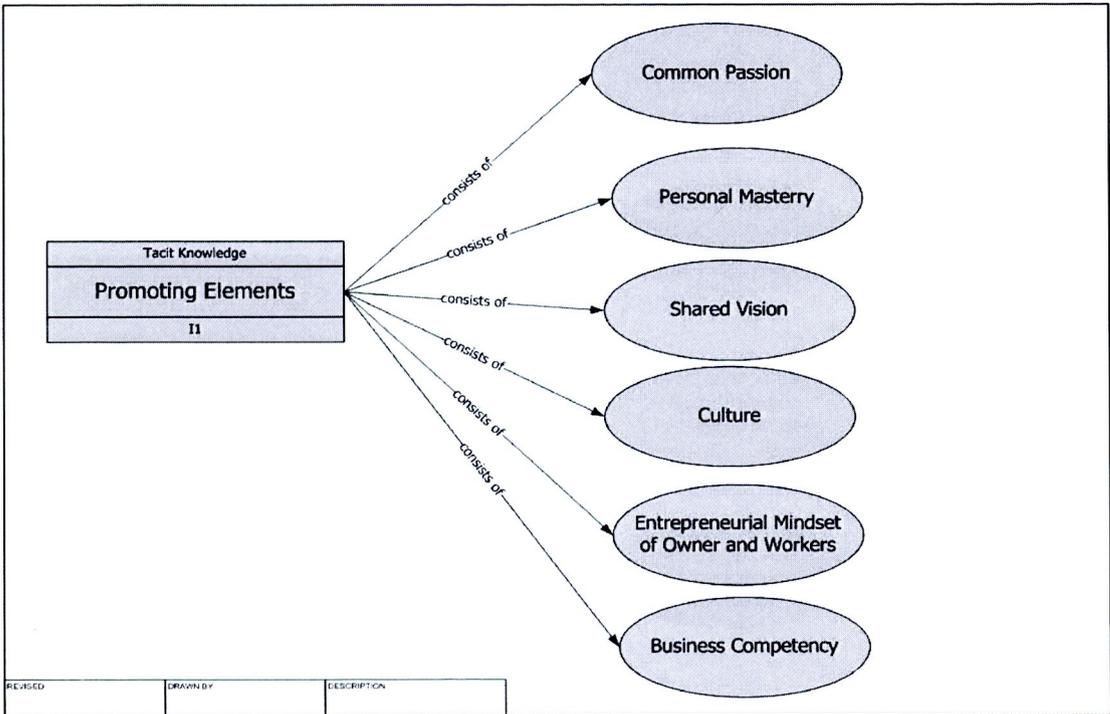Figure 4.2 Knowledge Map of Innovation Generation Model.

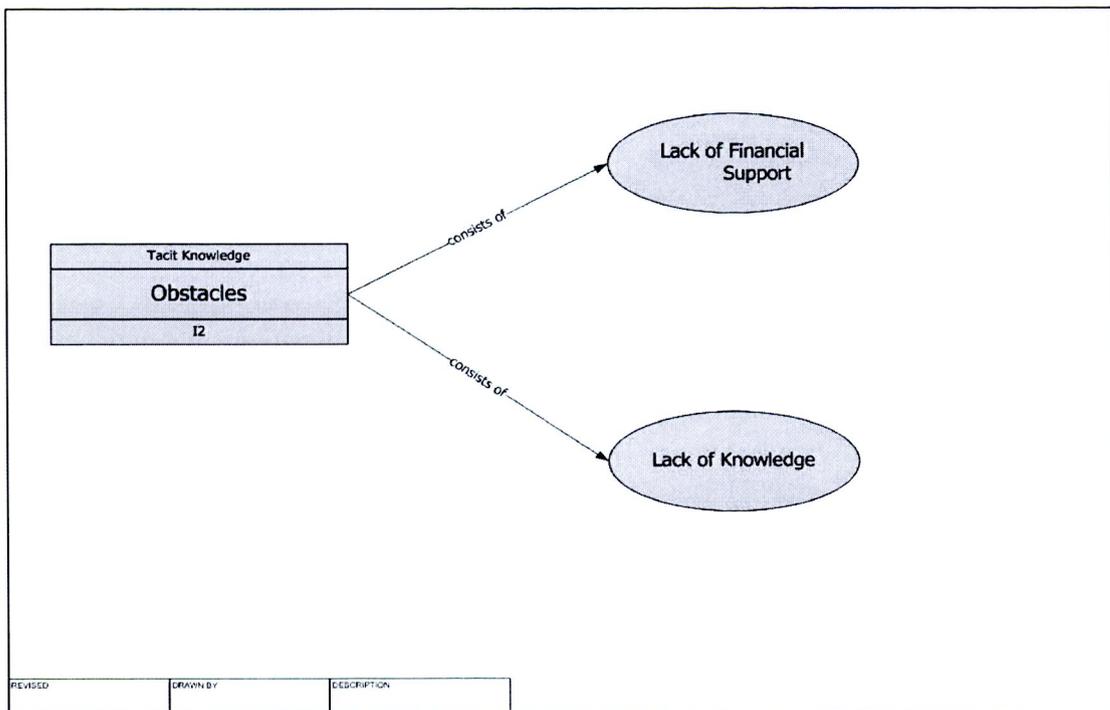Figure 4.3 Knowledge Map of Promoting Elements for Innovation Generation.
