

A Study on the Talents' Competency and the Need and Implement of Educating and Training at the Manufacturers in Taiwan

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Abstract - In the past ten years, many Taiwanese enterprises have gone to the countries in Southeast Asia and Chinese mainland to make the investment because the pressure of the Taiwanese personnel cost and the change of the world economy environment. Undoubtedly, "Talents" are the main powers which make manufacturing industry progressive in Taiwan. At the same time, the enterprises should understand the talents' competency and make a point of training the talents, which are the keys about driving profitable growth continuously of the organizations. In view of these, the concrete research purposes of this study are to build the measurement indicators of the talents' competency at the manufacturers, to investigate what competency the talents possess at the manufacturers and the need of educating & training, to understand the educating & training methods and the situations of implement at the manufacturers. Finally, according to the results and findings of this study, we supply suggestions how to develop and improve the competency for the talents at the manufacturers, and give the reference to the enterprise for human resource education & training.

Index Terms - Competency, Educating & Training, Manufacturer, Talent

INTRODUCTION

1. Background and Motive

Manufacturing jobs are changing rapidly, it's critical that manufacturing companies take steps to expand their skill sets, drive profitable growth, unlock the value of technology investments, and ensure the security and integrity of their global supply chains [10].

Taiwan though service trade output value account for GDP rate rise to 73% today, higher than 21% of the manufacturing industry, but can not assert that the importance of the service trade has already surmounted the manufacturing industry. The prosperities of logistics, transport and storage, financial insurance, retail depend on manufacturing industry produce circumstances [22].

The market environment competition changes violently, the enterprises face the changes of the environment in facing policy, economy, society, technology, culture, etc., wanting to seek survival must improve the core competency of enterprises constantly. And the core competency is exclusive resource and ability which creates and protects this enterprise competition advantage. Jack Welch (the last executive chairman of GE) thinks the talent is the most important priority--people are right, the organization will be right. It is useless to only follow strategy in the books, and talents are the first important step of the strategy. [12]

II. Research Objectives

- Establish competency guides of manufacturing industry talents.
- Probe competency current circumstances which should be possessed by manufacturing industry talents.
- Probe the need degree of education and training of manufacturing industry talents.
- Probe the implement of education and training of manufacturing industry talents.

LITERATURE REVIEW

I. Intension of talents competency

Reference [17] shows that divide the competency into five basic properties: motive, traits, self concept, knowledge and skill.

Knowledge and skill can be developed easily, however, education and training are the best methods, which can bring their cost effectiveness into play. Motive and traits are difficult to investigate and develop. Self concept lies in between the knowledge and specialty, but the time of attitudes and values shall be longer although being changed.

However, definitions of the competency by many scholars are not completely same, and there are still some differences. The definitions and explanations of the competency have listed as the Table I.

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TABLE I
DEFINITIONS OF THE COMPETENCY DEFINED BY DIFFERENT SCHOLARS

Year	Scholar	Definitions of the competency
1982	Boyatzis	A capacity that exist in a person that leads to behavior that meets the job demands within the parameters of the organizational environment and that, in turn, brings about desired results.
1990	Woodruffe	The behavioral dimensions that affect job performance.
1990	Furnham	The fundamental abilities and capabilities needed to do the job well.
1995	Ulrich et al.	The competency refers to the common name of personal knowledge, skills and capacities. Development and use of these capacities shall make the work performances promoted.
1996	Wildman	The competency tends to be a regulation and is designed to solve the similar problems produced by environment.
1997	Roberts	All the work-related personal attributes, knowledge, skills and values that a person draws upon to do their work well.
1999	Mansfield	An underlying characteristic of a person that results in effective or superior performance.
2001	Armstrong	Competency are "criterion validated", they are derived from analysis of the key aspects of behavioral, or "soft skills" which differentiate between effective and less effective performance.

"Competency" or "Competence" has become the term generally used to embrace the concepts of both competency and competence. But Charles Woodruffe (1991) believed that the word competency is being used both to refer to the ability to perform a job or part of a job competency and to the sets of behavior the person must display in order to perform the tasks and functions of a job with competence [1].

Based on researches of many scholars, this research generalizes and study out that the manufacturing industry labors should be owned the following competencies in seven levels: 1. Research and Development Competency; 2. Marketing Competency; 3. Product Technology Competency; 4. Information Technology Application Competency; 5. Human Relationship Competency; 6. Self Encouragement and Learning Competency ; 7. Reasoning and Analysis Competency [1][3][4][6][8][10][11][13][14][15][18][20][21].

