The impact of human resources on partnership of orange farmers and Muchacha-en,Ltd : evidence from Japan

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Abstract. This study aims to analyze the impact of human resources on partnership of orang farmers and Muchacha-en, Ltd. This study was conducted in Akehama, Seiyo City, Ehime Prefecture, Japan with 35 respondents consisted of farmers engaged in the Unshiu oranges cultivation and being a partner with Muchacha-en, Ltd. The data analysis used linear regression analysis by using IBM SPSS version 24. The study showed that simultaneously, human resources (knowledge and skills) have an impact on partnership of oranges’s farmers and Mucaha-en,Ltd. The path coefficient value (β) of knowledge is 0.260 and skills is 0.450

1. Introduction

Japan is one of the oranges producer countries which has various of varieties orange such as Unshiu oranges. Unshiu oranges also known as Satsuma Mandarin (Mikan). It is of Chinese origin with names Wenzhou Mikan. Ehime Prefecture is the second largest producer of Unshiu orange. It is one of the highest value crop for trading in Japan. Orange fruit is consumed domestically in many forms, such as 1. Fresh fruit; 2. Processed into fresh juice; 3. Canned fruit; 4. Cosmetic purposes and others. Data from Global Agricultural Information Network [1] shows that Japan’s fresh mandarin orange imports in 2017/18 approximately 18.659 MT. The United States is the leading supplier of fresh mandarin to Japan and accounts for nearly 70 percent of Japanese imports. Japan exported 1.590 MT of mandarin oranges in 2017/2018, down 11.8 percent compared to 2016/17. The decline in export volume and value of the oranges export in Japan was in line with the decline in oranges’ production in various regions in Japan. Kurai (2018) argued that the decline in production was attributed to several factors such as: 1. Japan's agricultural policy; 2. Aging population of Japanese farmers; and 3. Unfavorable weather conditions during the growing season.

Japan faced with the problems of agricultural which is the decline of agricultural population and ratio of farmers. Based on data from the Ministry of Agriculture, Forestry and Fisheries (MAFF,
2019), the number of agricultural households decreased from approximately 5.5 million (65%) in 1985 to 2 million (30%) in 2015. Gustavo [2] argued that with an increasing trend of aging farming population, agriculture and rural development will be increasingly encouraged by older persons. Stloukal (2000) states that older farmers have expansive knowledge and experience of agricultural production that are conservative traditional agricultural practices and they can transfer their experience to young farmers in spite of that older farmers are less incentive for investment and innovation in agriculture and are slower to adapt to the change in agriculture [3].

Based on these conditions, the farmers as human resources have a key role in term of enhancement Unshiu oranges productivity. Kipkorir [4] argued that human resources are the source of achieving competitive advantage because of its capability to convert the other resources (money, machine, methods and material) into output (product/service). Realizing that level of productivity will be challenging for farmers, especially in the face of obstacles such as climate change, aging and decline of agricultural population, and pest that have become resistant. Therefore, through collaborative efforts such as partnerships is one way to foster innovation and technology accessibility in dealing with agricultural systems. In the case of farmers in Ehime Prefecture, Japan, one of the established partnership is a partnership between orange’s farmers as plasma and Muchacha-en, Ltd as the core. Based on these arguments, the purpose of this study is to analyze the impact of human resources on partnership of orange’s farmers and Muchacha-en, Ltd: Evidence from Japan.

2. Methods
This study was conducted in Akehama, Seiyo City, Ehime Prefecture, Japan on December 2018 – March 2019. The number of respondents is 35 people consisted of farmers engaged in the Unshiu oranges cultivation and being a partner with Muchacha-en, Ltd. Furthermore, linear regression analysis is used to see the impact of human resources on partnership between Unshiu orange farmers and Muchacha-en, Ltd. The data were analyzed by using IBM SPSS version 24. The equation model as follows:

\[ Y = b_0 + b_1X_1 + b_2X_2 + e \] (1)

Where:
- \( Y \) = Partnership
- \( X_{1,2} \) = Human resources (Knowledge and Skills)
- \( b_{0,1,2} \) = Regression coefficient
- \( e \) = Error variable

3. Results and discussion
3.1 Farmers profile

3.1.1 Age. Age of farmers gives an effect on productivity and physical abilities. Generally, a person who is young and healthy has a stronger physical ability compared with old age. A young person is quicker to accept new things, and be more dynamic.