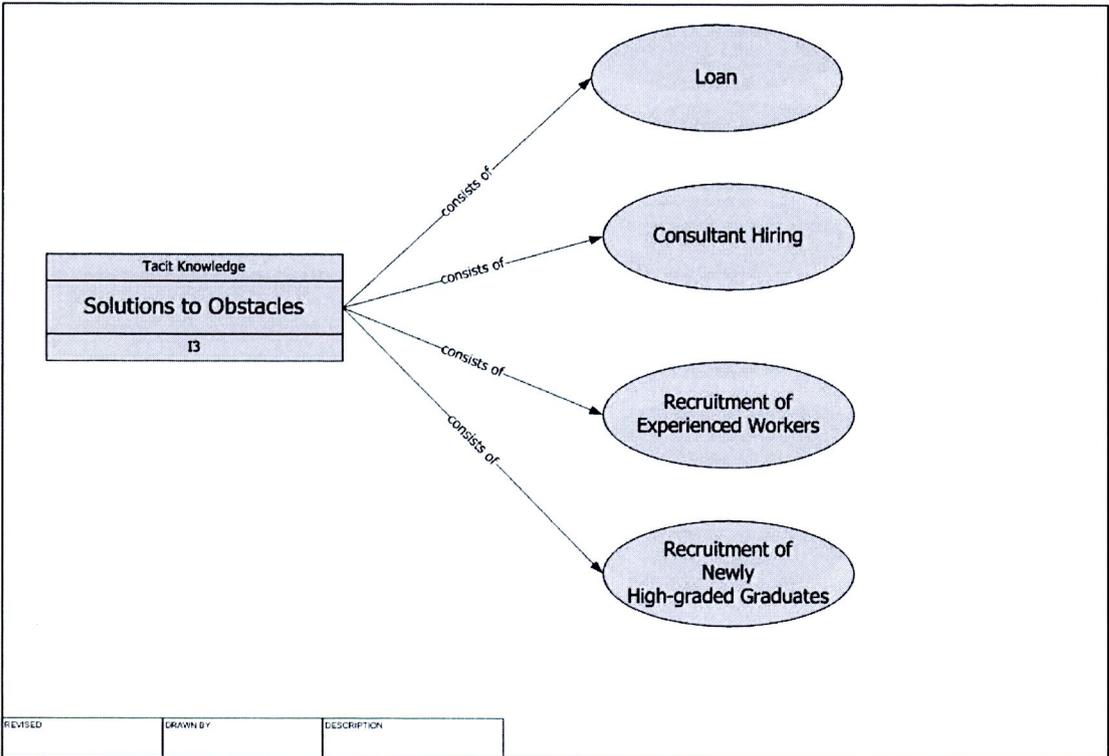

Figure 4.4 Knowledge Map of "Obstacles to Innovation Generation"

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Figure 