

An Exploratory Factor Analysis of Learning Leadership Characteristics of Thai SME Entrepreneurs

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Abstract

This research aimed to analyze exploratory factors of learning leadership characteristics of Thai SME Entrepreneurs in order to explore the structure of variables and to decrease the number of variables. The researcher found that 3 exploratory factors of learning leadership characteristics of Thai SME entrepreneurs are Component 1 Identity Learning, referring to learning individually and integratively with the use of technology, Component 2 Sustainability Team Learning, referring to learning to build up a team to work together sustainably, and Component 3 Creative Differentiation Learning, referring to learning to think differently and creatively in innovative learning environment, which could explain the learning leadership characteristics at 77.974%: 54.631%, 12.105%, and 11.238% accordingly.

Keywords: Exploratory Factors Analysis, Learning Leadership, Thai SME Entrepreneurs

Introduction

Since human has limited ability but unlimited needs, it is necessary to increase the capability of human by coming together and forming an organization, in which its members use their ideas, attitudes, experience and skills as a part of their work. There are certainly similarities and differences in organization management; therefore, a leader is needed to move in the same direction towards the goals to achieve both individual and organizational success. A leader, therefore, plays an important role in leading an organization in the internal and external open managerial environment. Nowadays, as an organization always encounters changes and competitions, it is important to learn continuously and appropriately.

At present, the organizations of Thai SME entrepreneurs need integrative thinking to establish causal relations among objects, events or stories through observation, data collection, consideration, problem solving, causal relation identification as well as the ability to synthesize to explain the current situation of the organizations which will lead to complete thoughts (Munkham, 2004). In addition, it requires the ability to think roundly and holistically and link all common factors to the main subject properly (Charoenwongsak, 2004) and the ability to create differences with the use of technology and knowledge to add value to the products. The emphasis should be on increasing the capability of each producing country, especially by applying technology and knowledge which is essential to industrial development. The existing knowledge in each industry can be integrated with new knowledge and technology in order to sustainably enhance industrial capability and to prepare for changes associated with globalization (Ministry of Industry, 2011). Building the strength of a community enterprise requires a learning leader in the organization and team learning to begin the exchanges of knowledge, experience and skills to develop the learning organization

(Bureau of Agricultural Economic Research, 2016), to develop new knowledge and to manage the organization sustainably.

This study adopted the learning leadership characteristics based on the CEFITTSTER grounded theory which has determined 10 learning leadership characteristics, including creativity and courage, environment of innovative learning, flexibility, integration, technology, tailor-made and transformation process, self-directed learning, team learning, economic sufficiency, and research (Somprach, 2015), as it is important to equip a leader with learning leadership characteristics to create sustainable leadership, efficiency and effectiveness in an organization (Patanathabutr & Somprach, 2015a), resulting in a high performance organization.

The researcher, therefore, conducted this exploratory factor analysis of learning leadership characteristics of Thai SME entrepreneurs to identify the component structure and decrease the factors of learning leadership characteristics in order to later determine the components that could explain the learning leadership characteristics with statistical reliability, leading to the development of learning leadership characteristics appropriate for Thai context. This research answered the research questions that what were common factors which can be used to explain the relations among factors of the learning leadership characteristics of Thai SME entrepreneurs, and how the components should be named and defined that can explain the learning leadership characteristics of Thai SME entrepreneurs. Therefore, the objectives of this study were to explore and identify common factors which can be used to explain the relations among factors of the learning leadership characteristics of Thai SME entrepreneurs, and to name and define components that can explain the learning leadership characteristics of Thai SME entrepreneurs.

Conceptual Integration and Research Framework

The researcher applied the following concept to create a conceptual framework for this research.

CEFITTSTER-10 Learning Leadership Characteristics, which each characteristic is consisted of factors (Patanathabutr & Somprach, 2015b), used to develop a question for this study included the following characteristics.

Characteristic 1: Creativity and Courage consisted of 3 factors, including (1) to think laterally and creatively, (2) to think differently and respond to challenges effectively, and (3) to use creativity in developing new products, services and organizational process.