II. Necessity of Education and Training

- **In term of necessity for the enterprise:** The development of modern enterprises is suffered by impacting of the information and computer, in recent years, the electronic computer enterprise which is the proud and dependence for existence for Taiwan should be second to none [16]. The science and technology have been changing so rapidly, especially new products such as the computer software updates at any time, even experts also feel the crisis of being unable to catch up with. At the rapidly changing times, any enterprise should keep up with times in order not to drop out and be eliminated. The only method is to intensify the enterprise education and training. In short, the enterprise must train employees continuously and constantly so as

to make them keep up with the development of science and technology [7].

- **In term of necessity for the employee:** In terms of the employee, education level of employees is higher and higher. They pay attention to the growth and development as well as expect the enterprise to provide training in order to make them join in more jobs and develop abilities [9]. From the above discussed, successful education and training can not only help enterprises promote new plan and hold together all employees but also carry out new strategy and help forward the organization growth; however, failure education not only is without advantage but also damage enterprise growth and unity. So we can see that the importance of education and training on enterprises are self-evident [20].

In short, the purposes of education and training need assessment are to assist the skill levels of the current staff in the enterprise, even to estimate the enterprise the development in the future, and technological changes as well as to combine the organization strategy goals and human resources system.

III. The Implement of Education and Training

The education and training of enterprise's manufacturer according to the content, person, teacher, place et al. The general enterprise's manufacturer's most frequently used categorical methods, for On-the-job Training and Off-the-job Training. Because On-the-Job Training is similar while studying situation and real work. It can be relatively suitable for the need of the work after training. The advantage of Off-the-Job Training which the place for study is not the job site. It will not cause the extra load of this departmental chief. And the supervise responsibility is lighter [20].

- **On-the-Job Training (O.J.T) :** Delegation, Work Instruction Method, Apprenticeships, Coach Teaching, Mentor Method, Job Rotation, Special Job Assignment, Task Forces, Multiple Management, Understudy Plan, Readings, Interview, Manager Training Plans, Director Training, Supervisor Training, Work Improvement, and Human Relationship, Work Safety.
- **Off-the-Job Training (Off.J.T) :** Lectures, Study, Panel Discussions, Programmed Instructions, Role Playing, Sensitivity Training, Business Games, Understanding Approach, Transactional Analysis, Grid Seminar, Walk Track, Brainstorming, Case Studies, In Basket Exercise, KJ Method, NM Method, ZK Method, KT Method, Case-Based Process Method, Training Game, and Problem-Solving Discussion.

METHOD

I. Research Hypothesis

H1: Personal characteristic effect the personnel manager's opinions about the competencies degree of the staff.

H2: Personal characteristic effect the unit head manager's opinions about the competencies degree of the staff.

H3: Personal characteristic effect the staff's opinions about the competencies degree of themselves.

H4: Personal characteristic effect personnel manager's opinions about the need of education and training degree of the staff.

H5: Personal characteristic effect the unit head manager's opinions about the need of education and training degree of the staff.

H6: Personal characteristic effect the staff's opinions about the need of education and training degree of themselves.

H7: Among of the personnel manager, the unit head manager and the staff have significant difference of showing to the competencies degree opinions of the staff.

H8: Among of the personnel manager, the unit head manager and the staff have significant difference of showing to the need of education and training degree opinions of the staff.

II. Revision the Questionnaires

In order to achieve the extremely content validity of the questionnaires (refer to measure the fitness of content). Invited nine experts and scholars provided suggestions and investigations in order to establish the content validity of the questionnaire and make the questionnaire more complete.

III. Research Subjects and Data Collection

Data were collected primarily by mean of the questionnaires. The investigation subjects are the first to third grade 555 manufacturers. They are stand on to "Taiwan Machinery Manufacturer Directory" which is compiled by of Taiwan Association of Machinery Industry. The research subjects are the personnel manager, the unit head manager and the stuff from these 555 machine manufacturing factories. This research used double sampling method which refers to be similar to stratified sampling method or cluster sampling method and then randomization. Collect 100 manufacturers, and recover 32 manufacturers (the rate of recovery is 32%).

IV. Analysis Method

The data of this study were collected by the questionnaires. The analysis used the SPSS statistical software package. The data analysis methods include Descriptive statistics, Reliability analysis, Mean analysis, T-test and One-way ANOVA. According to the results and findings of this study, we supply suggestions how to develop and improve the competency for the talents at the manufacturers.

