Lifelong Learning in the Era of Industry 4.0:

Workplace Learning Perspective

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Abstract—This article intends to describe the major problems regarding the operation of community enterprise in Thailand; to study successful cases for analyzing the best practices based on adult learning approach to promote the community enterprise; and to propose the guideline of Promoting Thai Community Enterprises through adult learning approach. The research methodology were mixed methods. The participants were entrepreneurs from the communities. Seven successful cases were analyzed for the best practices based on adult learning approach. Ten experts of adult education were validated on the guideline of promoting Thai community enterprises through adult learning approach. The results from the questionnaire showed that lack of knowledge and experience in abroad sales has the highest score. From successful cases, the operation of Thai community enterprises has faced both successes and failures. The strength of Thai economy is based on local wisdom in communities so that people can utilize the local knowledge for developing their well-being plans and successful businesses. However, there is a key to sustainable success, not only financial success, by realizing and engaging in meaningful ways, were proposed as the guideline of Promoting Thai Community Enterprises. This can be thought of as a way of life happiness and self-reliance.

Keywords—community enterprise, adult learning, lifelong learning, entrepreneur, local business

I. INTRODUCTION

In the Era of Industry 4.0, the emphasis on digital technology of interconnectivity through the Internet of Thinks, access to real-time data, and the introduction of cyber-physical systems. Industry 4.0 is a transformation that makes it possible to gather and analyze data across machines, enabling faster, more flexible and more efficient processes to produce higher-quality goods at reduced cost. Industry 4.0 empowers business owners to better control and understand every aspect of their operation, offers a more comprehensive, interlinked, and holistic approach to manufacturing. Industry 4.0 allows for better collaboration of system integration, promotes value creation processes and access across owners, partners, vendors, product, and people. In the perspective of workplace learning, adult education and learning has been recognized as both non-formal education and informal education for workers in the workplaces. It is providing workers with equal access to potential educational opportunities which are available in all forms of learning in the workplaces as are suitable to the workers' living conditions and problems in the workplaces [1]. The operation of the community enterprises has to be sustainable and can provide benefits in a form of having an opportunity in workplace learning and sharing knowledge together between community members, being satisfied with things they already acquire, being empathetic to others, and the sustainability of local culture and wisdom [2].

Thai community enterprises have effectively promoted the fundamental local economy for the past 10 years. Community enterprises are important for the foundation of economic and social development, and for enhancing the quality of life of the people in the community. However, community enterprises still have problems and obstacles, including restrictions on operations. Some were successful which would help strengthen community development. In the contrary, some faced with difficulties resulting in business discontinuance. The operation of both community enterprise and business organization is similar which aimed to find a way to effectively manage a group as well as reduce risk affecting its operation. It is important that businesses must be able to assess and identify factors or limitations that would cause an unsuccessful business operation of a group [3,4]. One of the important issues is lack of understanding of the Sufficiency Economy principles, which could be applied to community enterprises appropriately and in accordance with the requirements of target group. It is a philosophy that is highly abstract, difficult to make use with communities that are not defined as a model of concept in a clear application. Therefore, issues of community could not be truly solved, although implementation of the Sufficiency Economy philosophy has been done [5]. Another big problem of community enterprise is marketing issues because most community enterprises are in rural, people do not have knowledge about how to manage their marketing. In addition, they also lack accounting knowledge and the packaging and design are not attractive to buyers.

Hence to solve such problems, people should know what is present and what is lacking. Community members should be facilitated and encouraged to acquire knowledge from both inside and outside the group, by asking experts within the

group, or by undertaking study visits or attending training courses. Moreover, the sharing of knowledge among community members are important to maintaining a certain thought process. For knowledge distribution, therefore, the community enterprise should know how to acquire and transfer knowledge appropriately such as using processes of teaching, introduction, or demonstration [6]. This view is compatible with the guidelines for management of community enterprises proposed by Somswasdi and colleague [7], which found that community enterprises have several problems, such as internal management within their organization and a lack of knowledge of all aspects of management. For the development of community enterprises, a training program is important to improve their knowledge and skill. However, government agencies should act as a host to set up a free training program and enable the members of community enterprises to gain more knowledge and skill to develop their organization.