Characteristic 2: Environment of Innovative Learning consisted of 3 factors, including (1) to create a friendly organizational environment in which its members freely exchange knowledge, (2) to constantly propose new topics for all members to explore and become experts in different fields, and (3) to store information systematically so that all members have easy access to it.

Characteristic 3: Flexibility consisted of 3 factors, including (1) to be well-prepared for sudden changes, (2) to always have a back-up plan ready for unexpected situations, and (3) to assign or reassign responsibilities to all members so that they can replace one another in performing the same tasks.

Characteristic 4: Integration consisted of 3 factors, including (1) to establish new collaborations with other organizations or groups to increase organizational capability, (2) to work together with other organizations effectively, and (3) to enhance existing collaborations to achieve win-win outcomes.

Characteristic 5: Technology consisted of 3 factors, including (1) to develop technological skills to effectively communicate with all members in an organization, (2) to utilize technology to proactively establish intimate relationships with customers, suppliers and

business partners, and (3) to continuously use technology to enhance collaborations with other organizations.

Characteristic 6: Tailor-made and Transformation Process consisted of 3 factors, including (1) to adopt practical practices suitable for an organization, (2) to hand on responsibilities to appropriate members, and (3) to systematically adjust working style to suit an organization, such as making careful considerations, giving feedback and outlining future plans.

Characteristic 7: Self-directed Learning consisted of 3 factors, including (1) to seek new knowledge on one's own and use the knowledge to improve organizational process, (2) to discover personal weaknesses and overcome them to improve one's capability, and (3) to find personal strengths and use them creatively to benefit oneself and one's organization.

Characteristic 8: Team Learning consisted of 3 factors, including (1) to group members into capable teams according to their expertise, (2) to allow members to express their opinions and make all decisions together, and (3) to show appreciation for success and to accept and learn from past mistakes together.

Characteristic 9: Economic Sufficiency consisted of 3 factors, including (1) to adhere to economic sufficiency in workplace, (2) to manage budget effectively; without debt, retained earning can be used for useful purposes, and with debt, budget shall cover settlement within payment deadline, and (3) to prepare production plans for products and services as well as to systematically promote positive organizational images to respond to community and society.

Characteristic 10: Research consisted of 3 factors, including (1) to do research on developing products, services and organizational process based on members' capability to meet customer needs, (2) to continuously conduct research to create new products and services to fulfill customer needs, and (3) to carry out research on improving organizational process to systematically increase organizational capability.

Conceptual Framework

In this study, the latent variable was learning leadership characteristics and there were 10 observable variables, including creativity and courage, environment of innovative learning, flexibility, integration, technology, tailor-made and transformation process, self-directed learning, team learning, economic sufficiency and research. The researcher focused on exploring and identifying components that could explain the learning leadership characteristics by decreasing the number of variables or grouping some variables into on component. Then the exploratory factors, significance or loads of factors were analyzed. The researcher later established a factor relation structure appropriate for the learning leadership characteristics. The new components were used in the statistical analysis as shown in Figure 1.