RESULTS

I. Profiles of Respondents

From TableII shows the Demographic characteristics of the personnel manager, the unit head manager and the stuff. There are male exceed female. In term of age distribution, 31 to 35 years old were almost. The total working seniority is mostly 6 to 10 years, the relevant trade working seniority is

mostly 10 years below, and in this company working seniority is almost 5 years below. The education level of the respondents was university.

TABLE II
DEMOGRAPHIC CHARACTERISTICS

Characteristic	Number	Personnel manager	Unit head manager	Staff
Gender				
Male	75	23	28	24
Female	26	9	6	11
Age				
25 below	4	0	1	3
26-30	21	4	5	12
31-35	24	8	9	7
36-40	17	5	6	6
41-45	15	4	7	4
46-50	8	2	3	3
51-55	7	4	3	0
56 above	5	5	0	0
Total working seniority				
5 years below	18	2	6	10
6-10 years	23	7	7	9
11-15 years	21	7	6	8
16-20 years	13	2	6	5
21-25 years	10	4	4	2
26-30 years	11	5	5	1
31 years above	5	5	0	0
Relevant trade working seniority				
5 years below	28	8	6	14
6-10 years	28	6	12	10
11-15 years	10	4	3	3
16-20 years	14	2	7	5
21-25 years	9	5	2	2
26-30 years	10	5	4	1
31 years above	2	2	0	0
This company working seniority				
5 years below	31	9	7	15
6-10 years	28	7	12	9
11-15 years	10	3	4	3
16-20 years	13	2	6	5
21-25 years	8	4	2	2
26-30 years	9	5	3	1
31 years above	2	2	0	0
Education level attained				
Junior school below	1	1	0	0
Senior high school	18	4	3	11
Junior college	32	11	10	11
University	35	10	14	11
Master	14	6	6	2
Doctor	1	0	1	0

II. Mean analysis

Explain the personnel manager and the unit head manager's opinions about the competencies and the need of education and training degree of the staff at present, and the staff's opinions about the competencies and the need of education and training degree of themselves.

The grade of average scores in accordance with the importance degree weighting, it is 5 to be "very good", it is 4 to be "good", it is 3 to be "ordinary", it is 2 to be "not good", it is 1 to be "very bad", and assume that the suggestion of response presents the normality. Assign the bound to make five grades and divide a boundary and click the following [20].

$$X1 \text{ boundaries} = 3 + 0.84 * 1.42 = 4.19$$

X2 boundaries = $3 + 0.25 * 1.42 = 3.35$

X3 boundaries = $3 - 0.84 * 1.42 = 2.65$

X4 boundaries = $3 - 0.25 * 1.42 = 1.81$

This study judge the project standard of every competency degree. It follows to divide into according to these: “Very good” (4.19-5.00), “Good” (3.35-4.19), “Ordinary” (2.65-3.35), “Not good” (1.81-2.65), “Very bad” (1.00-1.81).

Mean analysis of the staff’s competencies degree. For “the personnel manager’s opinions”, Research and Development mean is 34.72 (every item mean is 3.472), Marketing mean is 48.88 (every item mean is 3.491), Product Technology mean is 49.41 (every item mean is 3.80), and Human Relationship mean is 38.03 (every item mean is 3.457) is good. For “the unit head manager’s opinions”, Research and Development mean is 33.59 (every item mean is 3.359), Marketing mean is 47.12 (every item mean is 3.365), Product Technology mean is 46.88 (every item mean is 3.606), Human Relationship mean is 37.91 (every item mean is 3.45), Self Encouragement and Learning mean is 31.00 (every item mean is 3.44), and Reasoning and Analysis mean is 20.21 (every item mean is 3.37) is good. For “the staff’s opinions”, Human Relationship mean is 39.60 (every item mean is 3.6), and Encouragement and Learning mean is 32.80 (every item mean is 3.64) is good.

Mean analysis of the staff’s the need of education and training degree. For “the personnel manager’s opinions”, for “the unit head manager’s opinions” and for “the staff’s opinions” about the need of education and training degree are very need, except for the “Self Encouragement and Learning” competency of the personnel manager’s opinions, and every item mean of “Self Encouragement and Learning” competency is 3.27.

III. The competencies degree of the talent

• The personnel manager’s opinions

The “education level” of the personnel manager can effect their opinions about the “research and development” competency degree of the staff ($F=3.834$; $P<0.05$). The personnel manager, which education level is “university” ($M=38.20$), they think the competency degree in research and development of the staff that is superior to the personnel manager who education level is “senior high school” ($M=29.80$). These results supported partly H1 hypothesis.