II. METHODS

This research study was employed mixed methods, divide into three phases of conducting a research. The first phase of conducting a research, a researcher used survey questionnaires to investigate the problems of Thai Community Enterprises on the aspects of productions, management/ marketing, and adult learning. The survey questionnaires were sent to entrepreneurs in Ubon Ratchathani province-Northeast, Phuket Province-South, Suphan Buri Province-Central.

The second phase of conducting a research, a researcher analyzed community enterprise successful cases for the practices, used field visit with semi-structure interview and an observation. There were seven community enterprise successful cases: 1) Ban Jum Rung community enterprise, Rayong province; 2) Baan Aoy village, Chainat province; 3) Thap Lan village, Prachin Buri province; 4) Mr.Yongyut Thienrungruang, a farmer in Klong Sam Va, Minburi district, Bangkok metropolis; 5) a community enterprise of growing organic vegetables, Nontaburi province; 6) the Rong Kaw community enterprise, Ubon Ratchathani province; 7) the Bubpha Kluay Tak community enterprise, Phitsanulok province.

Last, the third phase of conducting a research, a researcher proposed the draft guideline of promoting Thai community enterprises through adult learning approach to ten adult learning experts from Thailand, South Korea, Japan and Germany, used focus group discussion to validate and suggest some recommendation. Then a researcher revised the final guideline of promoting Thai community enterprises through adult learning approach.

III. FINDINGS AND DISCUSSION

A. *Questionnaires*

After the data collection and analysis has been completed, the results showed that most of the respondents were aged between 51-60 years (31.2%). Mostly, the community

enterprises were foods business (32.1%), garments business (27.5%), and arts & invention business (21.1%). Due to the investigation of the problems of Thai community enterprises on the aspects of productions, management / marketing, and adult learning, the majority of respondents reported that they commented on the production problems at a low level, while management / marketing and adult learning problems were at a moderate level.

B. *Successful Cases of Community Enterprises in Thailand*

Successful community enterprises in Thailand have high levels of member participation and trust in their managerial teams, and work together as a network [8]. In general, the focus of community enterprises is on four key components: organization management, marketing management, production management and financial management. However, management of community enterprises must focus on the participation of members. Participation in co-thinking and co-decision making makes the members feel as if they are co-owners. This will lead to the development of mutual learning and will make the community enterprise successful and will enable sustainable development [4]. In addition, local people in successful cases do not leave their hometowns to work in other areas. They also have to provide good cooperation with related organizations [2]. Likewise, the findings proposed by Chunnui and Lapthananon [9], study the work of community enterprises that led to the group's success on the basis of survival and sufficiency including Group Rak Don-Chedi community enterprise in Suphanburi, Ban Chanode community enterprise, and Ban-klong yong Lan-Tak fah in Nakhon Pathom. They found that the community enterprise's success has 3 major factors: 1) leadership and virtue of the enterprise's leader; 2) members of group must have time to regularly participate in the community enterprise activities; and 3) participation and group learning of every member in the enterprise. Nevertheless, the real success needs a clear goal setting of the enterprise which is viable and self-reliance. It makes members realize their wish, their duty, and their goal throughout the group process within the enterprise. In conclusion, the comprehensive guideline to establish successful community enterprise includes: 1) the ownership and management of community; 2) productivity from analysis procedures of community; 3) creativity and innovation; 4) indigenous knowledge integrated in global level; 5) systematic integration and cooperation; 6) learning process; and 7) self-sufficient orientation.