4.5 Knowledge Map of "Solutions to Obstacles of Innovation Generation"
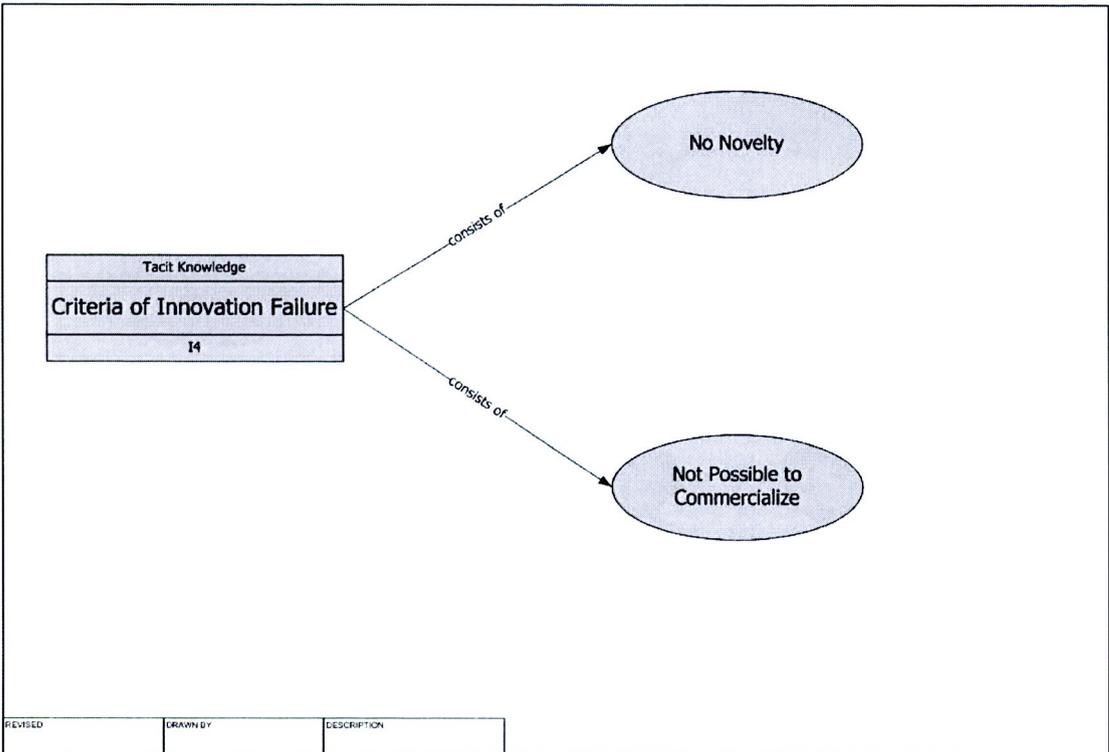
Figure 4.6 Knowledge Map of "Criteria of Innovation Failure"