• The unit head manager’s opinions

“Gender” of the unit head manager can effect their opinions about “human relationship competency” degree of the staff ($t=3.024$; $P<0.001$). The “male” unit head manager ($M=39.25$) think the competency degree in human relationship of the staff which is superior to the “female” unit head manager ($M=31.67$).

“Age” of the unit head manager can effect their opinions about “marketing competency” ($F=8.457$; $P<0.001$) and “product technology competency” degree ($F=3.294$; $P<0.05$) of the staff. So about “marketing competency”, the “26 to 30 years old below” unit head manager, who are ($M=50.67$), they think the degree of the staff that superior to the “46 to 50 years old” unit head manager ($M=37.00$). The “41 to 45 years old” unit head manager ($M=52.00$) think the degree of the staff that is superior to the “36 to 40 years old”

($M=41.67$) and “46 to 50 years old” unit head manager ($M=37.00$). Finally, the “51 to 55 years old” unit head manager ($M=56.33$) think the degree of the staff that is superior to the “36 to 40 years old” ($M=41.67$) and “46 to 50 years old” unit head manager ($M=37.00$). As for “product technology competency”, because the Sheffe comparative method is conservative and conscientious, they didn’t show the difference groups. These results supported partly H2 hypothesis.

• The staff’s opinions

“Gender” of the staff can effect the “product technology competency” degree themselves ($t=2.243$; $P<0.05$). Product technology competency degree of the male staff ($M=43.58$) which is superior to the female staff ($M=35.18$).

The “education level” of the staff can effect their “information technology application competency” degree ($F=5.073$; $P<0.01$) and “reasoning and analysis competency” degree ($F=4.429$; $P<0.05$). The staff, which education level is “university” ($M=22.55$), their information technology application competency degree that is superior to the staff who education level is “senior high school below” ($M=19.36$). And the staff, which education level is “university” ($M=39.45$), their reasoning and analysis competency degree that is superior to the staff who education level is “junior college” ($M=17.64$). These results supported partly H3 hypothesis.

• Among of the opinions

The results of the ANOVA were differences about “research and development competency” ($F=8.743$; $P<0.001$), “marketing competency” ($F=7.146$; $P<0.001$), “product technology competency” ($F=8.783$; $P<0.001$), and “information technology application competency” ($F=4.337$; $P<0.05$). The Sheffe comparative method showed that the significant difference was among the personnel manager, the unit head manager and the staff. About “Research and Development Competency” degree, the personnel manager ($M=34.72$) and the unit head manager’s opinions ($M=33.59$) are higher than the staff’s opinions ($M=28.97$). About “Marketing Competency” degree, the personnel manager ($M=48.88$) and the unit head manager’s opinions ($M=47.12$) are higher than the staff’s opinions ($M=41.43$). About “Product Technology Competency” the personnel manager ($M=49.41$) and the unit head manager’s opinions ($M=46.88$) are higher than the staff’s opinions ($M=40.94$). About “information technology application competency” the personnel manager ($M=52.78$) and the unit head manager’s opinions ($M=52.76$) are higher than the staff’s opinions ($M=45.77$).

And used the mean analysis (Table 3) can understand the personnel manager and the unit head manager’s opinions. They think the staff’s competencies degree (“research and development competency”, “marketing competency”, “product technology competency”, “information technology application competency”) are good (the every item is higher than 3) and can competence their (the staff’s) work. The degree of the personnel manager and the unit head manager’s opinions is higher than the staff’s competencies degree. These results supported partly H7 hypothesis.

IV. The need of education and training degree of the talent

- **The personnel manager's opinions**

"Age" ($F=2.987$; $P<0.05$), "total working seniority" ($F=2.704$; $P<0.05$) and "relevant trade working seniority" ($F=2.704$; $P<0.05$) of the personnel manager can effect their opinions about the need of marketing competency education and training of the staff. But the Sheffe comparative method is conservatively and conscientious, they didn't show the difference groups.

The "education level" of the personnel manager can effect their opinions about the need of "product technology competency" education and training of the staff ($F=7.445$; $P<0.001$). The personnel manager, which education level are "senior high school below" ($M=55.00$) and "master" ($M=53.17$), they think the need degree in product technology education and training of the staff that is superior to the personnel manager who education level is "university" ($M=44.40$). These results supported partly H4 hypothesis.

