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An Experimental Investigation on Performance under Individual, Team, and Mix Incentive Schemes

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ABSTRACT

It is a well-known fact that people respond to incentives; however, people respond differently on how these incentives are presented. This study aims to verify whether there are significant differences among the individual, team, and mix incentive strategies through an experimental setup. The Student's t-test was used to verify the significant mean differences on the students' performance under different incentive strategies. The results showed that there were significant mean differences on the students' performance among the three treatment groups in the study, with the mix incentives having the highest mean output level. An Ordinary Least Square regression analysis was conducted to identify factors that affect an individual's performance. Results of the estimation reveal that the mix incentive strategy has a significant effect on the performance and were consistent to the results of the t-test. Other factors that significantly affect the student's performance include the years of education, the perceived interest, and the perceived difficulty to the task. The study provided statistical evidence showing that, among the three incentive strategies, the mix incentive strategy provides the highest incentive to improve a student's performance under experimental setup.

Keywords: free riding, incentives, laboratory experiment, motivation, performance
JEL Classifications: C91, D03, D82

I. Introduction

Incentives are being used either to reinforce a positive behavior from an individual or to prevent them from exhibiting a negative one. In the business world setting, employers have the power to manipulate employees' behavior through incentives. By increasing the amount of the compensation, employees may be encouraged to increase their efforts to deliver better outputs.

This case is evident in a workplace environment. As such, firms channel incentives through compensation wages in their attempt to maximize an individual's performance. The firms believe that higher incentives will lead to higher performance of the workers (Prendergast, 1999). For this reason, firms think of strategies on how to effectively present these incentive schemes. Many economic studies have

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focused on the utilization of different compensation schemes to counter losses (Kidwell & Martin, 2005), yet, existing literatures focus more on incentive schemes, and not on the kinds of incentive strategies that best improve performance in individuals.

In the context of education, teachers implement incentives in order to boost students' performance in classes. They give grades as a compensation for a satisfactory performance. These can be in the form of additional scores, recognition, awards, or any non-pecuniary incentives. Moreover, students either work alone or work in a group. In theory, working in groups supports cooperative learning in students (Holt & Laury, 1997; Ruël et al, 2004).

Ahlgren et al. (2007) stated that laborers are the most important assets in production. Under the principal-agent theory, the principal will ensure that the agents are well motivated in order to remain efficient. To be able to encourage them to be productive, principals engage in finding better incentive systems. If the principal fails to do this, the individuals may withhold their efforts, thereby causing a domino effect, which, in turn, may withhold the increase on the output levels. The dilemma arises in the selection of the incentive system, wherein the principal should choose the kind of incentive that would be best suited for the firm. The two most employed incentive strategies are the "individual incentive scheme" or the "team-based incentive scheme." Differences in both incentive systems arise when both advantages and disadvantages contradict the preferences of individuals.

Individual incentive strategies can better motivate and promote healthy competition among individuals. The sense of giving them full responsibility is already considered to be an advantage of individual compensations (Ahlgren et al., 2007). However, an individual's marginal performance cannot be easily measured. The population of individuals in organizations affects the capacity of the principal to monitor an individual's output, which leads to higher monitoring costs (Jones, 1984). Also, when the incentive to work is too high or too low for an individual, the individual will withhold efforts that cause losses in performance (Gneezy & Rustichini, 2000).

On the other hand, Mitchell (2013) identified that team incentive strategies are effective as an organizational strategy since working in groups can bring the best out of an individual. Through collective thinking and effort, active communication within a group makes it easier for the individuals to generate ideas and grow relationships in the workplace. However, problems arise when members in the group opt to free-ride. The members who are contributing will receive additional burden transferred by the free-rider while the other members who do not want to suffer additional burdens may become free-riders themselves. In addition, a larger group will give a member more liberty to free-ride as compared to a relatively smaller group (Albanese & van Fleet, 1985).

Vandergrift and Yavas (2005) studied the difference between working under piece rate and team production. The authors used a real effort forecasting task, where they pay the participants according to their level of output. It was found that there was no discrepancy in production between the working strategies. Meanwhile, a study by Ruël et al. (2004) provided evidence that free-riding problems present in a team-based incentive scheme had an impact on team performance. However, the author states that having free-riders in a group does not necessarily mean that the overall group performance decreases. Overall performance will increase if other students compensate for the free-riding members, and it will only decrease if the "sucker effect," where other members lower their effort in the presence of free-riders, comes in.

Ahlgren et al. (2007) investigated the difference of individual and team-based reward systems by interviewing different organizations that implement reward systems under various conditions. The researchers concluded that in order to gain advantages and eliminate disadvantages, a mix of the two reward systems is recommended.

With the present inconsistencies in the results of existing literature, the study aims to determine whether there are significant differences in performance under

individual, team, and mix incentive strategies. Specifically, the study hopes to identify the incentive strategy that best improves performance of individuals, and verify other factors that determine the levels of performance through a laboratory setup.

The study conducted an experiment under three treatments in a classroom setup. The first treatment was under the individual incentive strategy where returns were equal to the output multiplied by the compensation rate. The second treatment was under the team incentive strategy where the returns of the individual would be based on the returns of the whole group that were divided equally among members. The last treatment was under the mix incentive strategy wherein an individual's compensation was based on his performance as an individual and as a member of the group. The experiment used counting exercises to measure the performance of participants. They were given the same set of "count the squares" worksheets in all treatments in order to determine if the level of performance under each condition differs. The payoffs were determined under piece-rate conditions. Participants were given additional questions after the task to elicit other factors that determine performance under the treatments.

II. Analytical Framework

2.1. Performance, Incentives, and Individuals

In economics, the theory of incentives suggests that the more an individual is paid, the higher the effort he gives to the task. Since individuals are deemed to be rational, they have the tendency to weigh the benefits and costs attached to a task presented to them (Olson, 1965; Mankiw, 1998). Furthermore, since individuals are found to be responsive to incentives, these then used a tool to encourage people to perform better. Festre and Garrouste (2006) explained this through the "principal-agent theory" where an employer hires a worker to get the job done. The motivation for the relationship to work is incentives. The central idea to the principal-agent theory is that the more productive an individual is, the more he will receive compensation for his actions.

However, an individual's behavior and performance level may change when they are under a team effort. Theories in productivity imply that, when individuals are being compensated under teams, it raises the possibility of free-riding and that free-riding discourages productivity of the individuals (Vandergrift and Yavas, 2005). Moreover, increasing incentives in the group may result to lower efforts from the individuals as the increase may be seen as an act of compensation for foregone efforts, which consequently leads to the individual's lower levels of productivity.

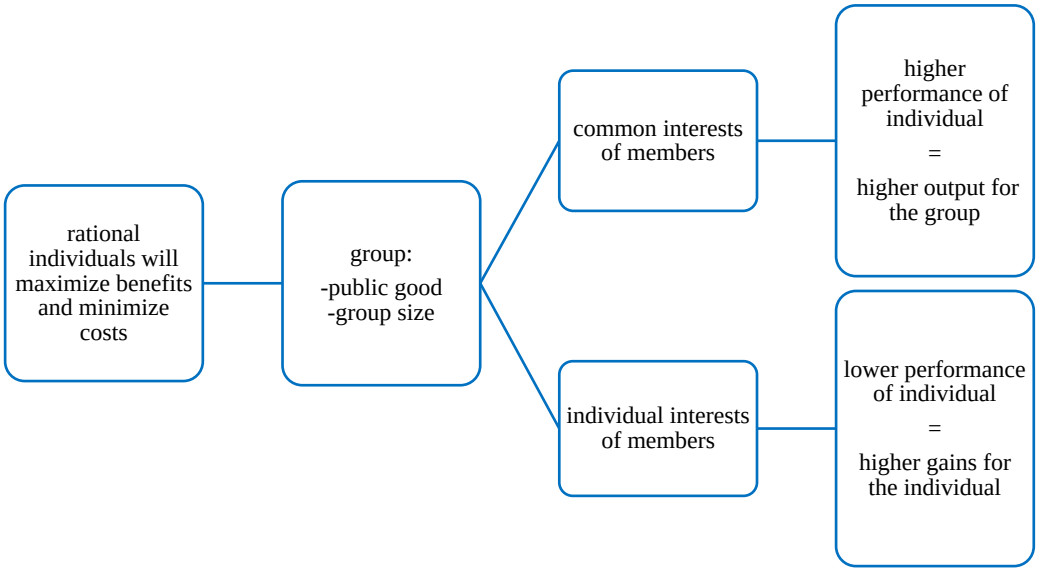
2.2. Free-rider Theory

According to the free-rider theory, a free-rider is a group member that does not contribute performance proportional to the benefits that he gains. Thus, free-riding affects group formation and an individual's level of productivity (Albanese & Van Fleet, 1985).

Adapting Olson's (1965) free-rider theory to focus on the behavior of an individual, the study assumes that individuals have a set of defined preferences influencing their interests. They are rational actors that have the tendency to weigh benefits over costs in order to obtain self-interests.

The assumption is that individuals, when under groups, change their behavior depending on the influence of their team members and the size of the group. If they opt to pursue the common interest of the group, which is to achieve higher output for the whole team, it is expected that they will perform more and put in more effort to the task. However, tasks in groups are considered as a public good; thus, implying the presence of a market distortion. A member, assuming that he is selfish, may choose to maximize his own gains without contributing to the group effort. They reduce their effort in order to gain higher marginal benefits. Moreover, group size can also determine an individual's decision on whether to contribute to the group work or not. The literature suggests that as group size increases, the tendency to free-ride increases as well.

Fig. 1. Adapted Olson's Free-rider Theory



2.3. Individual's Maximum Gain

Reiterating that people respond to incentives, incentives have become a motivation to increase their performance. However, an individual's behavior can change when under different types of incentive systems.

Under individual-based incentives, the maximum gain of the individual, is the returns of his effort, R(e), less the costs, C(e), which can be derived as:

$$\text{Max } G = R(e) - C(e) \quad (1)$$

The equation above means that returns and costs of the individual's effort will be directly affected once they put in effort to the task. One will maximize gains by increasing effort, supposing that returns are greater than costs.

Under team conditions, an individual's maximum gain will be determined by the cost and returns of the efforts he supplies to the group. Considering that efforts are directly related to returns and costs, Vandergrift and Yavas (2005) presented it as:

$$\text{Max } G = \frac{\sum R(e_i)}{n} - C(e_i) \quad (2)$$

where Max G is the maximum gain an individual could achieve, is the total returns of the effort contributed by group members, and is the cost of the individual's effort, under the assumption that total returns of the group are divided equally among individuals.

This implies that, under team based incentives, a member who puts in less effort can still gain greater marginal benefits than those who put in more.

III. Methodology

3.1. Experimental Procedure

The experiment was done inside the class where a real effort task was given to the students. The task was a "count the squares" worksheet. Across treatments, each individual received same worksheets and questionnaires on the individual's socio-demographic and economic profile. Moreover, additional questions

were added to identify the individual's perception on the task.

The experiment was done using three separate classes in the University of the Philippines Los Baños. Each class received a different treatment. The treatments were under individual incentive strategy, team incentive strategy, and mix incentive strategy. Under the team-based and mix, groups of eight were randomly sampled before the task started. Free-riders from both treatments were identified through the questionnaire.

Each individual was tasked to answer worksheets that contain squares to be counted. The participants were given three minutes to accomplish as many pages in the worksheet as possible. When the three minutes were over, participants handed their papers in along with the attached questionnaires. After checking the outputs, each individual received the following week the corresponding wage under each incentive treatment.

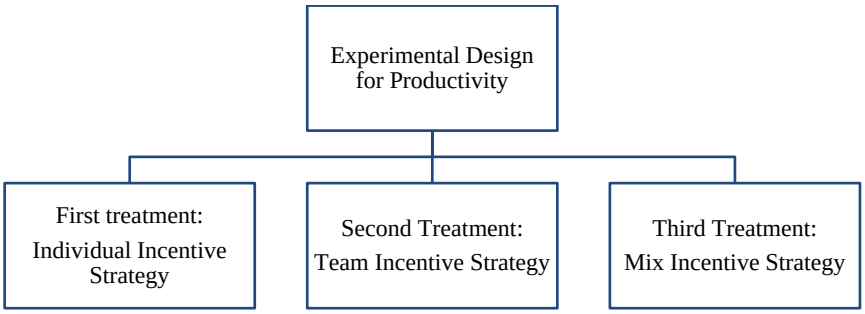
The study was able to determine an individual's performance through the number of their correct answer in the worksheet. A correct output corresponded to a page with the correct number of squares counted. An individual received a two-peso return for every correct page. The maximum payoff an individual could receive was Php 60, since the maximum correct output an individual could get was 30, and the minimum was zero.