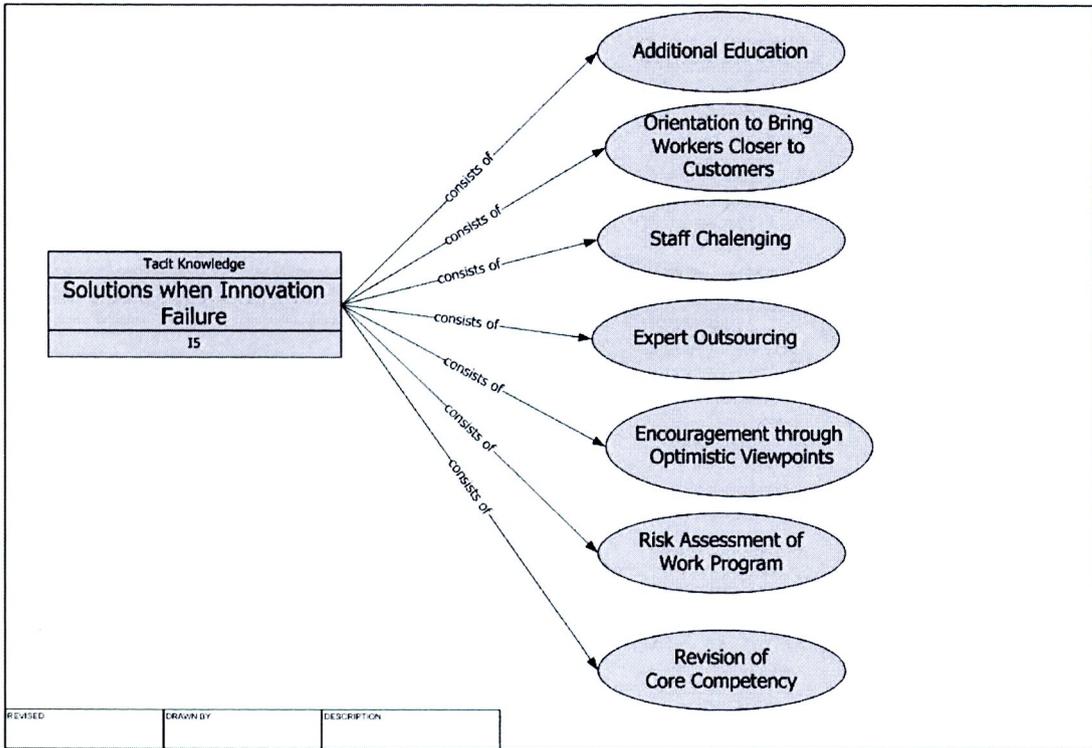
Figure 4.7 Knowledge Map of "Solution when Innovation Failure"
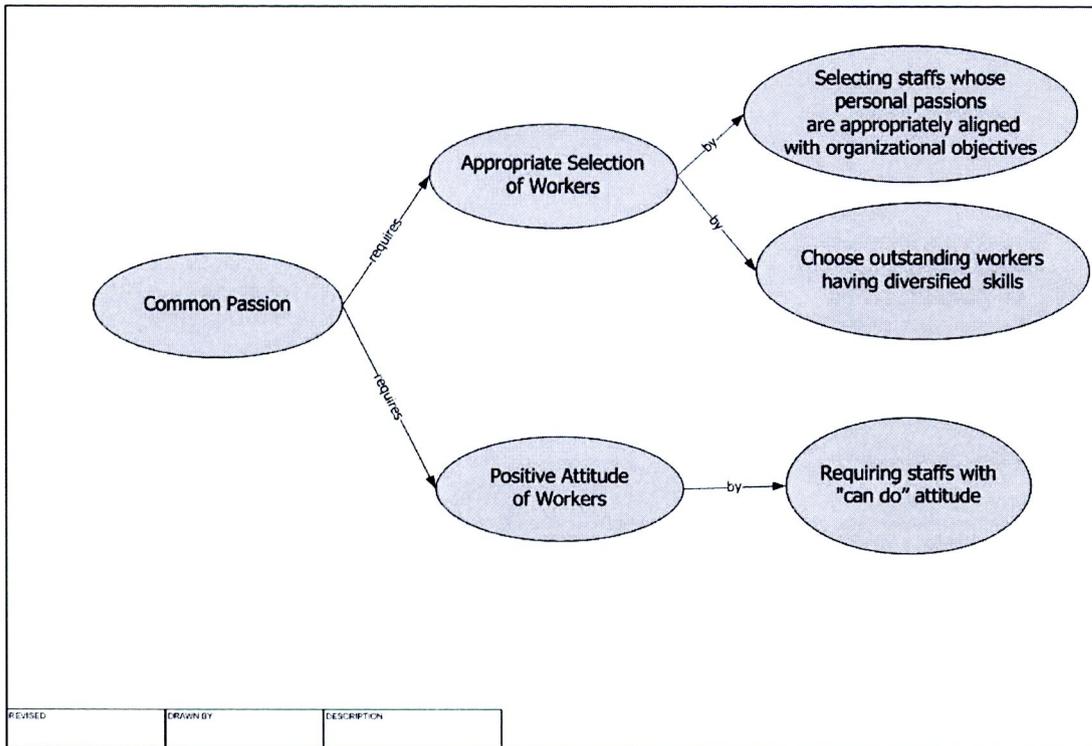
Figure 4.8 Knowledge Map of "Common Passion"