The first case, Ban Jum Rung community enterprise is located in Rayong province; east part of Thailand. This community is a model or best practice of Sufficiency Economic Philosophy and community enterprise. It is an agricultural community which was developed by groups of local residents. Ban Jum Rung community had visited by many representative from communities and organizations to learn a development experience under Sufficiency Economic Philosophy. From the field visit to all activities at Ban Jum Rung community, found that community launched many activities, such as local resource management as a community product, local university

as a learning center of community development, home-stay visits, restaurant, agricultural management, local transport, etc. From the interview the leader of the community, he said that "….the start of community enterprises in our community was originally from the problems of the community, we wanted to solve those problems together. We used the chemical for planting to get more products, then we were all ill. Some are very ill and get cancer. So, we came to discuss together, how to solve these problems. We all love King Bhumibol Adulyadej, that's the reason of using King's philosophy for solving our problems……".

Baan Aoy village in Chainat province, in the middle of Thailand, is another one of the successful community enterprises which set its goal in producing water-hyacin the handicrafts following the self-sufficiency scheme. Its members are basically farmers who, in their free time, produce water hyacinth handicraft through inherited indigenous knowledge of bamboo basketry. Like other community enterprises, their production was initially supported by the government in terms of funding, design and product development, and marketing. Later on, Thailand's economic crisis in 1997 caused the decline of both government's funding support and the product orders. Consequently, community leaders and members started to adjust their mindset toward self-reliance and created community network to overcome the higher cost of living such as healthcare and education expenses. From that point, the members began to develop their products such as baskets, boxes and handbags on the foundation of the existing Thai local markets and export markets. The community leader also buy beautiful handbag from local market for studying its form and plotting the weaving, or try to remember pretty products in magazines or television and later started creating new design. Hence, their product development strategy is based on minor changes in sizes, forms, integrated patterns, and decorations on the product exterior [10]. In addition, a researcher interviewed entreprenures in this community, they said that " …..we are farmers since our grand father, we have experiences in farming, and weaving from generations to generations. But we have never thought to sell anything. When the economic problem occurred, we decided to do anything to help ourselves, to depend on ourselves. So, we started the network of producing products from our community and shared our experiences to the network group….".

Another case located in Thap Lan village, Bu Pram sub-district, Na Di district, Prachin Buri province, in the east of Thailand, is called The Thap Lan woman's weaving group. There are many capitals such as local wisdom, natural resource, and socio-culture in this group, leading the group to be self-reliant. The knowledge of making products from Lan palm leaf such as hats, shopping bags, and various styles of boxes, is passed older generations to new generations including youths in the community. They can extend this weaving technique to other people inside and outside their community. Meanwhile, they can adapt local wisdom to new technology to improve their products. Moreover, work assignment should be suited to the member's abilities. Next, marketing, at both local and national level, are adequate. Lastly, members have enthusiasm

for both formal and informal learning to develop their tasks [11]. When a researcher interviewed the youths in the community, they said that "…. We used new technology for promoting our products from the community. We extended into the online market, which helped customers familiar with our products and bought our products more than before …."

Next, successful cases focused on participation, the first story started with a rice farmer named Yongyut Thienrungruang who live in Klong Sam Va, Minburi district, Bangkok metropolis. He established a rice production enterprise of the Muslim community in suburb of Bangkok, and started to gather all 30-40 farmers at Klong Sam Va area to participate and develop local rice grains. He wants to tell a story and package this special rice for sale in order to promote the standards of their production and packaging as a viable product. Presently, he is the leader of center for service and transfer agricultural technology for farmers. The center is organized by all farmers as a working committee. A researcher interviewed a leader and members of the community, they elaborated that…."we participated in distributing of knowledge, consulting, sharing and promoting each other to grow rice more productive with appropriate use of chemical. We can produce our own local rice grain, and reduce cost and expense for planting without buying seedling from the market….". However, establishing community rice mill for everyone in the community and others does not acknowledge the new generation who don't want to continue this difficult way of life. Anyhow, they are still helping their parents by using new technology for trading products for their parents.

Another case located in Nontaburi province is a community enterprise of growing organic vegetables. In the past, villagers have planted vegetables in this area for a long time, but using chemical caused health problem for people in the community, and would still have not enough income from selling vegetables individually. Becoming a community enterprise of selling organic vegetables, they started from only 8 persons in the community came to discuss to solving problems together. Right now, there are more than 50 members in only 2-3 years. Workers activities include planning together for which kind of plants or vegetables each family will plant, looking for market to sell their products, sharing the work for everyone in the community enterprise, and participating for a meeting each month for planning. Members of the enterprise concluded that…. "this can be thought of the success of group that comes from collaboration for working and solving problems and group discussion among the community for the best solution for our own context. Besides, technology is important for us especially for communication….".