After the experiment, students were asked to answer demographic questions that are applicable to students, like age, years in college, and sex. Questions were made to identify a participant's perception to a task. Using questions answerable by yes or no, participants determined their perceived interest and perceived difficulty. Also, a set of questions was added for the team-based and mix treatment questionnaires pertaining to the individual's capability to free-ride.

3.2. Experimental Design

In order to test an individual's behavior towards productivity and incentives, the experiment was measured based on the individual's output. The payoff schemes were modified from Vandergrift and Yavas' (2005) experiment. Their payoff was determined through the number of correct outputs.

Fig. 2. Experiments across Treatments

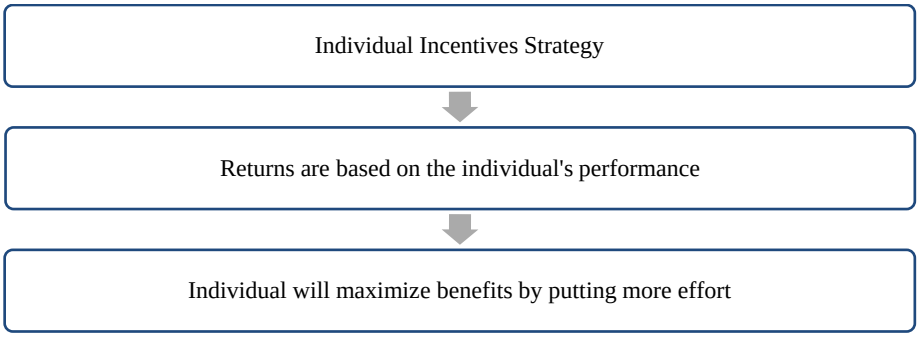


The first treatment was the individual incentive strategy where payoff was equal to the correct output. It corresponds to a two-peso return to the individual. This was determined by:

$$\text{payoff} = (2)\text{correct output} \quad (3)$$

In this treatment, individual's performance was based on his own output. The more an effort of individual puts into the task, the more likely he will receive higher payoffs. Fig. 3 tells the assumed decision making of an individual under individual-based incentives.

Fig. 3. First Treatment: Individual Incentive Strategy



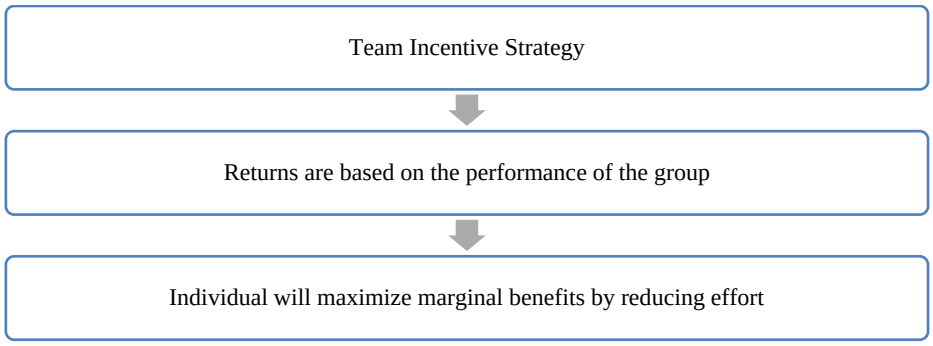
Under the second treatment, team incentive strategy, individual returns were equal to the total output of the group multiplied by a two-peso base rate. Each group was composed of eight members. Assuming that each member received equal payments, total returns were divided among all members.

$$\text{payoff} = \frac{(2)\sum \text{correct output}}{8} \quad (4)$$

Note that teams were composed of eight individuals since, in Olson's (1965) study, a group of six is too small to facilitate free-riding. Thus, this is to identify the free-riding members. Fig. 4 tells the assumed decision making of an individual under team-based incentives.

Note that teams were composed of eight individuals since, in Olson's (1965) study, a group of six is too small to facilitate free-riding. Thus, this is to identify the free-riding members. Fig. 4 tells the assumed decision making of an individual under team-based incentives.

Fig. 4. Second Treatment: Team Incentive Strategy



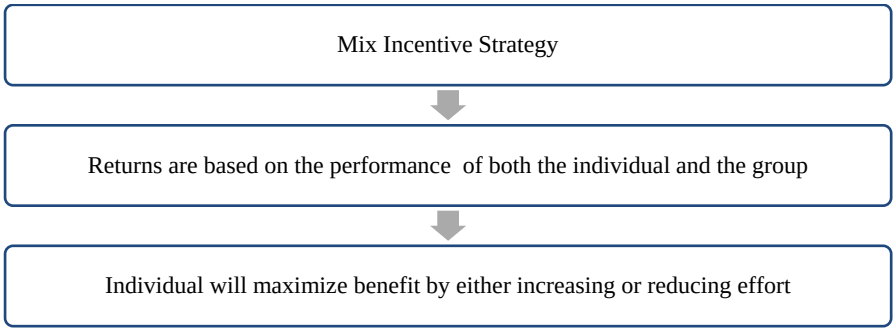
Under the third treatment, mix incentive strategy, the individual incentive strategy was combined with the team incentive strategy. Individuals changed their behavior depending on the decision they made. Payoff was equal to the total returns of the group divided by the team members plus the individual returns of the member.

$$\text{payoff} = 0.5\left[\left(\frac{(2)\sum \text{correct output}}{\text{n}}\right) + (2 * \text{correct output})\right] \quad (5)$$

In order to balance the mix incentive strategy, note that the study needed to reduce the corresponding returns to 0.5 to each of the incentive strategies. Again,

the study identified who are the free-riding members in with groups of eight. Fig. 5 tells the assumed decision making of an individual under mix incentives.

Fig. 5. Third Treatment: Mix Incentive Strategy Treatment



3.3. Regression Model

Aside from the incentive schemes implemented, socio-demographic profiles may have an impact on an individual's level of productivity. The study considered age (Skirbekk, 2003), sex (Vandergrift & Yavas, 2005), and years of education which was translated to their classification in college. Economic factors were also added. The daily allowance and incentive scheme belonged to this category. Moreover, the study added the individual's perception to the task which was the individual's level of interest, perceived difficulty level and free-riding.

$$Y = \underbrace{\beta_0 + \beta_1 A + \beta_2 S + \beta_3 C_t}_{\mathbf{SD}} + \underbrace{\beta_4 I_t + \beta_5 M}_{\mathbf{E}} + \underbrace{\beta_6 B + \beta_7 D + \beta_8 F}_{\mathbf{P}} + \mu \qquad (6)$$

To verify whether there are significant mean differences on individual performance across treatments, the study used the Student's T-test. The Ordinary Least Squares regression was used in order to determine whether the assumed factors have signify-cant impacts to performance. With the individual's level of performance being the dependent variable, the regression model is:

where:

Y = Individual's level of performance

A = Age of the individual

S = Sex of the individual: dummy variable; 1 represents female and 0, male

Ct = Classification in college, dummy variable; 1 represents lower year (freshmen and sophomores) and 0, upper year (juniors and seniors)

It = Incentive treatment dummy variable; three dummy variables used to represent each treatment. I1, 1 represents the second treatment which is team incentive strategy and 0, otherwise. I2, 1 represents the second treatment which is mix incentive strategy and 0, otherwise. The individual incentive treatment was set as the base.

M = Daily allowance of students

B = Individual's perceived interest dummy variable; 1 represents interested and 0, otherwise.

D = Individual's perceived difficulty dummy variable; 1 represents difficult and 0, otherwise.

F = Member type dummy variable; 1 represents the individual as a free-rider and 0, otherwise.

β_t = Estimation parameters

μ = error term

IV. Results and Discussion

The experiment was done in four classes of ECON 101 recitation sections. A specific class of 24 students

was assigned for each treatment. The sample size for the three treatments was 72. The dependent variable, the students' output levels, ranged from 3 to 12. On the average, the output level was 10.3194 with a standard deviation of 0.5380. In the observation, most of the respondents were female. And, since the respondents were students, most of them were from the lower years (freshman and sophomore). Their ages varied from 17 to 21, with an average of approximately 18 years.

4.1. T-Test on Individual, Team, and Mix Incentive Strategies

The Student's T-test was used to determine whether there were significant differences between the means in the output levels. By using the Shapiro-Wilk Test of Normality and the Variance ratio test, the study ensured that the assumptions of normal distribution and equal variances were true. All of the treatments were paired to each other in order to determine whether there were significant mean differences among them. For the t-test, the null hypothesis assumes that there are no statistically significant mean differences on the output levels of each pair of treatments, while the alternative hypothesis assumes otherwise.

With the previous results, it is safe to assume that at α=10%, there is a significant statistical mean difference between all the paired observations. Note that, when paired to the mix incentive strategy, the pairs of exhibit mean differences at a higher significance level. It can be seen in table 1, while the mix incentives paired with both treatments have positive mean significant differences with the mix at α=1%, the paired observation of individual and team incentive strategy was only significant at α=10%. Moreover, the significant mean difference of the first pair was negative. This implies that the mean output level of the mix incentive strategy treatment was higher than the team incentive strategy and the individual incentive strategy. Also, the individual incentive strategy has a lower output level than the team incentive strategy.

Table 1. Two Sample T-test on the Paired Observations

Paired Observation	**Mean Diff.**	**Std. Error**	**T**	**p-value**
Individual=Team[e]	-1.9583	0.9957	-1.9667	0.0553
Mix=Individual[u]	5.5000	1.1489	4.7870	0.0000
Mix=Team[e]	3.5417	1.3031	2.7179	0.0092

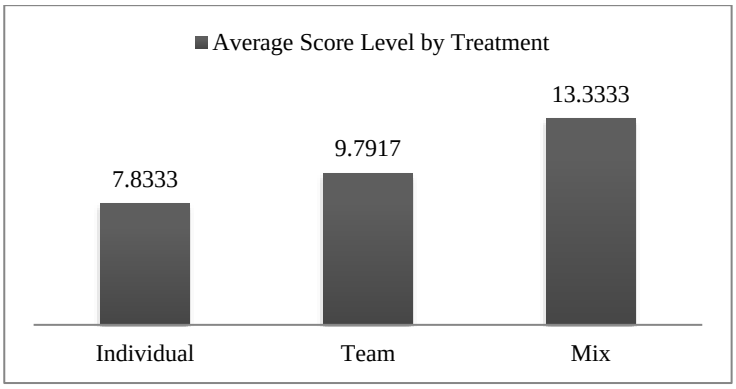
Notes: 1. e; of equal variance, u; of unequal variance.
2. Satterthwaite's degree of freedom was used.
3. Mean difference and standard error were from the paired observations.

Based on the previous significant results from the t-test and from Fig. 6, the highest mean score came from the mix incentive treatment (13.3333), followed by the team incentive treatment (9.7917), and, lastly, the individual incentive treatment lagged behind (7.8333). With the significant differences of the average means, it is safe to assume that the individuals under mix incentive strategy had the highest performance. Thus, for the experiment, the mix incentive was the best incentive strategy.

These results, however, negates the literature that there was no significant mean difference between individual and team-based incentives (Vandergrift & Yavas, 2005) but agrees with the assumption that mix incentive strategy will definitely have a positive effect on the performance of an individual (Ahlgren et al., 2007).

The t-test results provide the answers for the first and second objective in that, all of the incentive strategies have significant mean differences from each other. Moreover, the mix incentive strategy has stronger significant mean difference from the other two treatments. Thus, for the experiment, it is the best incentive strategy.

Fig. 6. Average Output Score by Treatment



4.2. Factors Affecting an Individual's Performance

The study employed an ordinary least square (OLS) regression for a sample of 72 observations used in the study. The significant determinants for the output level were the mix incentive strategy, lower year class, and perceived interest. The insignificant variables were team incentive strategy, age, daily allowance, sex, and free-riding. Tests on multicollinearity and heteroscedasticity were also done in order to avoid any errors in the specification. From the conducted diagnostics, multicollinearity was negligible and heteroscedasticity was not present in the regression.

The mix incentive strategy treatment has a positive impact on output levels at α=1%. This agrees that, by combining the individual incentive strategy and team incentive strategy, (the mix incentive strategy) it addresses both the advantages and disadvantages of each incentive strategy (Ahlgren et al., 2007). It implies that, if mix incentive strategy were to be implemented in the same setup, an individual's performance will likely improve as compared to only using the individual incentive strategy.