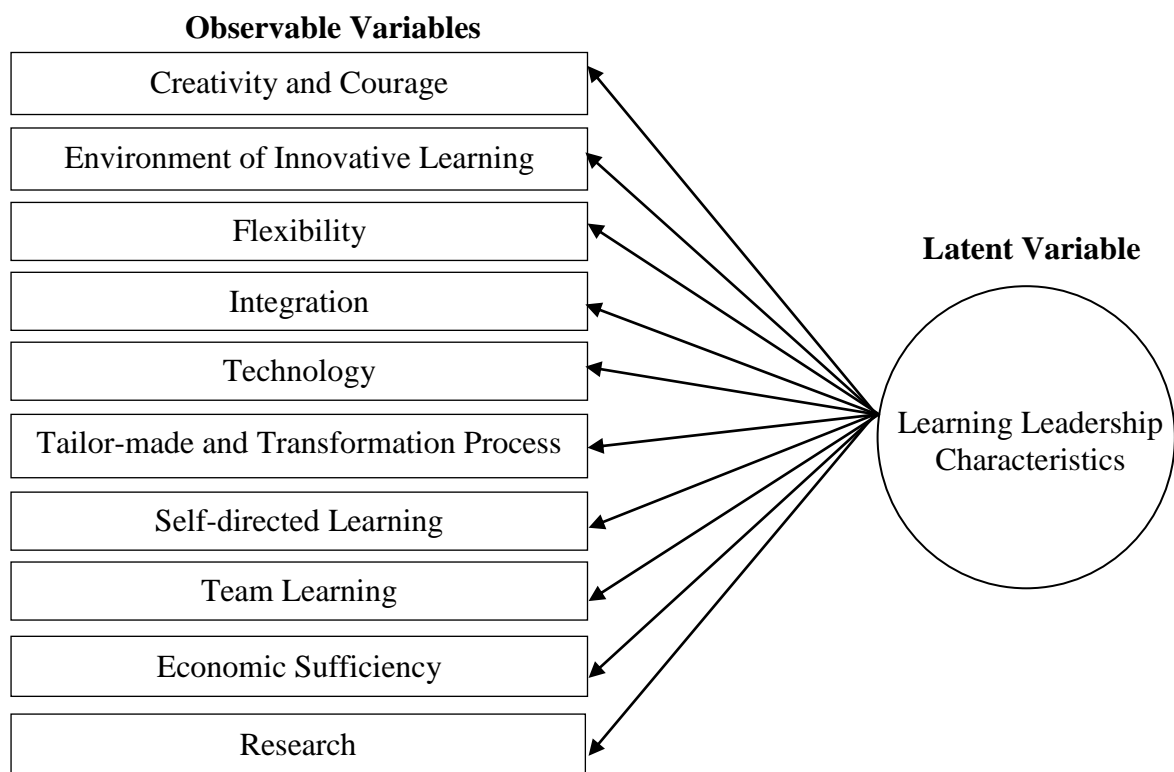


Figure 1 Conceptual Framework

Research Methodology

Scope of Research

1. The scope of this study was the upper northeastern region of Thailand, especially the first two potential areas, Khon Kaen and Udon Thani.
2. The population in this research was a group of SME Entrepreneurs in the upper northeastern region of Thailand under the SME Networking Project in 18 Provincial Groups carried out by the Department of Industrial Promotion, Ministry of Industry, Thailand, in the fiscal year 2015. The sample group was 300 SME entrepreneurs participated in the project in the first two potential areas, Khon Kaen and Udon Thani. The number of the samples was appropriate according to Comrey and Lee (Tuksino, 2015).
3. The content scope of this study was to explore and identify the components that could be used to explain the opinion of Thai SME entrepreneurs based on the CEFITTSTER-10 learning leadership characteristics.

Data Collection

The researcher collected primary data on general information and learning leadership characteristics of the sample group which consisted of 300 SME entrepreneurs in the first two potential areas, Khon Kaen and Udon Thani, participating in the SME Networking Project in 18 Provincial Groups organized by the Department of Industrial Promotion, Ministry of Industry, Thailand, in the fiscal year 2015. The data was collected in period of year 2015-2016 and the questionnaire was comprised of 2 parts.

Part 1-General Information contained 10 nominal scale questions about gender, age, level of education, position, type of business, experience in enterprise, annual income of enterprise (before dividend and tax), working at an enterprise as a permanent or part-time job, and permanent job in case of having an enterprise as a part-time job.

Part 2-Self-assessment on Learning Leadership Characteristics contained 30 5-point rating scale questions categorized based on the CEFITTSTER's 10 learning leadership characteristics. There were 3 items for each characteristic.

To assess the validity and reliability of the instrument (Piyapimonsit & Saipatthana, 2015), the content of the questionnaire was validated by 3 experts to systematically examine the content and ensure that it covered the targeted learning leadership characteristics. The index of item-objective congruence (IOC) was 1, while the reliability of the questionnaire's rating scale items was assessed and the Cronbachs' alpha coefficient was 0.87, meaning that the questionnaire was valid and reliable enough to be used for data collection.