- **The Unit head manager's opinions**

"Age" of the unit head manager can effect their opinions about the need of "marketing competency" education and training ($F=2.671$; $P<0.05$) of the staff. But the Sheffe comparative method is conservatively and conscientious, they didn't show the difference groups. These results supported partly H5 hypothesis.

- **The staff's opinions**

"Post unit" of the staff can effect the need of "research and development competency" education and training degree themselves ($F=5.232$; $P<0.01$). Research and development competency degree of the "research and development unit" staff ($M=42.14$) which is superior to the "production management" staff ($M=29.86$). These results supported partly H6 hypothesis.

- **Among of the opinions**

The results of the ANOVA were not differences. These results didn't support H8 hypothesis. Because, the personnel, the unit head manager and the staff judge the need of education and training, their mean are all higher than 3 from mean analysis. Although ANOVA were not differences, we know that they need to educating and training for the seven competencies.

V. The implement of education and training degree of the talent

The whole manufacturer of manufacturing industry carries on talent's education and training education and training methods, as follow:

- **On-the-Job Training (O.J.T)** : Work Instruction Method (84.38%), Apprenticeships (78.13%), Delegation (65.63%), Job Rotation (50%), Task Forces (34.38%), Work Safety (34.38%), Human Relationship (31.25%), Work Improvement (31.25%), Readings (28.13%), Special Job Assignment (28.13%), Supervisor Training (28.13%), Understudy Plan (21.88%), Manager Training Plans (21.88%), Director Training (18.75%), Mentor Method (15.63%), Interview (15.63%), Coach Teaching (9.38%), and Multiple Management (9.38%).

- **Off-the-Job Training (Off.J.T)** : Lectures (75%), Study (56.25%), Panel Discussions (56.25%), Problem-Solving Discussion (46.88%), Brainstorming (37.50%), Case Studies (34.38%), Transactional Analysis (31.25%), Programmed Instructions (28.13%), Training Game (18.75%), Business Games (15.63%), Grid Seminar (15.63%), Understanding Approach (15.63%), Case-Based Process Method (12.50%), Role Playing (12.50%), Walk Track (9.38%), In Basket Exercise (3.13%), KT Method (3.13%), NM Method (3.13%), Sensitivity Training (3.13%), KJ Method (0%), and ZK Method (0%).

CONCLUSIONS

Different personal characteristic will affect the personnel manager, the unit head manager and the staff's opinions about the competencies degree and the need of education and training degree of the staff. Among of the personnel manager, the unit head manager and the staff have significant difference of showing to the competencies degree opinions of the staff in Taiwan. But the competencies are localized about the core competencies and functional competencies, not the general competencies. These shows, in many competencies, the manager think the competencies of the staff can competence for their (the staff's) work, but the staff think their competencies are not enough to do their work. And they also think that the staffs need to accept the education and training.

The whole manufacturer of manufacturing industry carries on talent's education and training education and training methods. About On the Job Training, the major methods are Work Instruction Method, Apprenticeships, Delegation and Job Rotation. About Off the Job Training, the major methods are Lectures, Study, and Panel discussions.

The competency can assist the company to decide the staff. To adapt the world, the personnel manager, the unit head manager and the staff think need to educating and training. So the company must be strong to educating and training about the functional competencies.

In order to take advantage and get benefit in the manufacture in the competitive world. Not only confirm the competency and the need of the education and training but also the managers must take care of the development of the staff. To face the change rapidly and competitively world, and the staffs of the company need to learn continuously.

At present, there are 70% enterprises to engage in the function construction one by one and develop employees' roles or various management systems of introducing function guidance in Taiwan. So that human resources can be paid attention, and it should be understood that education and training are rooted education work even an imperative enterprise conduct.

However, as the education and training content must be suitable to many products, its life cycle is shorter and shorter, which results in more and more complicated education and training provided and cannot produce instant results on account of needs of time. But if enterprises are not willing to put emphasis on the education and training because of this, the staffs don't understand the enterprise culture and work

specification. The enterprises always want to seize the talents of other companies. On the one hand, it is not the permanent solution; on the other hand, it will influence even change the original deep-rooted excellent business culture, which is not a wise move for the enterprise in the long term.

From the above discussed, we must pay attention to the great influence of talents education and training on the development of enterprises and the country. Therefore, when researching and discussing about the talents of manufacturing industry, we should possess the abilities of knowing which roles can be competent in this position as well as understand current needs of education and training carried out by enterprises and existing implementing situations.

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