The lower-year class has a positive effect on the output level at α=1%. The lower-year students have a higher performance on average when compared to the upper-year students. This affirms Brown's (1982) study where education has a negative relationship with performance. Interestingly, this might be related to the individual's competitive behavior. Students, who are in the prime of their college life, tend to be more competitive and more productive than the upper-year students.

The perceived interest of an individual was significant at α=10% and had a positive relationship with the performance of the individual. On average, the output level is higher when a person is interested in the task as compared to those who are not interested. As the literature confirms, the more an individual is interested in a task, the more he is willing to work and the more he will improve his job (Albanese & van Fleet, 1985).

The perceived difficulty of an individual towards the task was significant at α=10%. It had a positive effect with an individual's performance. When compared to

students who considered the task to be easy, those who perceived it to be difficult had higher outputs. This may explain a student's behavior when he/she faces a difficult subject. He tends to exert more effort when challenged unlike when he is presented with an easy one (Hughes et al., 1985).

Table 2. Ordinary Least Squares Regression for Output Levels.

Variables	Coefficient	Std. Error
Constant	-3.2695^{NS}	11.52
Treatment		
Team	2.5449^{NS}	1.61
Mix	6.6187***	1.64
Age (years)	0.2944^{NS}	0.62
Allowance (daily)	0.0031^{NS}	0.00
Class (lower year students)	3.2322***	1.06
Sex (female)	-0.4124^{NS}	1.05
Perceived Interest in the task	3.0981*	1.61
Perceived Difficulty in the task	1.5555*	0.91
Free-rider	-0.9655^{NS}	1.42

Notes: 1. n=72.

2. coefficients are rounded off to 4 decimal places; standard errors and means are rounded off to 2 decimal places; R^2= 0.4144; p-value= 0.0001.

3. ***, **, *, NS are significant at 1%, 5%, 10%, not significant, respectively.

Additional variables mentioned in the literature that affect an individual's performance, aside from the four variables that were previously mentioned, were found to be insignificant. Surprisingly, free-riding did not elicit any significant relationship with the output levels. It contradicts the existing literature that free-riding discourages an individual to improve performance (Albanese & van Fleet, 1985; Blinder & Morgan, 2000; Olson, 1965).

Since the team incentive strategy was insignificant, it supports the t-test result that the mix incentive strategy is the best incentive strategy in the experiment. For further details on the regression, refer to table 2.

The ordinary least squares regression provided the results to satisfy the second and third objectives of the study. Based on the experiment, this proves that there is a definite increase in the performance level of the individuals using the mix incentive strategy. Moreover, this also determined the significant factors that improve the individual's level of performance: mix incentive strategy, classification in college (lower-year students), the interest of the individual on the task, and the perceived difficulty of the individual towards the task.

With the model significant at α=1%, the study can assume that 41% of the variation of the individual's performance is explained by the model.

4.3. Limitations of the Study

Since the experiment was done in an experimental setup, variables were controlled and, as such, an artificial situation might have been inadvertently created. The situation and activity done and the motivation for the students might not mimic the real-world scenario. The experiment was constrained to the researcher's budget; hence, the low income that the

students received might have affected their behavior during the experiment.

V. Conclusion

The results of the Student's T-test showed that there were significant differences between the three treatments, with the mix incentive strategy obtaining the highest mean score. This answers the first and second objective of the study. The mix incentive treatment was the incentive strategy that best improves performance. Under this treatment, individuals performed better relative to the other incentive strategies.

For the third objective, the factors were regressed against the student's scores using an ordinary least squares regression. The result was that, the mix incentive strategy, college classification (lower year), the interest of an individual to the task, and the individual's perceived difficulty towards the task had a significant positive effect on performance. This also affirmed the answer for the second objective that the mix incentive strategy provides a greater effect on performance.

The study suggests that, for a similar setup, the mix incentive strategy could be a better incentive strategy than the other two. Since the results of the study are limited due to its experimental nature, the study may only offer varying results in different situations. As for firms and organization, they may find mix incentives as a way to boost performance, but not as conclusive as in the case of education. In the context of the experiment, the performance of individuals was encouraged while letting them experience camaraderie and collaboration. There are many ways of utilizing compensation based on the mix of individual and team-based incentives. Finding a perfect 'mix' of the incentive is necessary to create an effective motivation. With this, there is a potential for output to increase without penalizing the welfare of individuals.

For future references, the study recommends focusing on the mix incentive strategy to elicit the determinants of an individual's performance since, in real life situations, individuals can be social loafers as long as they are a part of an organization. Thus, the proposition that free-riding can be detrimental to performance can be proved in an experimental setup.

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An Analysis of Leisure Activities and Leisure Space in Accordance with the Leisure Learning Attitudes of Casino Employees

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ABSTRACT

The purpose of this study was to practically investigate how leisure activities and leisure space are composed according to the leisure learning attitudes of front-line workers at a foreigner-only casino. For this study, 353 employees of a casino located in Seoul were selected. The collected study data were analyzed using social network analysis, and the results of the study were as follows. First, the connection centrality values of the present and the desired leisure activities based on the employees' leisure learning attitudes showed that the distribution was more diverse for the current than the desired activities, but the concentration was stronger for the desired leisure activities. Second, the connection centrality values of the current and desired leisure spaces based on the leisure learning attitudes showed that the distribution was more diverse with the desired than with the current spaces, but the concentration was stronger with the current spaces. This shows that there were differences in the casino employees' present and desired leisure activities and spaces based on their leisure learning attitudes, as well as showing a circular relationship between the leisure learning attitudes, leisure activities, and leisure spaces; the differences between the employees' present and desired leisure activities and spaces could be visualized through network analysis from the perspective of their attitudes.

Keywords: casino employees, leisure activities, leisure learning attitudes, leisure space, social networks
JEL Classifications: C19, C39, I21, L83, L84

I. Introduction

Among foreigner-only casino employees, it is possible to increase customer satisfaction by providing professional service that meets customers' expectations; if exceptional service is not provided, it will only lead to stress (Chuang & Lei, 2011). Considering the characteristics of casino employees who are exposed to significant stress from working front-line customer service, stress may result in decreased team morale, and therefore, stress relief methods and options must be provided. Appropriate relief of stress can improve employee health and self-esteem, which could result in higher efficiency (Anderson, 2007).

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Leisure activities comprise activities during which people take time away from their daily duties to rest, improve their moods, expand their knowledge, participate in society, and freely exert their creativity. They entail voluntary participation in activities that fulfill individual desires (Stenseng, 2008). In order to engage in a leisure activity, a number of social conditions and resources are required. Of these, the broadest in scope with regard to life and means both philosophically and conceptually is leisure space (Min, 2014). A leisure space is a place where leisure activities take place, including facilities and physical resources. They refer to all spaces with the properties of leisure; that is, places where one can retreat from life, enjoy oneself, and rest (Min & Oh, 1993).

It has been possible to conceptualize the relationship between people's lives and their spatial conditions by applying the spatial usage characteristics of leisure activities to the dimension of personal experience (Kim & Bae, 2012). In order to engage in leisure activities in leisure spaces, proper leisure learning is required. Participation in specific leisure learning can affect individual happiness, enhance quality of life, lead to self-growth, enhance health, relieve stress, and allow people to enjoy lives of adventure and excitement, fulfill challenges, increase personal satisfaction, and maintain self-esteem (Zabriskie & McComick, 2003). Leisure learning creates internal achievements through interactions with others. Positive views on and evaluations of leisure learning can lead students to develop positive thinking and learning attitudes (Amye, 2009). Leisure learning attitudes refer to how people feel about their learning experiences as the result of their commitment to high achievement in their endeavors through investing significant physical and mental attention. Active and perceptive leisure learning attitudes influence leisure activities and spaces, and the more positive one's attitudes, the more active the participation in leisure activities, contributing to greater satisfaction with life (Ragheb & Tate, 1993). From this point of view, front-line casino employees, who are exposed to very high job stress because of their customer service work, require encouragement and provision of leisure activities and spaces so they can relieve stress.

In terms of helping people resolve their daily personal and, ultimately, organizational issues such as stress relief, finding the meaning of life, mental and psychological issues, and self-improvement, it is necessary to conduct studies on leisure activities and leisure spaces. With regard to the match between current and desired leisure activities and spaces, it is the leisure learning attitude that makes the difference; the gap between the current and desired activities and spaces may depend on how the individual reacts to leisure learning and from what perspective. That is, if one sees leisure activities from the perspective of learning, then leisure activities and spaces will be closely related to leisure learning. It is important to review the types of current and desired leisure spaces and activities based on leisure learning attitudes.

Therefore, the purpose of this study was to practically examine the structures of leisure activities and spaces in accordance with front-line casino employees' leisure learning attitudes. Attitudes were divided into achievement, satisfaction, and social adaptation, and along each sub-dimension, the structures of the current and desired activities and spaces were analyzed. That is, they were analyzed based on the employees' leisure learning attitudes, their current and desired leisure activities, and the spaces where they performed these activities. The study used network structure analysis.

II. Literature Review

2.1. The Characteristics of Casino Employees in South Korea

Currently, there are three casinos in Seoul, two in Busan, one each in Incheon and Daegu, two in Gangwon, and eight in Jeju, totaling 17; in 2015, the

total number of visitors to the casinos was 5,705,994. The casino industry is labor intensive and highly influenced by human resources, such as the employees who serve as the direct points of contact with the customers. For casino employees, human skills, such as maintaining positive relationships, rather than mechanical skills, are more important (Yoon, 2007). These employees face many complicated situations, such as new regulations, globalization, Internet technology changes, demanding customers, and unstable employment status (Tajeddini, 2010). Most of the casinos are open 24 hours a day, seven days a week. That is, the employees have to on weekends and holidays (Kim, Murrmann, & Lee, 2009).

Although casino employees have their own work stations, most of them spend most of their working hours standing. Additionally, the industry involves the pressure of having to respond to customers immediately as well as face them in person (Wan & Chan, 2013). Casino employees are recognized as professionals who learn the service skills of the card games but also professional customer service skills and have high levels of morality and ethics (Jeon, 2011).

The employees of casinos are exposed to unique working environments in which they must maintain smiles, respectful attitudes, and elegance even as they are exposed to mental or physical difficulties. Due to the unique nature of their working environments, these employees experience more rage and stress (Anderson, 2007). The 24-hour, on-the-go atmosphere and the requirement to always smile are significant sources of stress for these employees (Shelly, 1997). In pleasing customers, employees must hide their own emotions and treat customers with kindness (Kim & Kim, 2010), but on the inside, they may be feeling quite opposite emotions because of their working environments (Yook & Cho, 2014). That is, casino employees are required by the nature of their work to maintain two emotional "faces." This "two-faced" emotional expression then affects their job exhaustion (Lee & Ashforth, 1993; Mikolajczak, Menil, & Oliver, 2007), and thus it is necessary accumulate studies and manage employees efficiently. Studies that focus on individual casino employees may affect these individuals' lives in many aspects by developing in them the defense mechanisms to suppress negative emotions.

2.2. Leisure Activities

Leisure activities refer to voluntary pursuits of satisfaction by fulfilling one's desires (Kim, 1997), and they can be understood as the result of organic interactions between different variables that affect individuals and selected leisure activities (Sohn, Ahn, Cho, & Lee, 2002). Leisure activities relate to resting, changing one's mood, expanding knowledge, voluntarily participating in society, and freely exerting creativity (Gurbuz & Henderson, 2014), and these are achieved through physical movement and lead to mental satisfaction. Open, extroverted people spend more time doing team sports and leisure activities that entail socializing with friends (Tingya & Tang, 2013), and participation in leisure activities is focused on internal factors such as pleasure, fun, self-satisfaction, and resting (Han, Kang, & Oh, 2011). Developing leisure strategies induces changes in awareness and values, which then result in expanding demands and establishing public directions. As a result, expanding leisure spaces and leisure learning can proactively popularize leisure (Han & Cho, 2010). In summary, leisure activities are activities that people pursue with the goal of improving daily life by overcoming internal or external environmental challenges, meeting goals, and so on.

2.3. Leisure Space

Leisure spaces are spaces and physical facilities where leisure activities take place. They are spaces where the pursuit of leisure—that is, freeing oneself

from life's duties and enjoying oneself—is possible (Yoon, 2002). They are diverse and varied in nature, with their characteristics changing in accordance with a person's needs. A single leisure space can overlap with residential, production, or transportation spaces as compound spaces with multiple functions (Kim, Kim, Yoon, & Kim, 2007).