Data Analysis

This study was a quantitative research; factor analysis (Tuksino, 2015) refers to one of statistical analytical methods developed to analyze correlations of targeted variables, aiming to form the variables into appropriate groups. Variables in the same group had high correlation, while those with low correlation were put in different groups. It based on positivism (Ketchaturat, 2012) with these following steps to analyze the factors (Vanichbuncha, 2015).

Step 1-The researcher formulated specific research questions, reviewed theories about learning leadership characteristics and collected data. For the factor analysis, there must be more data than variables and the variables selected for the analysis must be continuous variables. In this study, the variables were assessed by rating scale items and the researcher chose the factor analysis method appropriate to the objectives.

Step 2-The researcher examined the collected data to ensure that it agreed with the assumption. The selected variables had a high correlation ($r=0.30-0.70$), while the relation between factors and variables had a linear pattern. Common factors and unique factors of the variables were observably independent or with the variance between common factors and unique factors was 0.

The relations were examined as follows:

1) A correlation matrix was constructed employing correlation coefficient of each variable couple. Any variables irrelevant to other variables (with a correlation coefficient of near 0) were eliminated.

2) The researcher conducted KMO and Bartlett's Test and then used Bartlett's Test of Sphericity in the hypothesis testing. The hypotheses were formulated as follows:

H_0 : The 10 factors were not related.

H_1 : The 10 factors were related.

Step 3-The researcher performed a factor extraction analysis to retrieve data from the variables and group into components using principle component analysis.

Step 4-Factor rotation was applied to group the variables into components, using Varimax orthogonal rotation which keeps the axes perpendicular to each other or independent.

Step 5-Factor loading was performed to classify the variables according to the factor scores. Each variable was grouped into a component of which its factor score was near +1 or -1.

Step 6-Name and defy the analyzed components and later use the new components in the statistical analysis.

Research Results

General Information about Thai SME Entrepreneurs

The researcher found the general information about the Thai SME entrepreneurs as follows:

Gender: 89.8% of the respondents are female and 10.2% of them are male. The ratio of female to male respondents is 9: 1.

Age: 69.5% of the respondents were 40-60 years old, 16.9% of them were over 60 years old, 8.5% of them were 30-40 years old and 5.1% of them were 20-30 years old.

Level of Education: 71.2% of the respondents pursued less than a bachelor's degree, 23.7% of them pursued a bachelor's degree and 5.1% of them pursued a degree greater than a bachelor's.

Experience in Enterprise: 35.7% of the respondents had less than 5 years of experience, 22% of them had 10-15 years of experience, 22% of the had more than 15 years of experience and 20.3% of them had 5-10 years of experience.

Type of Organization: 61% of the respondents were community enterprises and 39% of them were business enterprises.

Profession: 61% of respondents started an community enterprise as a part-time job, including agriculturists (33.9%), employees (11.8), government officers or state enterprise employees (8.5%), housekeepers (5.1%) and retired government officers (1.7%) and 39.0% of them were business enterprises.

Size of Organization: According to the capital, the capital of community enterprises was between 10,000-300,000 baht and the capital of business enterprises was between 500,000-2,000,000 baht. Regarding the number of personnel, the community enterprises had 2-150 members and business enterprises had 7-32 employees.

Annual Income of Enterprise: The annual income of the community enterprises was 50,000-500,000 baht and the annual income of the business enterprises was 1,000,000-3,000,000 baht.

Survey Results and Common Factors Used to Explain Factor Relations among Learning Leadership Characteristics of Thai SME Entrepreneurs

Survey Results: According to the opinion of Thai SME entrepreneurs on the 10 learning leadership characteristics, the respondents agreed with 9 characteristics, including economic sufficiency (mean = 4.0113), team learning (mean = 3.9492), self-directed learning (mean = 3.9322), research (mean = 3.8023), creativity and courage (mean = 3.7345), integration (mean = 3.6949), environment of innovative learning (mean = 3.6949), flexibility (mean = 3.6045) and tailor-made and transformation process (mean = 3.5932), while their opinion was neutral on 1 characteristic, namely technology (mean = 3.4576), with normal standard deviations.

Data Examination: The data examination revealed that the data used in the analysis supported the hypothesis, meaning that all the 10 factors had strong relations with a statistically significant level of 0.05, and Pearson's correlation coefficients were greater than 0.3.