The next case focuses on knowledge management and learning methods, which is divided into 2 case studies. First, Sutthisakorn [12] studied the learning process and knowledge management of the Rong Kaw community enterprise in Pho Yai sub-district, Warinchamrap district, Ubon Ratchathani province, in the northeast of Thailand, which lead to its successful operation and to analyze the knowledge acquired in order to apply it to other community enterprises. After

establishing the community enterprise in 2005, villagers brainstormed together and realized that 'concrete brick' is a very useful material for every household, so they selected a working group. The project reflected the cooperative behavior of the people in this community in many aspects such as the use of labor and a share of production methods and experiences of experts inside and outside the community. They conducted an extensive research on the product quality until they could manufacture products with a higher quality than other producers in the market. Besides, they have formed a savings group to allow every household to invest in their enterprise and gain dividends. The study of key success factors revealed that community leaders have experiential learning and tacit knowledge which facilitate the setting up of the community enterprise. Villagers have collective learning through discussions, exchanges of ideas and experiences and joint consideration about the setting up of the community enterprise. They also have management knowledge that assists them in searching, upgrading and developing knowledge to produce outstanding products for the market. In addition, multiple learning methods used include educational trips, learning from instructors, experimentation and interviewing customers about the product quality until they can produce the best quality products. A researcher interviewed the members of the enterprise, they mentioned that … "the capability of the leader is significant for the success of our group. The leader opened the opportunity for us to share our ideas to the group and introduced us the new way of learning…...".

Last case study by Yuwawutto et al. [13], is called The Bubpha Kluay Tak community enterprise, which was established in 2008, is located in the Bangkathum district, Phitsanulok province, a major area of dried banana production in the north of Thailand. Dried banana, which is produced by family and community-based enterprises, is widely traded in domestic markets. Key issues in the processing of bananas are the scientific and technological knowledge. The technology now commonly used by community enterprises to dry bananas is hot air oven drying, a simple variation of the traditional open-air method, which offers production on a scale that is commercially viable. Unfortunately, it is likely that the dried banana products marketed by the community enterprise will have limited potential for market growth. However, community-based firms are generally more inclined to look further, with the aim of engaging in knowledge exchange, to make significant changes to their methods of production and extend their markets. From the interviewed members of the enterprise that…. "we liked to learn more how to extend our markets, especially the use of technology to help us…"

C. Analysis of Thai Community Enterprises Ways and Methods used in Developing their Groups

On the first assumption, it seems clear that there is much to be gained for developing community enterprises through the promotion of knowledge management. Community members may behave in different ways to deal with knowledge depending on their needs and wants. These behaviors include acquiring, creating, improving, sharing, and transferring knowledge. Within the operation of the community enterprise, there is interaction mechanism between groups and individuals both inside and outside their community. Some members may acquire and improve knowledge through experts' knowledge sharing or transferring such as socialization, or training programs. Some may create new knowledge through improving or acquiring knowledge depending on appropriate situations or their convenient locations. However, most action can be performed more effectively through active learning, self-directed learning, cooperative learning and experiential learning. Especially, learning by doing, or learning on the job, is a key component and a good way for members to develop their operation of community enterprises. In conclusion, knowledge management can be classified into 3 approaches: practical, educational and socialized approaches. As reviewed by Jonjoubsong [8], first, the practical approach is concerned with work processes which are likely to be informal and problem-solving processes. Second, the educational approach focuses on knowing and perceiving through learning processes, especially informal models. Finally, the socialized approach focuses on social interaction including discussion, collaboration and the interaction of individuals, for example, brainstorming for creating new knowledge or innovation.