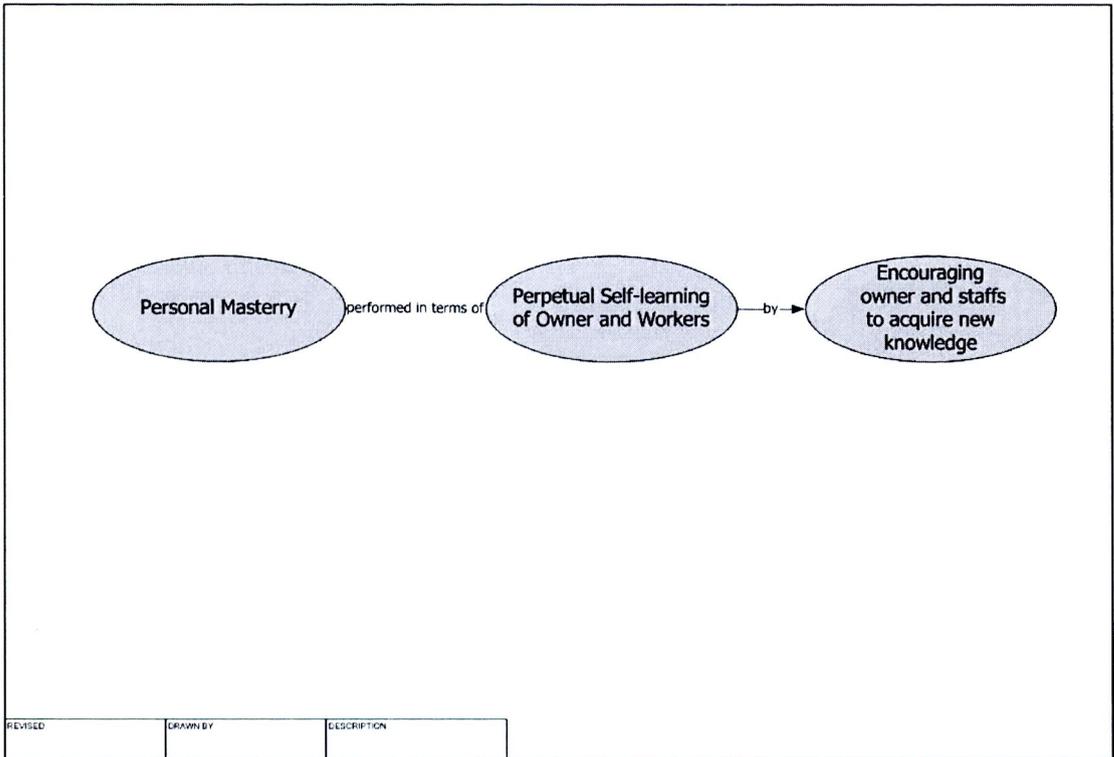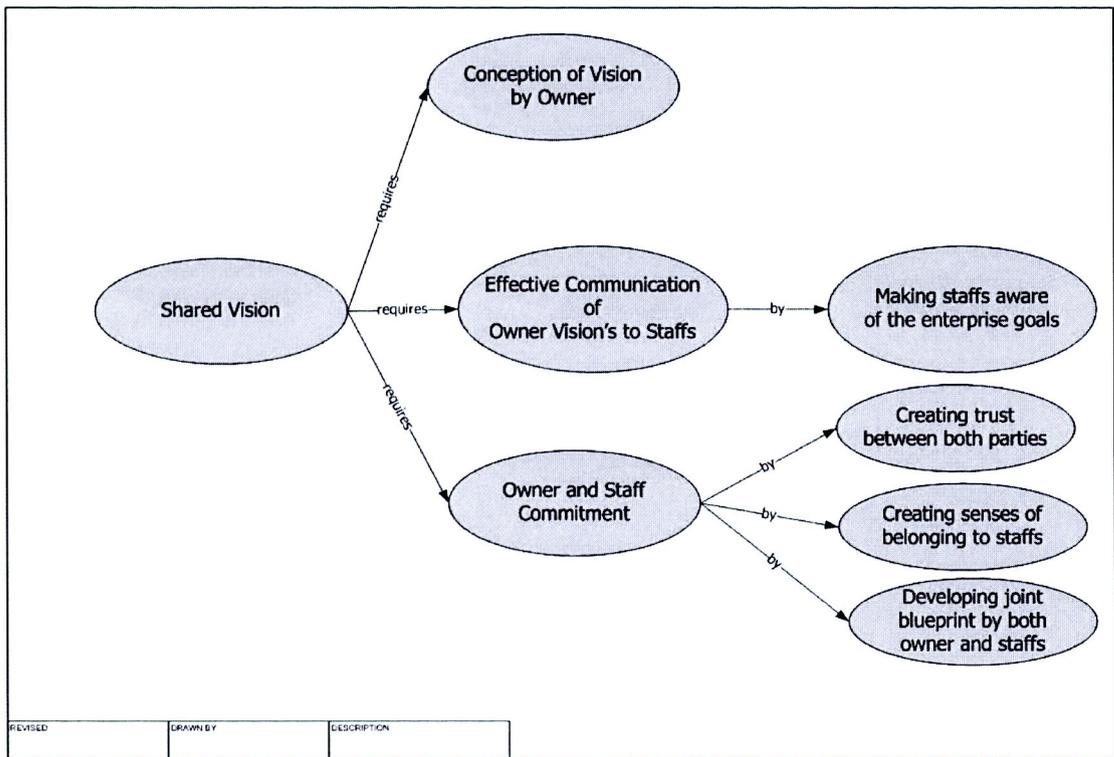
Figure 4.9 Knowledge Map of "Personal Mastery"

Figure 4.10 Knowledge Map of "Shared Vision"