To find the relations among the 10 factors, the hypotheses were formulated as follows:

H0: The 10 factors were not related.

H1: The 10 factors were related.

The KMO value was found at 0.845, and the Bartlett's Test of Sphericity tested through Chi Square had a computed value of 368.475 with the df value of 45 and the Sig. value of 0.000, or less than 0.05, which meant the null hypothesis was rejected (H0) and the alternative hypothesis was accepted (H1). In conclusion, the 10 factors are related.

Factor Extraction:

1) According to the factor extraction, the communality of each factor was 1, which meant that all factors could explain the variance in all common factors, and the correlation of each factor was greater than 0.7, which meant that there were strong relations among the factors.

2) Principal component analysis was used to establish the components of the 10 factors by analyzing each standardized factor in order to make the average value of each factor equal to 0 and the variance equal to 1. As a result, the total variance of all the factors was 10.

(1) Using the values of total variance explained in the initial eigenvalues, the variances of Component 1, Component 2 and Component 3 were greater than 1, which was greater than the variance of standardized factors.

(2) Using the values of total variance explained in the extraction sums of squared loadings, the 10 factors were regrouped into 3 components. The percentage of variance of Component 1 was 54.631, the percentage of variance of Component 2 was 12.105 and the percentage of variance of Component 3 was 11.238. The total variance of all 3 components was 77.974% of all the variance.

In addition, after analyzing the factor loadings using principal component analysis for factor extraction to classify factors with high factor loadings (near +1 or near -1) within each component, it was found that all factors in Component 1 had the highest factor loading. However, some factors in other components had similar factor loadings, making it more complicated to group the factors into appropriate components. The researcher later applied factor rotation to properly classify the components.

Factor Rotation: Factor rotation was applied to classify the factors into appropriate groups by Varimax orthogonal rotation in case that the factors had no relation among one another. The results were as follows:

(1) Using the value of total variance explained in the extraction sums of squared loadings, new variances of the 3 components. For Component 1, the value of total variance explained was 3.429, its percentage of variance was 34.287 and its cumulative percentage was 34.287. For Component 2, the value of total variance explained was 2.532, its percentage of variance was 25.323 and its cumulative percentage was 59.610. For Component 3, the value of total variance explained was 1.836, its percentage of variance was 18.364 and its cumulative percentage was 77.974.

(2) Using principal component analysis for factor extraction and Varimax with Kaiser Normalization for factor rotation, a rotation converged in 5 iterations as shown in Table 1.

Table 1 Rotated Component Analysis

Factor	Component		
	1	2	3
Flexibility	0.856	0.302	0.000
Tailor-made and Transformation Process	0.830	0.282	0.228
Technology	0.828	0.136	0.228
Self-directed Learning	0.730	0.483	0.000
Integration	0.697	0.129	0.470
Research	0.201	0.876	0.256
Economic Sufficiency	0.205	0.840	0.176
Team Learning	0.404	0.739	0.132
Environment of Innovative Learning	0.143	0.193	0.835
Creativity and Courage	0.194	0.192	0.832

Factor Loading: The 3 new components were as follows:

(1) Component 1 consisted of 5 factors, including flexibility with a factor score of 0.856, tailor-made and transformation process with a factor score of 0.830, technology with a factor score of 0.828, self-directed learning with a factor score of 0.730 and integration with a factor score of 0.697, respectively.

(2) Component 2 consisted of 3 factors, including research with a factor score of 0.876, economic sufficiency with a factor score of 0.840 and team learning with a factor score of 0.739.

(3) Component 3 consisted of 2 factors, including environment of innovative learning with a factor score of 0.835 and creativity and courage with a factor score of 0.832.

Naming and Defining Learning Leadership Characteristics of Thai SME Entrepreneurs

From the exploratory factor analysis, the researcher was able to identify 3 components which were later named and defined in order to explain the learning leadership characteristics of Thai SME entrepreneurs as follows:

Component 1:

(1) It was named Identity Learning.

(2) It referred to learning individually and integratively with the use of technology.

(3) It was composed of 5 factors, including flexibility, tailor-made and transformation process, technology, self-directed learning and integration.