Next, self-reliance is one of the important concepts in developing community enterprises. Its objective is to create a learning society that is strongly empowered through self-reliance based on self-sufficiency economic theory. All community people co-exist peacefully, with ethics and morals while preserving all local cultures, local wisdom, natural resources and the environment so that they live together under a democracy [14]. In basic practices, community members can provide and utilize their local wisdom, natural resources, raw materials and other capital in the local area before purchasing from outside communities. In addition, they can create new methods to improve their tasks and solve their own problems. They manage their capitals by themselves especially, natural resources, local wisdom, and financial capital in responding to either individual or community needs. Moreover, they can participate in development project to raise their standard of living within their potential. They can also work in groups to achieve their goals. Consequently, all activities are performed to reach their life-fulfillment based on sufficient income [11].

Finally, participation is an important condition to achieve sustainable development of community enterprises, which allows people to think and work together. In physical participation, community members mostly work in groups using their skills and efforts at all level of operation. In mental participation, community members engage in collaborative processes that lead to decision-making and willingness to cooperate for the good of the community. As they take part in the community, they are given opportunities to engage in discussion about any issues they may concern in the community. Discussion methods are informal by using a variety for open-ended sharing, which mostly include brainstorming, dialogue, or collaborative exchange of ideas among members for the purpose. In addition, cooperative members may include outsider researchers, experts or local

representatives from public and private sectors. These outsiders can support any capital resources especially economic and innovative factors for community development.

D. Adult and Lifelong Learning approach to Promote Thai Community Enterprises

Thailand is experiencing a demographic change with a rapidly increasing senior citizen population. This may contribute to the higher adult and elderly population in rural areas. Hence, all sectors of the community must be actively involved in social activities provided for them by promoting community enterprises so that they can have vibrant and sustainable economic development, as well as individual, family and community well-being. In order to promote Thai community enterprises, there is a need to create an environment for lifelong learning which facilitates the human and social capital development. Human capital refers to the potential members of the community including residents, community leaders, elders and their local wisdom; commitment to social capital refers to the social relationships that are formed in the community that cause people to gather into a group as a community including rules, norms, kindness, love, loyalty, generosity and trust [15].

Thai community enterprises consist of mainly adult and elderly workforce. This particularly concerns the lifelong learning activities which enables them to spend time away from the private sphere to interact with others in the public sphere. Lifelong learning is defined as: 'All learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social and/or employment-related perspective' [16]. Lifelong learning takes place in a variety of places, a variety of people working together; individually and collectively; and in formal and informal ways. Especially in terms of non-formal learning and informal learning, which are at the heart of adult learning, the recognition of non-formal and informal learning is a crucial part or an important means for making the lifelong learning. Non-formal programs to promote community enterprises are those sponsored by community, civic, and voluntary organizations, such as information booths, local library, local museum, local community centre, civil club, occupational training courses, and so on. In the role of informal learning, self and group directed learning is a part of the work processes in the community enterprise. This includes incidental learning, which is learning that results from daily activities related to work, family or leisure. In addition, self-study through various media or online information resources have become more and more common for people in rural areas due to the growth of digital technology and online services, which allow them to access knowledge independently, quickly and easily at anytime and anywhere.

Adult learning approaches need for rapid global change, and for the participation in economic activity and for promoting social and personal enrichment. First of all, like lifelong learning, adult learning may happen in the family, at the workplace, during an everyday conversation, in leisure activities, and in various life situations depending on personal learning needs. Establishing a community enterprise employing the principles of adult learning, requires some elements of behavioral, humanistic, transformative, and experiential learning theories [17]. In addition, adult learning approaches through community enterprise uses three areas of cognitive knowledge generation identified by Habermas [18]: technical, practical, and emancipatory. The technical area of learning is done through tasks that give the learner skills or competencies. The practical area involves social interaction and helps the learners construct meaning of knowledge. The emancipatory area helps learners identify problems and understand options to assume responsibility for decision making. In developing a community enterprise program, using the adult learning process, there is a need to establish an environment conducive to learning, prepare learners to engage in participative learning planning, diagnose the learning needs of the learners, create learning objectives, design learning plan, execute the plan, appraise objectives, and evaluate the learners' needs [19]. In conclusion, adult learning approaches geared towards community enterprises can be summarized as follows:

- The belief in potential of people and community.