2.4. Leisure Learning Attitudes

Leisure learning attitudes develop continuously over the processes of active learning, and these processes help people to understand their societies and their lives while enhancing their own quality of life (Santomier & Hogan, 1994). Attitudes toward leisure learning are learned, and they reflect consistent reactions—friendly or unfriendly—toward certain targets. They reflect individuals' patterned emotions, thinking, and trends (Ryfeel, Wirz, Kuhne, & Wirth, 2014), and successful learning experiences help people form positive learning attitudes and improve negative attitudes (Kempft, 1999). Leisure learning attitudes are key in predicting individuals' pursuit of and satisfaction with leisure activities, and they are significantly correlated with these activities (Manfredo & Yuan, 1992). Therefore, leisure learning attitudes are key in determining the types of leisure activities people pursue and in what spaces, and it can be argued that these attitudes are learned through experience. This study looked at leisure learning attitudes from the perspectives of emotion, satisfaction, and social adaptation. The achievement aspects refer to individual preferences for and feelings regarding leisure learning experiences and activities, whereas satisfaction pertains to behavioral intentions behind selecting and engaging in leisure learning, as well as participation in indirect activities. Social adaptation, the cognitive aspect of leisure learning attitudes, includes general knowledge of and convictions regarding leisure learning.

Individuals' leisure learning attitudes are important for predicting their satisfaction with leisure learning and activities. These attitudes and the resulting leisure activity behaviors have a close influential relationship (Manfredo & Yuan, 1992); attitudes determine the activities people pursue and in what spaces, and they are learned through leisure experiences.

III. Method

3.1. Gathering Study Data

This study was conducted over a period of 20 days, from August 20 to September 10, 2015, with employees of foreigner-only casinos in Seoul. For the survey, the interviewer explained the study's intent to the interviewees before they completed the survey. A total of 400 questionnaires were distributed, and 381 of them were returned. Of these, incomplete questionnaires or those that appeared to lack integrity were excluded, resulting in a total of 353 valid samples. The questionnaires included nominal variables such as demographics, leisure activities, leisure spaces, and leisure learning attitudes. Table 1 shows the demographics of the sample population.

3.2. Measurement Tools

The survey questions measured current and desired leisure activity and leisure space priorities. Leisure learning attitudes were constructed into 14 questions based on attitude items developed by Ragheb and Beard (1982) as well as on studies by Shim (2011), Park (2004), and Ahn (2005).

In order to analyze the sub-elements of the leisure learning attitudes, factor analysis (specifically, principal component analysis with varimax rotation) was performed; as a result of this analysis, three elements were extracted: achievement, satisfaction, and social adaptation. From among the 14 questions, those with

lower commonality and relevance were removed: No. 12 (I want to increase my time and effort in the leisure learning that I choose) and No. 13 (I participate in activities related to leisure learning even when I am busy).

Table 1. Demographics of Study Participants

	Item	Frequency (No.)	Percentage (%)
Gender	Male	188	53.3
	Female	165	46.7
Age	20s	52	14.7
	30s	233	66.0
	40s	56	15.9
	50s or older	12	3.4
Type of work	Sales (dealer, manager, marketer)	248	70.3
	Administrations	105	29.7
Shifts	3 shifts	243	68.8
	Full time	110	31.2
Experience	Less than 3 years	23	6.5
	3 to less than 5 years	30	8.5
	5 to less than 10 years	240	68.0
	10 years and up	60	17.0
Position	Staff	27	7.6
	Chief	236	66.9
	Assistant Manager	48	13.6
	Manger	22	6.2
	Deputy General Manager	15	4.2
	Others	5	1.4
	Total	353	100

The 12 remaining questions were simplified into three factors: achievement, satisfaction, and social adaptation. Without the removed questions, the commonality of the questions ranged from .650 to .750, which seemed appropriate for further analysis. The Kaiser-Meyer-Olkin value for the relevance of the factor analysis samples factor analysis was .939, which appeared to be appropriate for the variables. The Bartlett's sphericity test result for the relevance of the factor analysis model was 2429.245, with a significance of .000, indicating that the factor analysis model was relevant and there were common factors. The total power of the extracted factors was 70.009%, and their analysis showed that the confidence indices (Cronbach's alphas) for factor 1 (achievement), factor 2 (satisfaction), and factor 3 (social adaptation) were .871, .862, and .787, respectively, which showed internal consistency. The details are shown in Table 2.

Table 2. Leisure Learning Attitude Scale Questions and Confidence Indices

Factor	Measurement Item	Load	Eigenvalue	Dispersion force	Confidence Index
Factor 1 (achievement)	The leisure leaning that I choose gives me enjoyment.	.807	3.042	25.352	.871
	The leisure learning that I choose invigorates my life.	.747			
	The leisure learning that I choose is important.	.739			
	The leisure learning that I choose makes me feel happy.	.583			
	The leisure learning that I choose is valuable.	.518			
Factor 2 (Satisfaction)	The leisure learning that I choose makes me feel refreshed.	.787	2.728	22.736	.862
	The leisure learning that I choose is satisfactory.	.774			
	The leisure learning that I choose is an important part of my life.	.663			
	I like the leisure learning that I choose.	.620			
Factor 3 (Social adaptation)	I seek friendship through the leisure learning that I choose.	.772	2.620	21.921	.787
	The leisure learning that I choose helps me with my health.	.767			
	The leisure learning that I choose benefits society and me.	.742			

3.3. Analysis of Data

For this study, social network analysis was used. This analytical method allows visualizing more data and approaches through network analysis (David & Lynn, 2015). The positional difference of each node and information or experience shared allows visualizing of the network and connection patterns (Wee & Lee, 2011). That is, social network analysis expresses the information or opinion exchanges between the members of a communication group by means of quantitative analysis or in the form of networks composed of edges that connect the nodes between people and organizations in order to analyze the characteristics of systems (Gwon & Cho, 2011). Based on the connections between the members, that is, the people and the objects, one may build a one-node network, which reflects the relationships between individuals, or a two-node network, which reflects the relationships between different entities such as people and objects (Kim, 2011). In this study, the author conducted one- and two-node analyses based on the central positions of a given network's actors in order to show the important element within the network (Gwak, 2014; Prell, 2012; Scott, 2012). For this, the analysis was conducted based on the centralities of the degree, closeness, and betweenness.

The author used SPSS 18.0 and Netminer 4 software to analyze the data for this study, including frequency analysis in order to identify the general characteristics of the study population. NetMiner 4 is a social network analysis tool and was the main tool used in the study for the network analysis; it analyzes nodes and links and displays the results visually.

IV. Results

4.1. Analysis of Leisure Activities Based on Leisure Learning Attitudes

Based on the leisure learning attitudes, the current and desired leisure activity connection, closeness, and betweenness centrality indexes were used to make relative comparisons (see Table 3.) The results for the comparisons showed that the centrality index was highest for desired leisure activities; that is, the casino employees wished for more diverse leisure activities than were available to them. They specifically preferred overseas travel and watching movies in addition to their current activities. The results also showed that other current leisure activities were shopping, eating out, taking naps, and meeting friends. The desired leisure activities included camping, water sports, and volunteering.

Table 3. Current and Desired Leisure Activities Based on the One-node* Leisure Learning Attitude Network

Leisure Learning Attitude	Current And Desired	Degree Centrality		Closeness Centrality	Betweenness Centrality			Leisure Activities
Achievement	Current	.118	.124	.192	.139	.237	.148	Overseas travel, shopping, eating out, watching movies
	Desired	.242		.331		.385		Overseas travel, camping, water sports
Satisfaction	Current	.110	.133	.222	.111	.316	.274	Watching movies, overseas travel, taking naps, meeting friends
	Desired	.243		.333		.590		Overseas travel, taking naps, water sports, watching movies, golf
Social adaptation	Current	.075	.053	.211	.033	.285	.100	Overseas travel, watching movies, taking naps
	Desired	.128		.244		.385		Overseas travel, water sports, volunteering

Note: * The one-mode network showed the relationships between employees and leisure activities.

For the specific differences in leisure learning attitudes, the differences between the current and desired leisure activities were highest, in order, for satisfaction, achievement, and social adaptation. For closeness, the differences in order were highest for achievement, satisfaction, and social adaptation, and for betweenness, the order was satisfaction followed by achievement and social adaptation. These results show that casino employees' leisure learning attitudes were highest for satisfaction (degree, betweenness), meaning that the greater the satisfaction, the more diverse the desired leisure activities compared with the current activities. Next, the high achievement (closeness) results reflect that the greater the achievement in leisure learning attitudes, the greater the diversity in the desired versus current leisure activities. In addition, the casino employees with higher social adaptation leisure learning attitudes reported less diversity in their desired leisure activities than those among the employees with higher satisfaction and achievement. This reflects that employees with higher satisfaction and achievement leisure learning attitudes were more proactive and oriented toward the future than were those with high social adaptation attitudes.

Table 4. Leisure Activities Based on the Two-node Leisure Learning Attitude Network

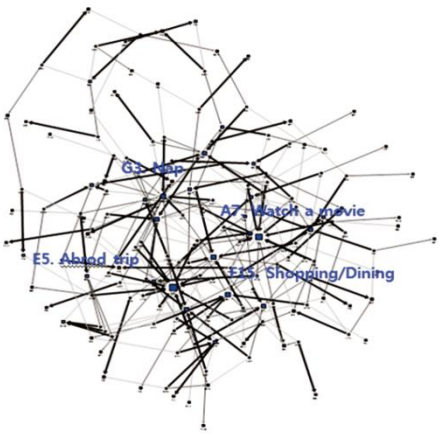
Item	Current And Desired		Leisure Activity: Degree	Closeness		Betweenness	
			Single Mode Normalized	Normalized	Single Mode Normalized	Normalized	Single Mode Normalized
Achievement	Current	Main Node (Actor)	0	.188	.135	.025	.027
		Sub-node (Eent)	.203	.262	.318	.240	.236
	Desired	Main Node	0	.248	.188	.047	.047

		(Actor)					
		Sub Mode (Eent)	.402	.523	.523	.392	.392
Satisfaction	Current	Main Node (Actor)	0	.231	.176	.037	.039
		Sub-node (Eent)	.205	.328	.375	.320	.318
	Desired	Main Node (Actor)	0	.242	.177	.041	.045
		Sub-node (Eent)	.421	.480	.537	.597	.594
Social adaptation	Current	Main Node (Actor)	0	1.413	1.357	.109	.107
		Sub-node (Eent)	.159	1.353	1.357	.290	.291
	Desired	Main Node (Actor)	0	1.342	1.302	.047	.047
		Sub-node (Eent)	.259	1.360	1.338	.392	.392

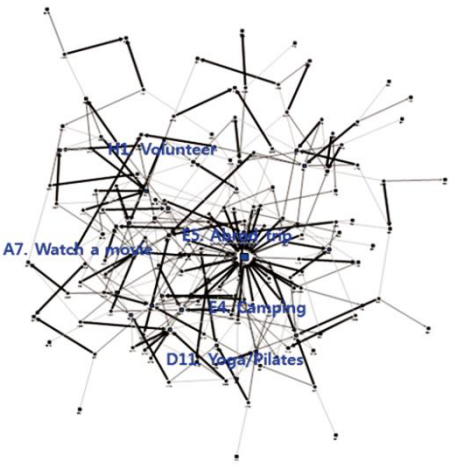
Note: * The two-node network showed the relationships between employees, leisure learning attitudes, and leisure activities.