(4) It could explain the learning leadership characteristics at 54.631%.

Component 2:

(1) It was named Sustainable Team Learning.

(2) It referred to learning to build up a team to work together sustainably.

(3) It was comprised of 3 factors, including research, economical sufficiency and team learning.

(4) It could explain the learning leadership characteristics at 12.105%.

Component 3:

(1) It was named Creativity Differentiation Learning.

(2) It referred to learning to think differently and creatively in innovative learning environment.

(3) It consisted of 2 factors, including environment of innovative learning and creativity and courage.

(4) It could explain the learning leadership characteristics at 11.238%.

With Component 1 Identity Learning alone, the explanation of the learning leadership characteristics of SME entrepreneurs was rated at 54.631%; however, with Component 2 Sustainable Team Learning, the explanation of the learning leadership characteristics increased to 66.737%, and together with Component 3 Creative Differentiation Learning, the learning leadership characteristics could be explain at 77.974%.

Conclusions, Discussions and Suggestions

Conclusions

According to the exploratory factor analysis of learning leadership characteristics of Thai SME entrepreneurs, the ratio of community enterprises to business enterprises was 6: 4. Most community enterprises were mainly agriculturists, employees and government officers or state enterprise employees. In terms of the capital, the capital of community enterprises was between 10,000-300,000 baht and the capital of business enterprises was between 500,000-2,000,000 baht. The community enterprises earned an annual income of 50,000-500,000 baht, while the business enterprises made an annual income of 1,000,000-3,000,000 baht. Concerning the number of staff, the community enterprises had 2-150 members and business enterprises had 7-32 employees.

In addition, the ratio of female to male entrepreneurs was 9: 1. Most of the were 40-60 years old with less than a bachelor's degree and less than 5 years of experience and 10-15 years of experience, respectively.

Regarding the opinion of Thai entrepreneurs on the learning leadership characteristics, there were 10 components, including economic sufficiency, team learning, self-directed learning,

research, creativity and courage, integration, environment of innovative learning, flexibility, tailor-made and transformation process and technology, respectively. After analyzing the 10 learning leadership characteristics, the researcher found that it agreed with the assumption by using the KMO, resulting in the KMO value of 0.845, and the Bartlett's Test of Sphericity tested through Chi Square, having computed value of 368.475 with the df value of 45 and the Sig. value of 0.000, which meant the null hypothesis was rejected (H_0) and the alternative hypothesis was accepted (H_1). In conclusion, the 10 factors are related and the factor extraction revealed that the initial factor of each factor was 1 while the factor extraction value of each factor was greater than 0.7, which meant there were strong relations among the factors. The 10 factors, therefore, were used in the exploratory factor analysis.

Using the value of total variance explained in the extraction sums of squared loadings, the factors were regrouped into 3 components. After using Varimax with Kaiser Normalization for factor rotation and choosing the factor loading matrix, the 3 new components were as follows:

Component 1 consisted of 5 factors, including flexibility, tailor-made and transformation process, technology, self-directed learning and integration, respectively. This component could explain the learning leadership characteristics at 54.631%.

Component 2 was composed of 3 factors, including research, economical sufficiency and team learning, respectively. This component could explain the learning leadership characteristics at 12.105%.

Component 3 was comprised of 2 factors, including environment of innovative learning and creativity and courage, respectively. This component could explain the learning leadership characteristics at 11.238%.

The learning leadership characteristics of SME entrepreneurs have been named and defined as follows:

Component 1 Identity Learning refers to learning individually and integratively with the use of technology.

Component 2 Sustainable Team Learning refers to learning to build up a team to work together sustainably.

Component 3 Creative Differentiation Learning refers to learning to think differently and creatively in innovative learning environment.

According to the SME entrepreneurs, Component 1 alone could explain the learning leadership characteristics at 54.631%; however, with Component 2, the explanation of the learning leadership characteristics increased to 66.737%, and together with Component 3, the explanation was rated at 77.974%.

The three components of learning leadership characteristics of SME entrepreneurs are concluded in Figure 2.