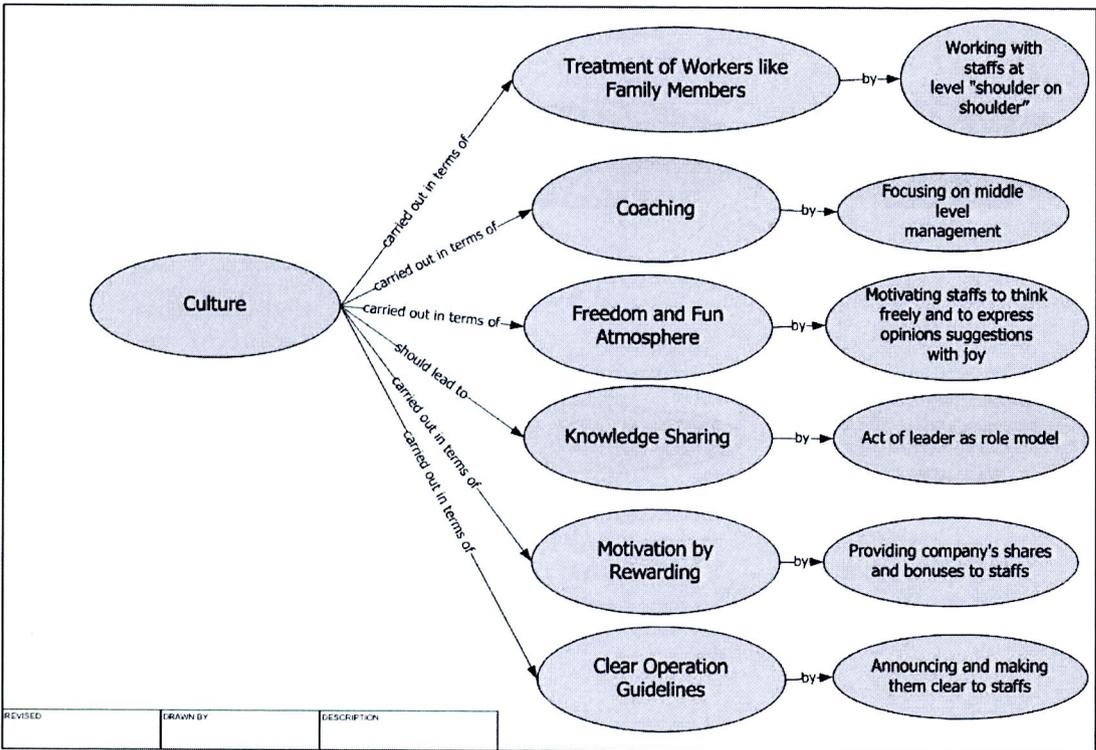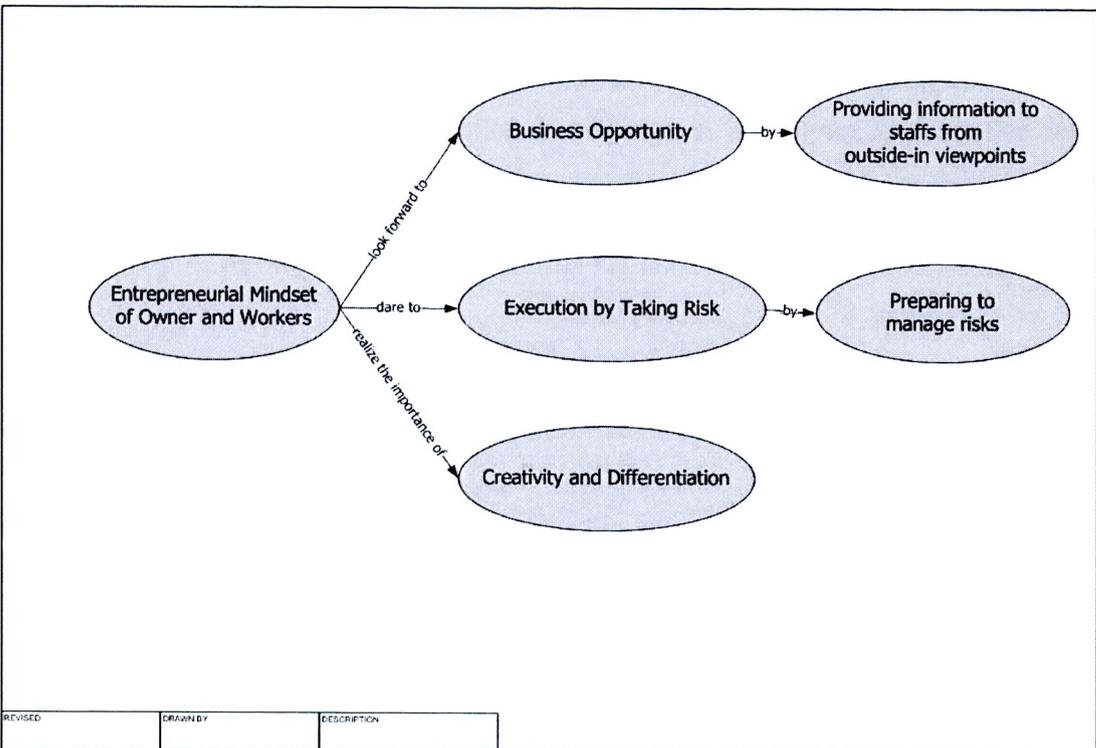
Figure 4.11 A Knowledge Map of "Culture"

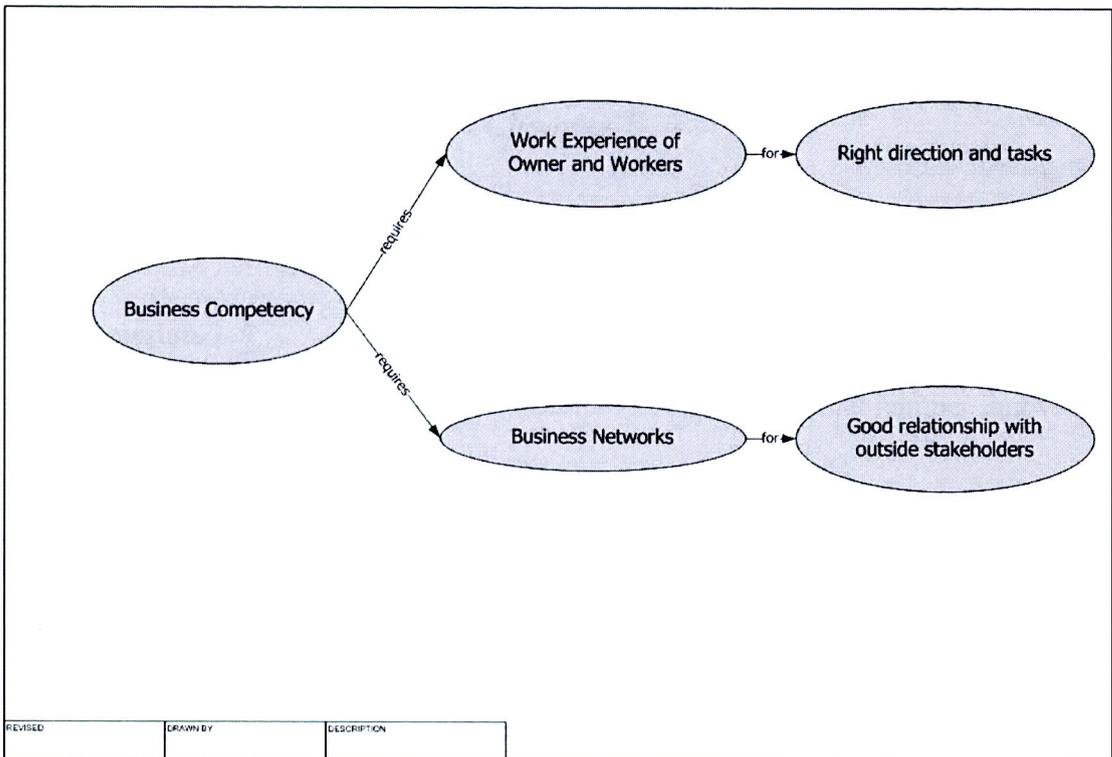Figure 4.12 A Knowledge Map of "Entrepreneurial Mindset of Owner and Workers"

Figure 4.13: A Knowledge Map of "Business Competency"

It is clearly seen that the CommonKADS knowledge engineering methodology realizes the tacit knowledge to explicit knowledge in a compact and concise form. The innovation generation model is thus readily to be applied by the interested persons who want to materialize the innovation.