Fig. 1. The Network Structure of Leisure Activities Based on Leisure Learning Attitudes

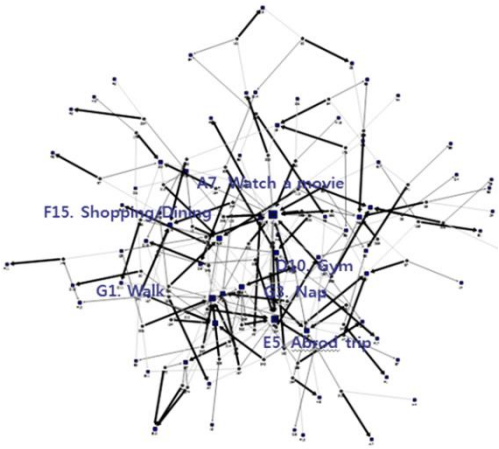
(a) Achievement Attitude's Current Leisure Activity Centrality Structure



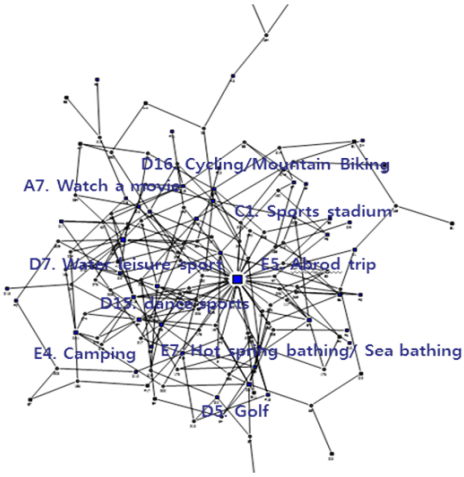
(b) Achievement Attitude's Desired Leisure Activity Centrality Structure



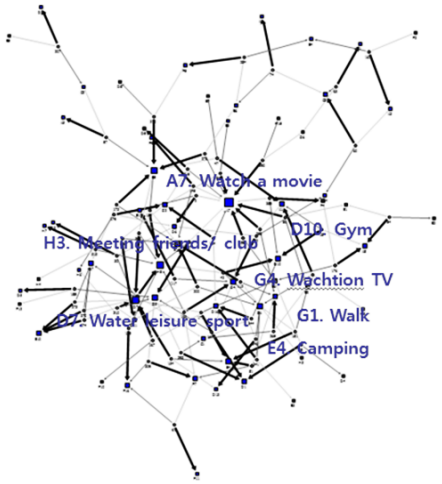
(c) Satisfaction Attitude's Current Leisure Activity Centrality Structure



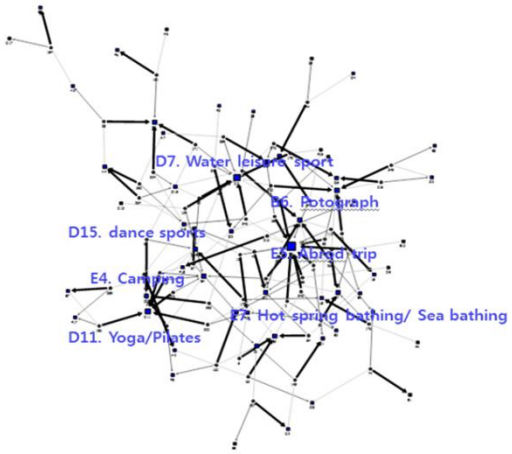
(d) Satisfaction Attitude's Desired Leisure Activity Centrality Structure



(e) Social Adaptation Attitude's Current Leisure Activity Centrality Structure



(f) Social Adaptation Attitude's Desired Leisure Activity Centrality Structure



4.2. Analysis of Leisure Space Based on Leisure Learning Attitudes

Based on the leisure learning attitudes, the current and desired leisure spaces were compared in terms of their degree, closeness, and betweenness centrality indexes; the overall comparison showed that the indexes were higher for current leisure spaces. That is, the casino employees showed a greater preference for their current leisure spaces (Table 4). Specifically, the employees' leisure activities were heavily concentrated in a few of the current leisure spaces where indoors leisure activities are possible. The casino employees also preferred natural, outdoor spaces, such as

mountains and the sea; for other activities, the results showed that the current leisure spaces were mainly restaurants, diners, and coffee shops, whereas the desired spaces were theme or amusement parks and neighborhood parks.

Table 5. Current and Desired Leisure Spaces Based on the One-node Leisure Learning Attitude Network

Leisure Learning Attitude	Current and Desired	Degree Centrality		Closeness Centrality		Betweenness Centrality		Leisure Spaces
Achievement	Current	.400	.025	.213	.003	.272	.013	Neighborhood parks, amusement parks, theme parks, restaurant, diners, coffee shops
	Desired	.375		.210		.259		Sea/river, neighborhood parks, amusement parks, theme parks, mountains, health facilities
Satisfaction	Current	.454	.147	.257	.081	.327	.120	Diners and restaurants, neighborhood parks, theme and amusement parks, health facilities
	Desired	.307		.176		.207		River/sea, neighborhood parks, amusement and theme parks, health facilities
Social adaptation	Current	.344	.029	.203	.018	.245	.005	Diners and restaurants, neighborhood parks, amusement and theme parks, health facilities
	Desired	.315		.185		.240		River/sea, neighborhood parks, amusement and theme parks, health facilities

Note: * The one-node network showed relationships between employees and leisure spaces.

Table 6. Leisure Spaces Based on the Two-node Leisure Learning Attitude Network

Item	Current and Desired		Leisure Space				
			Degree	Closeness		Betweenness	
			Single Mode Normalized	Normalized	Single Mode Normalized	Normalized	Single Mode Normalized
Achievement	Current	Main Node (Actor)	0	.448	.551	.027	.036
		Sub-node (Eent)	.311	-.787	.265	.269	.215
	Desired	MainNode (Actor)	.001	.549	.754	-.004	.006
		Sub-node (Eent)	.261	-.882	.213	.255	.193
Satisfaction	Current	Main Node (Actor)	0	.423	.506	.343	.384
		Sub-node	.349	-.720	.312	-.677	.185

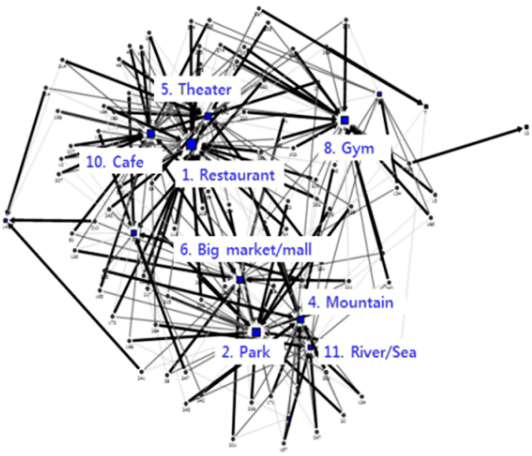
		(Eent)					
	Desired	Main Node (Actor)	0	.011	.022	.028	.039
		Sub-node (Eent)	.213	.324	.266	.203	.146
Social adaptation	Current	Main Node (Actor)	0	.369	.390	.005	.018
		Sub-node (Eent)	.278	-.405	.256	.243	.191
	Desired	Main Node (Actor)	0	.345	.372	.008	.022
		Sub-node (Eent)	.242	-.418	.2	.237	.183

Note: * The two-node network showed the relationships between the employees and the leisure spaces.

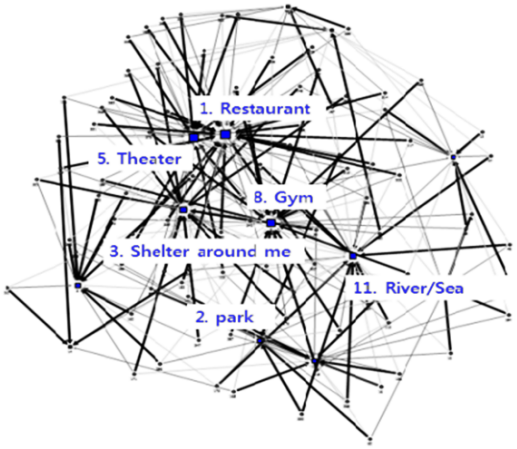
The degree centrality analysis results for the two nodes between the leisure spaces and leisure activities based on the leisure learning attitudes showed that, as was the case with the one-node analysis, the overall indices for the desired activities and the current spaces were higher. These results show that the employees desired more intense participation in their desired leisure activities than in their current activities, but they focused on current rather than desired leisure spaces.

Fig. 2. The Leisure Space Network Structure Based on the Leisure Learning Attitudes

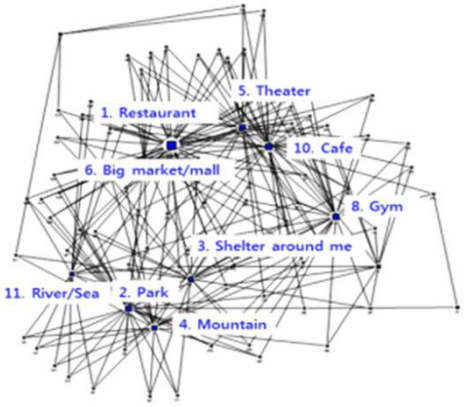
(a) The Current Leisure Space Centrality Structure of the Achievement Attitude



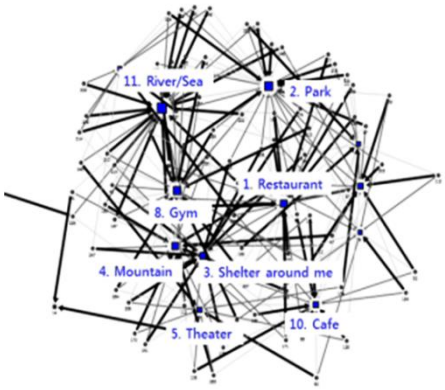
(b) The Desired Leisure Space Centrality Structure of the Achievement Attitude



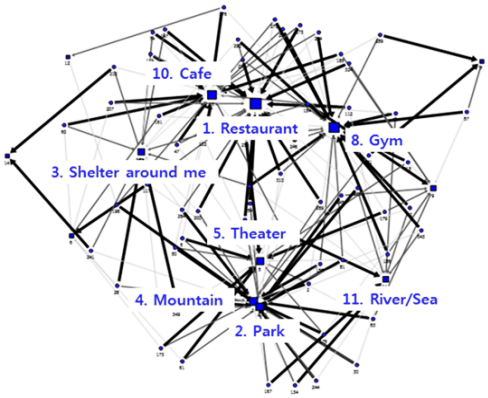
(c) The Current Leisure Space Centrality Structure of the Satisfaction Attitude



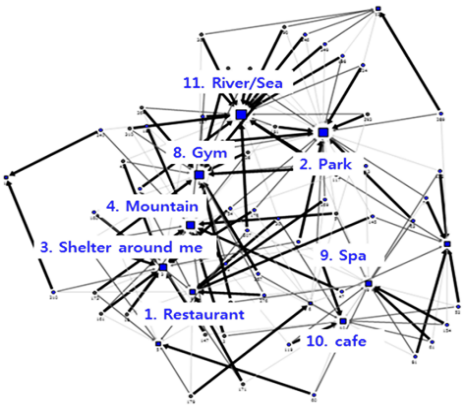
(d) The Desired Leisure Space Centrality Structure of the Satisfaction Attitude



(e) The Current Leisure Space Centrality Structure of the Social Adaptation Attitude



(f) The Desired Leisure Space Centrality Structure of the Social Adaptation Attitude



In terms of the leisure learning attitudes for current leisure spaces, the centrality was highest for satisfaction, followed by achievement and social adaptation. For the desired leisure spaces, the order was achievement first and then social adaptation and satisfaction. The high satisfaction in terms of leisure learning attitudes (degree, closeness) indicated that the greater the satisfaction with their leisure learning, the more the employees used their currently available leisure spaces, and they also used more diverse spaces; that is, there was less diversity in their choices of desired leisure spaces. The fact that the achievement attitude was high (betweenness) showed that the greater the achievement element of leisure learning attitudes, the more diversity in the current than the desired leisure spaces. Additionally, the casino employees with more of a social adaptation focus were more concerned with variety in their current leisure spaces than were those who reported higher satisfaction and achievement; the achievement and satisfaction leisure learning attitudes were more realistic and practical than the social adaptation attitude.

V. Discussion and Conclusion

The purpose of this study was to examine casino employees' current and desired leisure activities and

spaces based on their leisure learning attitudes. The results showed greater diversity in the employees' current leisure activities than in their desired activities, but the desired activities showed more concentration than the current activities. This finding indicates that employees had more diverse leisure desires than they did current leisure activities. With regard to specific current leisure activities, there were a number of centralities, such as watching TV or movies, shopping, eating out, meeting with friends, pursuing hobbies, walking, taking naps, and traveling. In contrast, the desired leisure activities were concentrated in areas that required investments of time and money, such as overseas travel, camping, water sports, and attending sporting events. The concentration was greater among desired than current leisure activities, but the diversity was greater in current activities.

The casino employees' current leisure spaces showed greater concentration than did their desired spaces, and the dispersion was wide with the desired spaces. To be more specific, the current leisure spaces, such as neighborhood parks, amusement and theme parks, and health facilities took place in some of the employees' desired leisure spaces. The analysis of other spaces showed that the most preferred current leisure spaces were diners and restaurants, followed by coffee shops, and the desired leisure spaces were rivers, the sea, and mountains. As with the leisure activities, the employees' desired leisure spaces were outdoor spaces that require time and money.

For network centrality, the employees' current leisure activities were, in order, watching movies, watching TV, shopping, and eating out, and their desired activities were overseas travel, camping, water sports, and volunteering. This reflects the working patterns of the casino employees, who can use their leisure time more efficiently than full-time employees because they work in shifts. In addition, in Nam, Lee, and Kim (2010), the emotional workers preferred more resting-type leisure activities such as baths, saunas, naps, and taking walks in addition to watching TV, whereas here, the participants preferred experiential and active leisure activities.