| No. | Age Category (Years) | Total (Person) | Percentage (%) |
|-----|----------------------|----------------|---------------|
| 1   | 15 - 64              | 23             | 65.71         |
| 2   | > 64                 | 12             | 34.28         |

Table 1 shows that 65.71% of farmers are 15 – 64 years old and 34.28% of farmers are more than 64 years old. Working age in Japan is approximately 15 – 64 years old. Majority age of respondents include on working age categories. According to the MAFF census, the average age of people, primarily engaged in agriculture has increased by 7.2 years over the last decade to 67. The situation is
particularly advanced in the highland and mountainous regions of Japan, where over 70% of farmers are aged 65 or older. Guo [5] argued that various training should be conducted to improve the scientific and technological level as well as cultural attitudes. This training should equip them with more modern agricultural production skills to make up for the problems caused by aging.

### 3.2 Human resources

#### 3.2.1 Knowledge

Farmers' knowledge is obtained from formal and non-formal education that has been attended. Training is one of an important factor for increasing a farmer's knowledge. The training referred from this research is frequency of training that has been followed by respondent related to citrus farming. A farmer who often participates in training will add knowledge and skills to farming.

| No. | Education level      | Total (Person) | Percentage (%) |
|-----|----------------------|----------------|----------------|
| 1   | High school          | 19             | 54.28          |
| 2   | Vocational school    | 6              | 17.14          |
| 3   | Bachelor             | 10             | 28.57          |

Table 2 shows that the number of farmers who have bachelor education level is 10 respondents (28.57%), 6 respondents (17.14%) are vocational school standard education and 19 respondents (54.28%) are high school education standard. Farmers who have a high standard of education will find it easier to receive innovations that are supported by increasingly mature ways of thinking. This is in line with the theory of human capital where the education standard of agricultural labor has an impact on agricultural productivity. This relationship consists of three forms, namely: 1) Education can improve the quality of the workforce of farmers by enabling them to produce more available stock of production factors, 2) Education can improve the efficiency of resource allocation, 3) Education can help farmers choose the production method more effective by adopting new techniques. According to FAO, partnership as external organizations and individuals are actively approached to contribute through sharing knowledge, skills and expertise.

| No. | Training frequency (Times) | Total (Person) | Percentage (%) |
|-----|----------------------------|----------------|----------------|
| 1   | < 4                        | 28             | 93.33          |
| 2   | 4 - 6                      | 1              | 3.33           |
| 3   | > 6                        | 1              | 3.33           |

Table 3 shows that the number of farmers who had participated in training related to citrus farming in the last three months with a frequency of less than 4 times is 28 people (93.33%), participated with a frequency of 4-6 times is 1 person (3.33%) and participated with a frequency of more than 6 times is 1 person (3.33%). The pooling knowledge and resources, partners can address systemic gaps (e.g. in infrastructure, farmer training or market access), which ultimately creates more opportunities for everyone in the long run.

#### 3.2.2 Skills

Farmers skills are obtained from the experience of farming owned. Theoretically, the longer a farmer farming cultivates the more skilled. The experience that farmers have able to take into account the opportunities and threats that will face.
Table 4. Farmers profile based on farming experience, (n=35)

| No. | Farming experience (years) | Total (Person) | Percentage (%) |
|-----|---------------------------|----------------|----------------|
| 1   | 5 - 23                    | 18             | 51.42          |
| 2   | 24 – 42                   | 12             | 34.28          |
| 3   | 43 - 60                   | 5              | 14.28          |

Table 4 shows that the number of farmers with farming experience 5 - 23 years is 18 people (51.42%), 12 people (34.28%) have farming experience 24 - 42 years, and 5 people (14.28%) have farming experience 43 - 60 years. According to FAO, the skills the farmer learns through contract farming may include record keeping, the efficient use of farm resources, improved methods of applying chemicals and fertilizers, a knowledge of the importance of quality and the characteristics and demands of export markets. Farmers can gain experience in carrying out field activities following a strict timetable imposed by the extension service. In addition, spillover effects from contract farming activities could lead to investment in market infrastructure and human capital, thus improving the productivity of other farm activities. Farmers often apply the techniques introduced by management (ridging, fertilizing, transplanting, pest control, etc.) to other cash and subsistence crops.