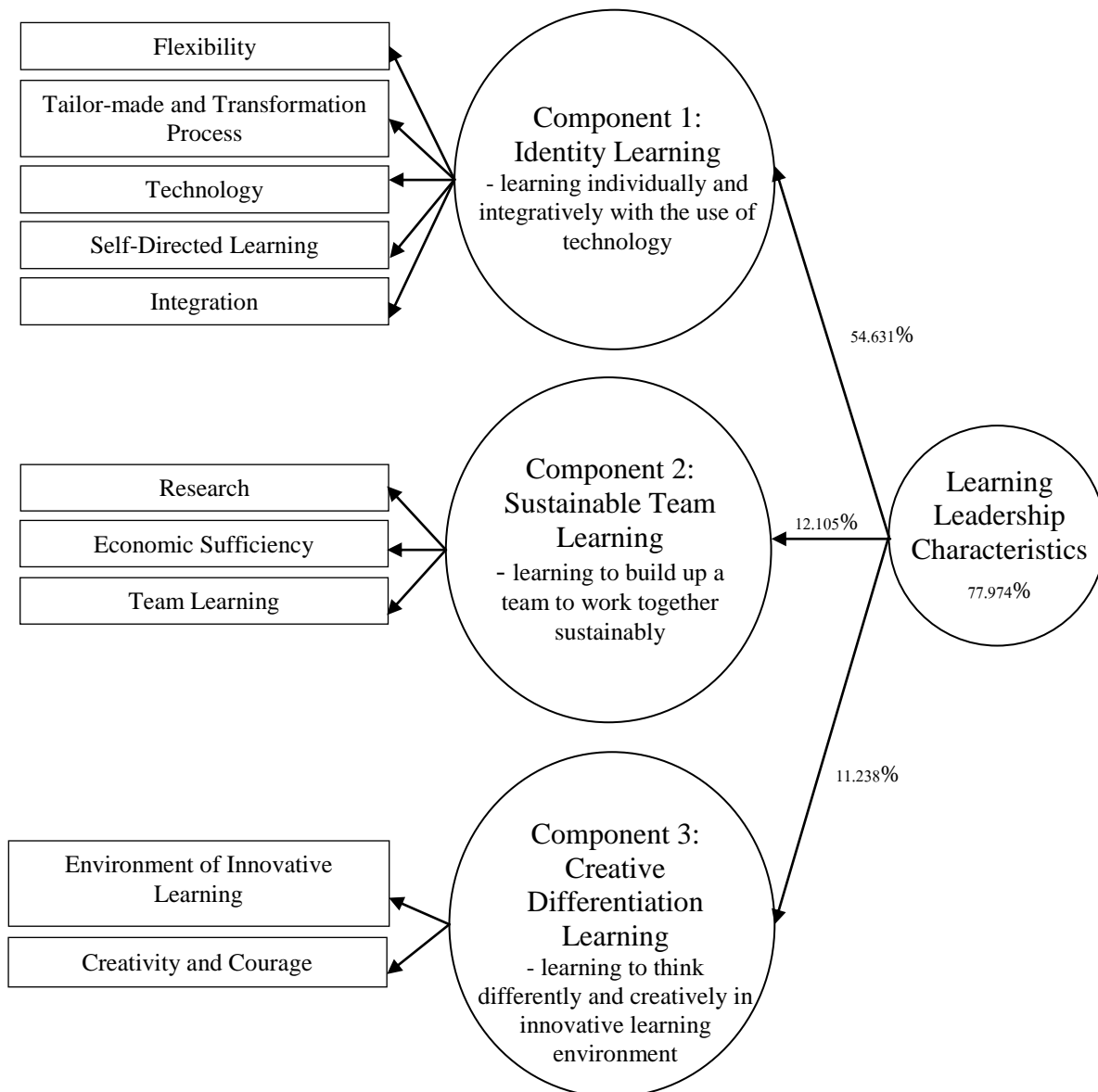


Figure 2 Components of Learning Leadership Characteristics of Thai SME Entrepreneurs and businessmen

Discussions

The results have shown that developing learning leadership characteristics of SME entrepreneurs requires these 3 following components.