In one leisure white paper from 2013, the participants' current leisure activities were watching TV (40.1%), taking walks (21.0%), and meeting friends or joining club activities (20.9%), and their desired activities were watching movies (41.4%), overseas travel (31.4%), and attending sporting events (18.7%). Compared with this, the casino employees had more diverse desires than the general public, and their current leisure activities were also different due to their different working arrangements, such as working in shifts. The general public appeared to want their leisure activities to focus on fulfilling economic and time conditions, whereas the casino employees preferred active experiential activities to relieve their emotional stress; activities such as talent shows, volunteering, participating in groups, and so on can be recommended to induce active participation in order to fill the gap between one's current and desired leisure activities.

For leisure spaces, based on the leisure learning attitudes, the current leisure space centrality was greater with diners, restaurants, and other types of food shops, whereas those for the desired spaces was the highest for rivers, the sea, and parks (neighborhood, amusement, etc.) These centralities and the preference orders differed from the results in the 2013 leisure white paper (Ministry of Culture, Sports, and Tourism, 2013), except for diners.

Additionally, in the network structure, current leisure space had a higher concentration than the desired space, but the desired space showed wider dispersion. For the casino employees, as with other workers, the concentration (centrality) was highest for diners, restaurants, and other food shops, which shows the limitations of the leisure spaces that are readily available. For the desired leisure spaces, the outdoors (rivers, mountains, the sea) were preferred to indoor spaces such as health facilities, indicating that the casino employees desired spaces for resting the body and mind; however, the preference for sport facilities was the same as that in the 2013 white paper.

The conclusions of this study are thus as follows:

First, the leisure learning attitudes, leisure activities, and leisure spaces had mutually influential relationships; from the perspectives of the casino workers, the relationships between leisure activities and spaces was analyzed using network analysis, and patterns were identified that could be viewed graphically.

Second, if casino managers wish to relieve the emotional labor of their employees, they should suggest participating in leisure activities or even developing programs to promote leisure activities in order to reduce the gap between the employees' current and desired leisure activities and leisure spaces. The active leisure activities and outdoor spaces could connect casino floor workers with other employees as the basis for training and HR management.

Overall, the front-line workers at foreigner-only casinos reported significant differences between their current and desired leisure activities and spaces based on their leisure learning attitudes, and their desired activities showed greater concentrations than their current activities; current leisure activities, however, showed wider dispersion. Current leisure spaces showed greater concentrations than did desired activities, but the desired spaces showed wider dispersion. These results were based on an attempt to visualize the differences between the casino workers' desired and current leisure activities. The goal was to suggest a model that could ensure successful leisure learning, stress relief, and satisfaction by improving workers' leisure learning attitudes. With the current leisure activities, their wider dispersion and the concentration on outdoor activities showed that working five days per week in three shifts can be more efficient for participating in preferred activities than is standard full-time work. In addition, based on the differing leisure learning attitudes, the differences in the desired and current leisure activities and spaces suggest differences in the casino employees' awareness of and satisfaction with leisure learning. For this reason, it is necessary to reinforce leisure learning attitudes to fulfill desires and relieve stress.

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Domestic Resource Costs of Philippine Citronella Oil and Lemon Grass Oil

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ABSTRACT

Being new products, not much has been done yet to study the economic potential of two of the up-and-coming natural ingredients in the global market, namely, citronella oil and lemon grass oil. Hence, this study aims to determine the profitability of producing citronella and lemon grass at the farm level and the competitiveness of Philippine citronella oil and lemon grass oil with reference to imported citronella oil and lemon grass oil counterparts. Based on the economic analysis, both natural ingredients are profitable, with citronella posting net returns of PhP 108,362 (or USD 2,189) per hectare per year and lemon grass yielding PhP 47,224 (or USD 954) per hectare per year. Moreover, it is relatively more expensive to import citronella oil and lemon grass oil than to obtain them at the local wholesale market, ceteris paribus. The ratio of the import parity price to domestic wholesale price is 1.39 for citronella oil, and 1.10 for lemon grass oil, respectively. In terms of domestic resource cost ratio (DRCR), both citronella oil and lemon grass oil had less than unity values, implying comparative (economic) advantage in the production of these two natural ingredient essential oils.

Keywords: citronella oil, comparative advantage, domestic resource cost, import competitiveness, lemon grass oil
JEL Classifications: F10, O13, Q17

I. Introduction

These days, it is common to see the growing number of stalls and kiosks in the Philippines selling natural health and wellness products. This has become a trend over the past decade because of the increasing consumer preference for pharmaceutical and nutraceutical products (Catelo & Jimenez, 2016; Chamber of Herbal Industries of the Philippines Inc., 2013; Halos, Mendoza, & Guererro 2014). The fear of disease, rising incidence of life threatening medical cases, and belief that prevention is better than the cure has significantly pushed the demand upwards, and contributed, in more ways than one, to the proliferation of natural health shops that sell imported and high

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priced natural and organic wellness products (Cision Enterprises, 2015). There is particular concern regarding diet, choice of functional food, proper nutrition, and prevention of the onset and/or mitigation of the effects of chronic diseases (Hipol et al., 2010).

This wellness revolution has induced a two-fold change in the business climate: on the demand side, a departure from the use of synthetic preservatives, growth hormones, antibiotics, artificial additives, hydrogenated oils, stabilizers, and emulsifiers; on the supply side, the change is manifested in the increased production of natural ingredients and extracted oil from natural ingredients that are not genetically engineered and do not contain genetically modified organisms (GMOs), synthetic ingredients, synthetic chemical preservatives, and artificial ingredients (Natural Ingredient Resource Center, n.d.).

Natural ingredients are comprised of plant, animal, mineral, or microbial ingredients that are present in or produced by nature. They are used either as raw material for processing secondary ingredients or directly by end-product manufacturers (Hipolet al., 2010). Extracted oils from natural ingredients are now well-recognized for their value in pharmaceutical, nutraceutical, cosmetics and personal care products industries (Catelo, Espino, & Bello, 2013).

Since 2000, building a natural ingredients industry has been a priority under the National Biotechnology Program of the Department of Agriculture (DA) in the Philippines. The initial phase of the program included the broad spectrum of biotechnological applications that can be harnessed to transform knowledge and principles into tangible benefits for Filipino farmers and the Philippine agriculture. The DA Biotech Program is committed to work towards paving the way to allow biotechnology to prosper and realize its full potential for national development. In more recent years, the Program covered also a production and marketing potential study on top of the researches on increasing biotechnology awareness and acceptance, supporting policy formulation and advocacy, and enhancing capacities for research and development, management, and regulation.

This study posits that for the natural ingredients industry in the country to be sustainable, the production, processing and market forces at play should be economically conducive to players in the value chain. To have an impact on inclusive growth, one that is employment-generating and income-enhancing, the production of natural ingredients at the farm level should be profitable. Similarly, the extracted oils must be cheaper than imported natural essential oil substitutes so as to sustain their market niche. To date, however, the basic information on domestic production and processing costs are scarce, if not absent. Being new products, nothing has been done yet to study their profitability and competitiveness in the global market. This study, which focuses on the economic assessment of two of the up-and-coming natural ingredients, namely, citronella and lemon grass, is an attempt to provide this missing information.

2. Objectives of the Study

In general, this study aims to explore the economic potential of citronella oil and lemon grass oil. Specifically, it determines the 1) profitability of citronella and lemon grass at the farm level; and, 2) competitiveness of citronella oil and lemon grass oil with reference to imported citronella oil and lemon grass oil counterparts.

3. Methodology

3.1. Field Surveys and Key Informant Interviews

Primary data were collected in 2015 through face-to-face interviews using pre-tested questionnaires. The field surveys and key informant interviews were conducted in 20 farms in the provinces of Biliran, Laguna, Quezon, Negros Oriental and Aklanto observe and describe the various citronella and lemon grass production activities. Specifically, information about the farm operations, inputs, herbage yield, input and output prices and oil production were gathered. However, citronella and lemon grass were later found

to be usually grown by only a few on small-scale or backyard level and productions were fragmented to generate stable yield and cost estimates. To reinforce the limited and sometimes in substantial data from the survey, an experimental farm was put up at the University of the Philippines Los Baños (UPLB) to fully assess the input requirements, production costs, and yield of citronella and lemon grass.

Similarly, the survey on natural ingredient oil processing and manufacturing was limited by the unavailability of commercial processors to be interviewed. It must be mentioned that citronella and lemon grass essential oil extraction is still at the infant stage in the country. In turn, the study had to resort to another experimentation to validate the collected data from the 20 processors, particularly with respect to natural oil recovery rates. The harvested citronella and lemon grass leaves from the experimental farm were later brought to the National Institute of Molecular Biology and Biotechnology (Biotech), UPLB for oil extraction using the enzyme-mediated process.

Secondary data were collected from various agencies including the Bureau of Agricultural Statistics (BAS), Department of Agriculture (DA) and Philippines Statistics Authority (PSA). The import parity prices were based on the data gathered from the Bureau of Customs (BOC), essential oil manufacturers, and exporters in the country

3.2. Analytical Tool

To analyze the competitiveness of locally produced oil from natural ingredients, the import parity price and domestic resource cost (DRC) were estimated [2]. Import competitiveness was analyzed through this ratio:

$$\frac{\text{Import Parity Price}}{\text{Domestic Wholesale Price}} > 1$$

where,

Import Parity Price = Import price (PhP/unit) + Duties and Taxes (PhP/unit) + Port Costs (PhP/unit) + Transport Cost (PhP/unit) until the imported oil reached the Manila oil processor

Import Price (at Manila South Harbor Port, PhP/unit) = CIF price (Manila South Harbor port, USD/unit) x Foreign Exchange Rate (PhP/USD)

CIF Price (Manila South Harbor Port, USD/unit) = World Price (FOB, USD/unit) + Ocean Freight and Insurance (USD/unit)

Total Duties and Taxes = Customs Duty+ VAT+ IPF+ Excise Tax (if applicable)

Customs Duty = Customs Value (Dutiable Value) x Foreign Exchange Rate x Rate of Duty

i. Dutiable Value = Cost of Goods + Freight + Insurance + Other Charges and Costs

ii. Exchange Rate = As published weekly through Customs Memorandum Circular

iii. Rate of Duty = As per classification of goods under AHTN, Section 104, TCCP

VAT =12% of Total Landed Cost (TLC)

TLC = Dutiable Value+ Bank Charges+ Customs Duty + Brokerage Fee + Arrastre Charge + Customs Documentary Stamp (CDS) + Import Processing Fee (IPF)

i. CDS = Fixed amount of Php265.00

ii. IPF table

Dutiable Value of Shipment	IPF/entry
Up to Php250,000	Php 250.00
Over Php250,000 to P500,000	Php 500.00
Over Php500,000 to P750,000	Php 750.00
Over Php750,000	Php 1,000.00

When the computed ratio is greater than 1, the domestically produced product (natural ingredient oil) is less expensive and, henceforth, can compete with the imported equivalent natural oil. If the ratio is less than 1, the imported product is cheaper and the local product cannot compete (Pabuayon et al., 2013).

The "comparative advantage" interpretation of competitiveness was patterned after Briones (2014) as

[2]The estimation and analyses of import competitiveness and comparative advantage coefficients in this study draw from Catelo and Jimenez (2016).

follows: "the ideal of efficiency implies specialization of an economy in competitive sub-sectors, whilst relying on international markets to satisfy demand from other sub-sectors." In this study, DRC analysis measures the economic as well as the financial profitability of entire value chains including the individual segments within these chains. DRC estimates the country's efficiency in utilizing the domestic resources in the production of certain goods (Junning et al., 2009; Le Thi Thanh Loan et al., 2015 as cited in Catelo & Jimenez, 2016).

Comparative advantage is a concept used to explain specialization and trade patterns. It refers to the ability of a country to produce a good or service efficiently at a lower cost, relative to other goods or services, produced by another country (Junning et al., 2009). In economics, a country has a comparative advantage in the production of a good or service if it can produce it at a lower opportunity cost over other countries. This also means that a country with comparative advantage gives up less labor and other productive resources that could be used in the production of other goods or services, in order to produce it. Moreover, comparative advantage reflects the profitability under shadow prices that reflect the social value of costs and production that is not subject to any market distortions.