- Learning is the foundation for the development of the community enterprise.

- Learning can take place through active participation and take place anywhere and anytime, and there are no boundaries of learning.

- Learning should be used which is the approach of holistic problem-based solving. Learning therefor should promote the holistic ways of thinking.

- People and the community can learn in groups as they learn to work together.

- Community enterprise can solve the difficulties which occur in their daily community living.

- Support system must be available and utilized often as it is necessary as indicated in their needs.

- The success of the community enterprise depends on the intergenerational cooperation of each.

- Guiding and instruction should be simple and according to the nature and culture of the community and presented it step by step.

- Experiential learning is the core concept of community enterprise.

- Leaders should be creative and have high moral and ethical standards.

- Community enterprise enhancement through communication for understanding.

- In order community enterprise activities, they should uphold the Philosophy of the late King Bhumibol.

The recommendations for promoting community enterprises through adult learning approaches are listed as follows:

- To improve community enterprise, the community should concentrate on increasing adult learning opportunities by integrating and networking with collaboration to provide information and learning resources in the community.

- Enhancing attitudes, feeling acceptance and understanding the dimensions of adult learning towards becoming the community enterprise in concrete ways by promoting all sectors in and outside the community to involve in learning indirect and direct ways in order to change and improve the community.

- Promoting the support system in the community and building networking to enhance community enterprise in specific concerns towards the holistic development for becoming self-reliance community.

- Enhancing the involvement and decision making of members in organizing community enterprise including opening opportunities to every member in the community to involve at all levels of planning and working for all types of work and any time they prefer according to their interests of individuals.

- Building the awareness of local authorities and learning leaders in the community to understand the significant of community enterprise learning process.

- Analyzing the cultural identity with collaboration among all members in the community by emphasizing self-understanding and agreement from all members to be able to develop their own community enterprise with understanding of their roles in the community enterprise.

IV. Conclusion

Local wisdom and knowledge management is important in understanding the role of community enterprises in Thailand. This form of knowledge based on the experience of many generations living interdependently with their local community and environment. Communities have their own abilities to initiate change and make the human capital stronger. Promoting community enterprises can effectively contribute to encourage the local people to utilize their local knowledge in the production of creative goods and services so that they can generate income and ensure the sustainability of their life and work. As to the extent of sustainability, developing a sense of self-reliance and social participation is the important condition to achieve sustainable development of community enterprises. A focus on adult learning is key to ensuring that the community enterprise is able to adapt and prosper in a rapidly changing environment, whilst building social cohesion and connectedness in communities. The responsibility for valuing and promoting adult learning does not lie only with government. Community members and organizations also have a role to play in recognizing and rewarding adult learning and encouraging individuals to continue learning throughout their lives [20]. Adult learning enhanced when people are in a situation where they can share experiences and learn from each other. Working collaboratively in teams and engaging in dialogue between and with others usually boosts their well-being and self-esteem. In addition, to operate activities through adult learning approaches, community leaders should be trained on how to facilitate the dialogue among community members and how to motivate them to support each other for developing the community enterprise. This also can be useful for effective human resource management. The operation of community enterprise should be developed and integrated with other communities by using adult learning programs and activities. Creating networks can be able to exchange and cooperate in such aspects as economics, environment, or knowledge. Finally, using adult learning approaches should be flexible to meet the changing needs and objectives. For example, transformative learning approach is appropriate to the needs for changes. The conclusion of this paper should report the following lists: 1) Community enterprise aims for improving community continuously and understanding the benefit of collaboration; 2) Community enterprise is aware of the local wisdom in the community and adapts the local wisdom to the benefit of people and community; 3) Community enterprise uses knowledge management tools in the community to organize and manage community knowledge to become self-reliance and self- management community; 4) Informal learning activities in community enterprise are various and suitable to the nature and needs of each member in the community.

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