The first component is identity learning which refers to learning individually and integratively with the use of technology by increasing flexibility. This matches the study of Murray (2014) which reveals that the leader must have the flexibility to change styles and the skill to use the chosen style effectively in order to ensure the team's success. In terms of tailor-made and transformation process, it conforms to the research by Şimşek (2015) which has found that rapidly changing factors that affect daily life also affect operational environment and the way leaders fulfill their missions with the help of technological developments, traditional linearity of conflict and situation. Mission domain has broadened to include traditional threats, hybrid threats and new challenges of cyber and space. Considering the future operational environment, future leaders need to adapt themselves to the new challenges of the future competitiveness. Regarding technology, it is in line with the study of Vukšić, Vidović, and Glavan (2015) which states that information technology plays an

irreplaceable role in introducing and improving business process orientation in a company and the work of Suwunniponth (2014) which has suggested that the B2C ecommerce business in Thailand should opt in improvement approach in terms of managerial structure, leaderships, staff's skills and knowledge, and investment of information technology in order to capacitate higher efficiency of e-collaborative process that would result in profit and competitive advantage. Regarding self-directed learning, it is similar to what has been found in the work of Quah and Sim (2015) that a factor that propels them towards innovation is to improve the performance followed by self-satisfaction and recognition. The leader and team in the organization viewed the creation of innovation as a process of growth to fulfill the needs of others and also to realize their personal potential. In addition, with regard to integration, it conforms to the study of Pautasso, Castagno, and Osella (2015) which has found that the emergence of new social needs as an effect of the economic crisis has stimulated the flourishing of business endeavors characterized by explicit social goals. The importance of both profits and social impacts as the key success factors for a social business integration model.

The second component is sustainable team learning which refers to learning to build up a team to work together sustainably by developing research factors and doing research. This agrees with the study conducted by Sajdak (2015) which discovers that a research project fills a cognitive gap in the literature with regard to the conceptualization and operationalization of a company. In terms of economic sufficiency, it is in accordance with the research done by Phukamchanoad (2015) which points out that the leaders should have good knowledge and understanding about sufficiency economy philosophy. Especially in terms of money spending, they must consider the need for living and be economical. In relation to team learning, similar result has been found in the work of Gantasala (2015) that teamwork is the key to organizational learning, productivity and growth. The teams should built on shared vision and goals, cohesion was ensured, positive induction in the form of leader mentoring was provided for each participating team and the results have been presented with conclusions and suggestions.

The third component is creative differentiation learning which refers to learning to think differently and creatively in innovative learning environment. This conforms to the study of Gantasala (2015) which has found that complex environments triggered by globalization have necessitated new paradigms of leadership. Success of organization depends on how well leaders can provide adaptive, administrative and enabling leadership. Complexity leadership seems all the more relevant for institutions that are knowledge-driven and thrive on Knowledge creation, Knowledge storage and retrieval, Knowledge Sharing and Knowledge applications. Regarding creativity and courage, the finding is in line with the work of Ngo, Boer, and Enders (2015) which reveals that attitudes are the primary determinant of the styles that were found. Perceived behavioral control is a factor that explains some managerial leadership styles. By understanding the attitudes of leaders and their leadership styles, the organization can strengthen their management and governance, and improve their effectiveness and the work of Arif and Sindhu (2017) which found that leader competency provided a unique edge for the development of the learning environment in the organization that leads to the Team leaders to make creative decisions and also provided the epistemological issues related to these relationships and proposed the possible solutions for the future work.

Suggestions

1) The study revealed that SME entrepreneurs's level of opinion on technology was lower than other factors, while the factor score of the use of technology was 0.828, ranking third out of five regarding the first component, identity learning, which explained the learning leadership characteristics at the highest level of 54.631%. The study also found that the use of

technology has a significant relation with tailor-made and transformation process, flexibility and integration. Therefore, there should be further studies on the impacts between these factors to create new solutions to improve the learning leaders' capability to use technology.

2) Latent variables of learning leadership characteristics should be included in a path analysis with other variables related to learning organization in order to explain the relations among variables, to establish the variable structure, to explore the casual relation model and to create a simulation to develop an appropriate learning organization.

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