In the analysis of the country's competitiveness in selected natural ingredient oil production, the comparative (economic) advantage is indicated by a DRC of less than 1 (DRC<1). The smaller the DRCs the greater the advantage would be. On the other hand, DRC> 1 indicates the existence of the country's "comparative (economic) disadvantage". This implies that the country is not efficiently producing such natural ingredient. DRC can be computed as follows (Ismail et al., 2009):

$$DRC_{ij} = {C_{ij}^{d}}/{P_{ij} - C_{ij}^{f}}$$

where,

C^{d}_{ij} and C^{f}_{ij} represent the domestic and foreign input costs, respectively, for country i's (Philippines) production of good j (natural ingredient oil). P_{ij} is the average unit price of country I's production of good j. C^{d}_{ij} includes non-tradable inputs costs (e.g. land, labor and capital). P_{ij}-C^{f}_{ij} is the domestic value added generated by the production process.

IV. Results and Discussion

4.1. Natural Ingredients Industry in the Philippines

One of the biggest global trends in the past 20 years has been the growing interest in health and well-being. It has become increasingly important to consumers to improve both their own health and the environment they live in. Consumers are now drawn to household and home care products made with natural ingredients because of perceived health and environmental benefits.

In the Philippines, natural ingredients or natural health products industry is becoming a contributor to consumer welfare and inclusive growth in the country. The Department of Trade and Industry (n.d.) reported that the Philippines experienced a 40.35 percent and 34.25 percent growth in health supplements and personal care products from 2008 to 2011. However, in 2009, these same products posted a slight growth of only 2.8 percent and 7.1 percent respectively. The reduced importation of Australia and Malaysia, two of the top importers of Philippine personal care products, is said to be the cause of this decline.

The Philippine natural and organic products have an estimated total export value (FOB) of about USD153 million in 2011 (Department of Trade and Industry, n.d.). The major contributor of the growth in the sector is the medicinal plants/foods and the personal care category. Medicinal plants/food had the highest growth from 13 percent in 2009 to 111 percent in 2011. The continuous annual increase in the exports of medicinal plants/food can be attributed to increased

demand of raw materials brought about by the increasing demand for organic and natural health products in the global market.

4.2. Uses of Natural Ingredients

Natural ingredients are used as components food nutraceuticals, cosmeceuticals, and pharmaceuticals. Food nutraceuticals are used as stabilizers and emulsifiers, natural colors, and flavors and sweeteners (Hipol et al., 2010). These ingredients are also added to food for various reasons such as to improve taste, texture and appearance and to maintain or improve safety, freshness and nutritional value (International Food Information Council and U.S. Food and Drug Administration, n.d.).

Meanwhile, cosmeceuticals comprise a variety of products, including fragrances, make-up, hair care and coloring products, sunscreen, toothpaste, and products for bathing, nail care, and shaving (Transparency Research, 2012). Cosmeceuticals contain ingredients that can influence the biological function of the skin when applied topically. In general, vitamins, herbs, various oils, and botanical extracts are used in cosmeceuticals and are claimed by the manufacturers that do not penetrate beyond the surface layers of the skin (Schwartz, 2012).

Pharmaceuticals, particularly the herbal medicine industry component, use herbs, herbal materials, herbal preparations, and finished herbal products that contain parts of plants or other plant materials as active ingredients (World Health Organization, 2008). Herbal medicine is used to treat many conditions, such as allergies, asthma, eczema, premenstrual syndrome, rheumatoid arthritis, fibromyalgia, migraine, menopausal symptoms, chronic fatigue, irritable bowel syndrome, and cancer, among others (University of Maryland Medical Center,2017).

4.3. Uses of Citronella Oil and Lemon Grass Oil

Citronella is an aromatic grass belonging to the *Poaceae* family which is commercially cultivated for its aromatic oil (Tewari & Mohan, 2014). Citronella leaves contain 0.46% [3] of oil, an ingredient used extensively as a source of important perfumery chemicals like citronellal, citronellal and geraniol, which finds its extensive use in soap, perfumery, cosmetic and flavoring industries throughout the world (Wani et al., 2013).

Citronella essential oils and extracts are also used as ingredients of plant-based mosquito repellents. In 2011, citronella is one of the most widely used natural repellents in the market, used at concentrations of five to ten percent (Maia & Moore, 2011).

On the other hand, lemongrass (*Cymbopogon*) is a perennial grass which originated from the tropical and subtropical areas of India, Cambodia, Indonesia, China, Guatemala, Sri Lanka and Malaysia. It is a popular ingredient in many culinary dishes, especially those from Thailand, Malaysia, Cambodia, Vietnam, Philippines and Indonesia. Lemongrass adds a uniquely earthy and fresh flavor to soups, stews, teas and more (Bright, 2016). The grass also has great health benefits as it revitalizes the body and mind, helps with infections, and act as muscle and skin toner (Srivastava et al., 2013). Lemon grass and its extracted essential oil have been useful as analgesic, antidepressant, antimicrobial, astringent, diuretic and antiseptic (Organic Facts Website, n.d.). Lemon grass oil has strong lemon-like scent due to the high percentage (over 75%) of citral in the oil (Gupta & Sharma, 2009). Lemon grass oil produces semi-synthetic vitamin A that reduces the risk of xerophthalmia and night blindness (Srivastava et al., 2013).

4.4. Economic Analysis of Citronella Oil and Lemon Grass Oil Production

The economic costs per hectare of producing citronella and lemon grass were estimated at PhP

[3] Personal interview with Dr. Teresita Espino (2012), retired professor and scientist of UPLB Biotech, with expertise in biotechnology and essential oil extraction.

53,625 (USD 1,083) and PhP 58,118 (USD 1,174)[4], respectively (Table 1). Half of the costs of production were attributed to labor and about 27 percent was due to planting materials. The coststo produce a kilogram of citronella and lemon grass were estimated at PhP 0.66 and PhP 1.66, respectively.

The experimental farm at UPLB produced 81MT for citronella and 35MT for lemon grass. It should be pointed out that there were three harvests of both grasses in a year. At a shadow farm gate price of PhP 2 per kilogram of citronella and PhP 3 per kilogram of lemon grass one hectare can produce an annual gross income of about PhP161,988 (USD 3,272) and PhP 105,342 (USD 2,128), respectively. In a year, a hectare of citronella can give a farmer a net return of PhP108,362(USD 2,189) while a hectare of lemon grass can generate a net return of PhP47,224 (USD 954). Thus, these are indications of viable entry points for farmers in the rural areas, holding other factors constant.

The economic costs of a kilogram[5]of extracted citronella and lemon grass oil using the enzyme-mediated process amounted to PhP 1,815 (USD 36.68) and PhP 1,967 (USD 39.75), respectively (Table 2). The production of one kilogram of citronella oil needs 217 kg of citronella grass while the same quantity of lemon grass oil requires 196 kg of lemon grass. The cost structure of these two natural ingredients did not very much, percentage-wise. Labor represented about 30 percent while the extraction materials and depreciation of extraction equipment comprised 53 percent to 60 percent of the total costs.

Table 1. Costs and returns per hectare per year, citronella and lemon grass production, Los Banos, Laguna Philippines (2015)

Item	Citronella Grass		Lemon Grass	
	Value (Php)	Value (USD)	Value (Php)	Value (USD)
Labor	27,284.00	551.19	29,317.88	592.28
Planting Material	14,437.50	291.67	16,200.00	327.27
Inorganic Fertilizer	9,360.00	189.09	12,600.00	254.55
Fuel	2,544.00	51.39	-	-
Total Cost	53,625.50	1,083.34	58,117.88	1,174.10
Yield (kg)	80,994.00	80,994.00	35,114.00	35,114.00
Price per Unit	2.00	0.04	3.00	0.06
Gross Returns	161,988.00	3,272.48	105,342.00	2,128.12
Cost/kg	0.66	0.01	1.66	0.03
Net Returns	108,362.50	2,189.14	47,224.12	954.02

Sources: Author's calculation using Catelo, Espino, and Bello (2013) and Survey (2015).

[4] USD 1 = PhP 49.50 as of January 2017. All remaining conversions to USD equivalent used this exchange rate.

[5] 1 kg is approximately 1.11 liters of essential oil (http:// www.hort.purdue.edu)

Table 2. Cost of production per kg of citronella oil and lemon grass oil, Los Banos, Laguna, Philippines (2015)

Item	Citronella Grass		Lemon Grass	
	Value (Php)	Value (USD)	Value (Php)	Value (USD)
Raw Material	156.63	3.16	353.59	7.14
Labor	560.00	11.31	560.00	11.31
Extraction Materials	403.92	8.16	359.98	7.27
Extraction Equipment	692.30	13.99	692.40	13.99
Packaging Material	0.60	0.01	0.60	0.01
Transportation Cost	2.00	0.04	1.25	0.03
Total	1,815.46	36.68	1,967.82	39.75

Sources: Author's calculation using Catelo, Espino, and Bello (2013) and Survey (2015).

4.5. Steam Distillation and Enzyme-mediated (Enzymatic) Oil Extraction

Citronella and lemon grass oils are some of those commercially produced and internationally traded aromatic essential oils. These oils can be produced using steam distillation and enzyme-mediated methods of extraction. For steam distillation, fresh or dried citronella and lemon grass leaves are placed in the plant chamber where pressurized steam is generated and circulated through another separate chamber which forces the intercellular pockets holding the essential oils to open and release them. As the essential oils are released, they evaporate and travel into a condensation chamber. When the steam cools, it condenses into water and the essential oils form a film on top of the water. The oil is then decanted or skimmed off the top (Medina, 2014). Torres et al. (2001) as cited in Espino (2012) mentioned that steam distilled essential oils are steam volatile, stable to heat, and insoluble in water.

Unlike steam distillation, the enzyme-mediated (enzymatic) process uses pectic enzyme (pectinase) which enhances the oil yield. Moreover, this method eliminates the water-soluble and low molecular weight fatty acids, fatty alcohols, phosphatides and many undesirable non-triglycerides odorous constituents of essential oils (Sengupta & Bhattcharya, 1996 as cited by Espino, 2012). Enzyme-mediated extraction also makes the active components of the essential oils remain intact, thus producing quality and stable extracts (Medina, 2014). Espino (2017) cited that enzymatically produced essential oils are good quality oils with a relatively higher nutritive value of protein.

In terms of oil quality, Table 3 shows that the physicochemical properties of the enzymatically produced citronella oil from the Philippines and the steam distilled citronella oil from Vietnam are comparable. Citronella oils produced from steam distillation and enzyme-mediated extraction have slightly yellow to yellow and dark green colors, respectively. Also, it can be observed that both citronella oils, regardless of the origin, have specific gravity of less than one, indicating both oils are less dense than water (i.e., floats in water). The main component of citronella oil is geraniol, a phyto-chemical that is responsible for the rose-like characteristic of citronella oil. As observed from Table 3, oil derived using the enzymatic process has more geraniol content relative to steam distilled oil.

The physicochemical properties of the enzymatically produced lemon grass oil from the Philippines and steam-distilled lemon grass oil from India are shown in Table 4. Like citronella oil, both oils have specific gravity of less than one, indicating that they will float in water. Enzymatically produced lemon grass oil from Biotech, UPLB is characterized with dark green color and clear and oily attributes. It also contains limonene, a compound that is responsible for its citrus fragrance. Meanwhile, the citral content of steam distilled lemon grass oil also emits a strong lemon scent.

Table 3. Physiochemical Properties of Citronella Oils from the Philippines and Vietnam

Item	Vietnam[a]	Philippines (UPLB, Biotech)[b]
Color	Slightly yellow to yellow	Dark green
Appearance	Clear, oily liquid	Clear, oily liquid
Specific Gravity	0.876 - 0.930	0.8096
Geraniol Content	19% - 25%	28.05%

Note: [a] Derived from steam distillation; temperature is 20°C; [b] Derived from enzymatic process; temperature is 25°C
Sources: Espino (2012) and Alibaba.com (n.d.).

Table 4. Physicochemical Properties of Lemon Grass Oils from the Philippines and India

Characteristic	India[a]	Philippines (UPLB, Biotech)[b]
Color	Not available	Dark Green
Appearance	Not available	Clear, oily liquid
Specific Gravity	0.886 - 0.896	0.848
Citral	75% - 80%	Not available
Limonene	Not available	3.68%

Note: [a] Derived from steam distillation; temperature is 27°C; [b] Derived from enzymatic process; temperature is 25°C
Sources: Espino (2012) and Alibaba.com (n.d.).