3.3 Partnership. Muchacha-en, Ltd was established on August 1993 located in Ehime Prefecture Saiyo City Arihama Town 3-134. Muchacha-en, Ltd. Kiyotsu Otsu as representative director. As a private company, Muchacha-en, Ltd. initiated organic farming and cooperated with local citrus farmers.

Table 5. Farmers profile based on partnership period, (n=35)

| No. | Period (Years) | Total (Person) | Percentage (%) |
|-----|----------------|----------------|----------------|
| 1   | 1-14           | 10             | 28.57          |
| 2   | 15-28          | 10             | 28.57          |
| 3   | 29-43          | 15             | 42.85          |

Table 5 shows that the number of respondents who partnered with Muchacha-en, Ltd for 1 - 14 years was 10 person (28.57%), partnered for 15 to 28 years was 10 person (28.57%) and partnered during 29 to 43 years was 15 person (42.85%). Putri [6] the type of partnership that exists between farmers and Muchacha-en, Ltd is a partnership with the nucleus plasma pattern where Muchacha-en, Ltd is the core and orange farmers into plasma. This partnership model is mutually beneficial for both parties.

3.3.1 Information sharing. The establishment of partnership relations between farmers and Muchacha-en, Ltd makes the flow of information related to citrus farming easy to obtain.

Table 6. Information sharing frequency between orange farmers and Muchacha-en, Ltd (n=35)

| No. | Information Sharing Frequency (Times) | Total (Person) | Percentage (%) |
|-----|--------------------------------------|----------------|----------------|
| 1   | 1                                    | 33             | 94.28          |
| 2   | 2                                    | 2              | 5.71           |

Table 6 shows that 33 farmers (94.28%) who shared information with Muchacha-en, Ltd as much as once time in the past three months. The remaining 2 farmers (5.71%) shared information with Muchacha-en, Ltd twice in the past three months. Muchacha-en, Ltd gives freedom to partner farmers to discuss about citrus farming. Determination of the selling price of Unshiu oranges from farmers to Muchacha-en, Ltd was agreed upon through a meeting held before the harvest period arrived. Wu [7]
argues that partnerships have several common characteristics: future-oriented, mutual trust, information sharing/exchange and collaborative problem solving.

3.4 Direct impact analysis of human resources on partnership

Path analysis was carried out to find out the direct impact of human resources on partnerships with Muchacha-en, Ltd with exogenous variables, namely Human Resources (X1) consisting of knowledge (X1,1) and skills (X1,2), while the endogenous variable is a partnership (X3).

Table 7. The results of each test human resources on partnerships (t test)

| Variables      | Standardized coefficients (β) | t      | Sig. |
|----------------|-------------------------------|--------|------|
| Knowledge (X1,1) | .260                          | 3.511  | .001 |
| Skills (X1,2)   | .450                          | 6.625  | .000 |

Path analysis shows a positive impact of knowledge and skills on partnership of orange’s farmers and Muchacha-en, Ltd with path coefficient 0.260 and 0.450. The partnership between farmers and Muchacha-en, Ltd can increase the knowledge that farmers have with the training provided by Muchacha-en, Ltd to partner farmers related to citrus farming. In addition, the longer the farmer establishes a partnership with Muchacha-en, Ltd the farmers have enough skills in managing orange farming.

Toluwase and Apata [8] found that farmers acquired more experience with age leading to improved agricultural productivity and that they enhanced their entrepreneurial ability by joining cooperatives to gain easy access to information, capital, reduced operational costs and enhanced negotiation skills. Partnerships aim to connect individuals or organizations to enable easy flow and access to knowledge, experience, resources and connections, assist in making decisions and actions to achieve agreed outcomes. Structural equation of the path diagram 1 is: X2 = 0.260X1,1 + 0.450X1,2

![Figure 1. Path diagram 1](image)

4. Conclusion

Significantly, human resources (knowledge and skills) have an impact on partnership of orange’s farmers and Muchacha-en, Ltd. Path analysis shows a positive impact of knowledge and skills with path coefficient 0.260 and 0.450. The partnership between farmers and Muchacha-en, Ltd can improve the knowledge and skills of farmers.

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