4.6. Competitiveness Analysis

In the estimation of the import parity prices, the elements of the marketing chain included the landed costs (CIF at Philippine port in USD) multiplied by the foreign exchange rate, plus taxes and duties, plus port costs, and storage and transport costs to the wholesale market. Table 5 presents the calculated import parity prices for citronella oil and lemon grass oil. The departure points of the calculations were the prices of citronella oil and lemon grass oil in Vietnam and India, respectively. These two countries are the relatively big exporters of citronella oil and lemon grass oil in the region. The calculated import parity prices of citronella oil and lemon grass oil were PhP 3,022 per kg (USD 61.06 per kg) and PhP 2,593 per kg (USD 52.39), respectively.

The experience of a number of oil processor-respondents in the Philippines revealed a margin of about 20 percent from oil processing stations to the wholesale market. Based on this and the economic costs of producing a kilogram of citronella oil or lemon grass oil, the computed ratio of the import parity price to the domestic wholesale price is greater than unity (Table 6). This means that competitiveness exists for the domestic production of citronella and lemon grass oil. It is relatively more expensive to import citronella oil and lemon grass oil than to obtain them at the local wholesale market, ceteris paribus.

Table 5. Cost of Importing Citronella Oil from Vietnam and Lemon Grass Oil from India (in 30 kg and 1 kg terms) 2015

Item	Citronella Grass		Lemon Grass	
	Value (Php)	Value (USD)	Value (Php)	Value (USD)
FOB Price	51,975.00	1,050.00	44,550.00	900.00
Insurance	5,717.25	115.50	4,900.50	99.00
Freight Cost	25.99	0.53	25.99	0.53
CIF Price (Philippine Port)	57,718.24	1,166.03	49,476.49	999.53
Customs Duty	28,859.12	583.01	24,738.24	499.76
Customs Documentary Stamp	250.00	5.05	250.00	5.05
Import Processing Fee	250.00	5.05	250.00	5.05
BIR Stamp	15.00	0.30	15.00	0.30
VAT	3,524.89	71.21	3,030.39	61.22
Sub-total	32,899.01	664.63	28,283.63	571.39
Transport Cost	51.98	1.05	44.55	0.90
Total Cost per 30kg	90,669.22	1,831.70	77,804.67	1,571.81
Total Cost per kg	3,022.31	61.06	2,593.49	52.39

Source: Author's calculation using BOC (2015).

Table 6. Import Competitiveness of Citronella Oil and Lemon Grass Oil (2015)

Item	Citronella Grass		Lemon Grass	
	Value (Php)	Value (USD)	Value (Php)	Value (USD)
Import Parity Price (A)	3,022.31	61.06	2,593.49	52.39
Domestic Wholesale Price (B)	2,178.55	44.01	2,361.39	47.70
A/B	1.39		1.10	

Source: Author's Calculation using Survey (2015).

4.7. Domestic Resource Cost of Producing Citronella Oil and Lemon Grass Oil

Domestic resource cost (DRC) analysis is one of the measures of a country's efficiency in domestic resource utilization for the production of certain goods or service (Briones, 2014). It is a tool for determining the "relative position of competitiveness" of a country in the production and trade of a commodity, e.g., citronella oil and lemon grass oil.

The domestic resource cost can also be treated and calculated as a ratio of the returns to the non-tradable domestic factors (i.e., land, labor, and capital) to the value added of tradable inputs (measured as output less tradable inputs). This is termed as the domestic resource cost ratio (DRCR). The comparative (economic) advantage is indicated by a DRCR of less than 1. The smaller the DRCR the greater the advantage would be. On the other hand, a DRCR that is greater than 1 indicates the existence of the country's "comparative (economic) disadvantage".

As shown in Table 7, the estimated DRCRs for one kg of citronella oil and one kg of lemon grass oil were 0.75 and 0.76, respectively. These values suggest the existence of relative position of competitiveness in the production of these two essential oils.

Table 7. Domestic Resource Cost of One kg of Citronella Oil and One kg of Lemon Grass Oil (2015)

Item	Citronella Grass		Lemon Grass	
	Value (Php)	Value (USD)	Value (Php)	Value (USD)
Domestic Input Costs				
Raw Material	156.63	3.16	353.59	7.14
Extraction Materials	403.92	8.16	359.98	7.27
Labor	560.00	11.31	560.00	11.31
Transport Cost	2.00		1.25	0.03
Total (A)	1,120.55	22.64	1,274.82	25.75
Foreign Input Costs				
Extraction Equipment (dep'n)	692.30	13.99	692.40	13.99
Packaging Material	0.60	0.01	0.60	0.01
Total (B)	692.60	13.97	693.00	14.00
Total Costs	1,813.46	36.61	1,967.82	39.75
Domestic Wholesale Price (C)	2,178.55	44.01	2,361.39	47.70
DRC (A/[C-B])	0.75		0.76	

Source: Author's Calculation using Catelo and Jimenez (forthcoming) and Survey (2015).

V. Conclusions

Citronella and lemon grass' growing popularity rest on their essential oils and extracts' attributes. Citronella produces aromatic oil that can be used as a source of important perfumery chemicals that are found in soap, perfumes, cosmetic and flavoring products. Citronella essential oils and extracts are also used as ingredients of plant-based mosquito repellents. Lemon grass, on the other hand, produces very potent and highly therapeutic oil that has many applications in natural health.

Citronella and lemon grass are two promising natural ingredients that farmers may plant as main or additional income sources. Both are profitable, with citronella exhibiting potential net returns of PhP 108,362 (or USD 2,189) per hectare per year and PhP 47,224 (or USD 954) per hectare per year in the case of lemon grass.

The locally produced citronella oil and lemon grass oil can compete with the more expensive imported counterpart essential oils from Vietnam and India. The ratio of the import parity price to domestic wholesale price is 1.39 for citronella oil, and 1.10 for lemon grass oil, respectively. Domestic resource cost ratio, on the other hand, is 0.75 and 0.76 for citronella oil and lemon grass oil, respectively, implying that the country can efficiently produce these two natural ingredient essential oils.

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A Study on the Designation System of Registration Authority for Electronic Bills of Lading in Korea

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ABSTRACT

A Bill of Lading, an important shipping document in international trade, has been executing indispensable functions, especially in credit transactions. However, using a Bill of Lading in international trade between parties may cause inconvenience and costs. The reason stems from a situation that does not meet the basic premise for using a Bill of Lading when the Bills of Lading arrive at the destination before the goods. However, the phenomenon of the goods arriving at destination relatively faster than documents occurs when a faster shipping speed is achieved due to the development of shipbuilding technology and navigation techniques. Therefore, a situation arises where the delivery of goods is made without producing of a Bill of Lading since the goods have arrived but the Bill of Lading has not at the destination. Korean Maritime Law, which is part 5 of the Korean Commercial Law was amended and implemented, and is effective since August 3, 2007. The one reason for the revision was to introduce an electronic Bill of Lading. The purpose of this paper is to streamline the introduction of the registration authority of the electronic Bill of Lading by studying the designation system of the registration authority under Article 862 of Korean commercial law and the related enforcement regulation, and find the problems in the designation system of the registration authority and solutions to those problems.

Keywords: bill of lading, electronic bill of lading, Korean bill of lading, Korean commercial law
JEL Classifications: K22, K33, L91

I. Introduction

A Bill of Lading, an important shipping document in international trade, has been executing indispensable functions, especially in credit transactions. However, using a Bill of Lading in international trade may cause inconvenience and costs between parties. The reason stems from a situation that does not meet the basic premise for using A Bill of Lading, such as the Bills of Lading arriving at the destination before the goods.

However, the phenomenon of the goods arriving at a destination relatively faster than documents occurs when a faster shipping speed is achieved due to the development of shipbuilding technology and navigation techniques. Therefore, a situation arises where the delivery of goods is made without production of a Bill

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of Lading since the goods have arrived but the Bill of Lading has not at the destination.

In this case, the carrier can experience the inconvenience of keeping and storing the goods before the delivery of the goods is requested. In the case of the consignee waiting until the arrival of the Bill of Lading, missed sales opportunities or storage fees may occur for the consignee. The consignee will also encounter the inconvenience of submitting the letter of guarantee for requesting the delivery of the goods without the production of the Bill of Lading.

To solve these problems, there have been a number of trials internationally in terms of operation models, including the Bolero and TEDI RSP (Repository Service Provider) models and law model and the CMI Rules for Electronic Bill of Lading and Australia's Sea Carriage Documents Act of 1998. Also, the United States is drafting a new Carriage of Goods by Sea Act (COGSA), and the United Nations Commission on International Trade Law (UNCITRAL) enacted the Rotterdam Rules. That is to say, the United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea which was adapted by the UN General Assembly on December 11, 2008. In accordance with these international legislation trends, Korea revised the Korean Commercial Law to introduce an electronic Bill of Lading.

As a result, the Maritime Law, which is part 5 of Korean Commercial Law, was amended and implemented, and has been effective since August 3, 2007. The legal system related to maritime transport in Korea was overhauled to match international trade practices and systems such as an electronic Bill of Lading and sea waybill, which have been adopted as important shipping documents in electronic trading, and were introduced as appropriate systems for the new international trade environment. In order to prepare Maritime Law that is suitable for the status of Korea as maritime power, revisions were made in terms of adjusting the ship owner's liability limits and liability limits per unit of package or loading of goods in accordance with international standards.

The purpose of this paper is to streamline the introduction of the registration authority of the electronic Bill of Lading by studying the designation system of the registration authority under Article 862 of Korean commercial law and the related enforcement regulations, and find the problems in the designation system of the registration authority and solutions to those problems.

II. Contents of Commercial Act Article 862

2.1. Issuance of Electronic Bill of Lading and its Legal Effect

A carrier may issue an electronic Bill of Lading by means of registration with the registration authority designated by the Minister of Justice with the consent of a consignor or a charterer in lieu of issuance of a Bill of Lading referred to in Article 852 or 855. In such cases, an electronic Bill of Lading shall have the same legal effect as a Bill of Lading referred to in Articles 852 and 855 (*Korean Commercial Act 2007*, Art. 862(1)). Article 852 of commercial law regards the issuance of a Bill of Lading and the contents are as follows.

(1) A carrier shall deliver, at the request of a consignor, a Bill of Lading in one or more copies after receipt of the cargo.

(2) A carrier shall deliver, at the request of a consignor, a shipped Bill of Lading in one or more copies after loading the cargo, or shall indicate such loading on a Bill of Lading referred to in paragraph (1).

(3) A carrier may authorize a shipmaster or other agent to deliver a Bill of Lading or to make indication as referred to in paragraph (2).

Article 855 of Korean commercial law regards the charter party and Bill of Lading and is stated as follows.

(1) When requested by a charterer, a ship-owner shall issue a Bill of Lading under Articles 852 and 853 after receipt of the cargo.

(2) When a Bill of Lading has been issued under paragraph (1), a ship-owner shall be presumed to have received or loaded the cargo as stated in a Bill of Lading.

(3) When a third party has acquired a Bill of Lading in good faith, a ship-owner shall have the right and obligation as a carrier under Article 854 (2). The same shall also apply when a ship-owner has issued a Bill of Lading to a third party at the request of a charterer.

(4) In cases of paragraph (3), a third party shall be deemed a consignor under Articles 833 through 835 and 837.

(5) In cases of paragraph (3), no special agreement that reduces or exempts the obligation and responsibility as a carrier in violation of Article 799 shall be made.

In the revised commercial law, the carrier can issue an electronic Bill of Lading with the consent of a consignor or a charterer by way of registration with the registration authority designated by the Minister of Justice. At present, KTNET has been designated as the registration authority. Obviously, it is essential when using an electronic Bill of Lading for the Minister of Justice to recognize the importance of the registration authority and make the appropriate designation. In designating the registration authority to use an electronic Bill of Lading in Korea, the cautious approach and a more comprehensive and universal method must be required, but a Korea-specific registration authority was introduced.

2.2. Information and Effects

Information from all subparagraphs of Article 853 (1) shall be included in an electronic Bill of Lading and it shall come into effect when a carrier has transmitted with his electronic signature thereon and a charterer or a consignor has received it (*Korean Commercial Act 2007*, Art. 862(2)).

The content of Article 853 (1) is as follows.

Matters of the following subparagraphs shall be stated on a Bill of Lading, and a carrier shall write his name and affix his seal or sign on a Bill of Lading:

1. Name, nationality and tonnage of a ship;
2. Kind, weight or volume of cargo, classification, number and mark of packing notified in writing by a consignor;
3. Condition of external appearance of cargo;
4. Name and trade name of a charterer or a consignor;
5. Name and trade name of a consignee or receiver of notice;
6. Loading port;
7. Unloading port;
8. Freight;
9. Place of issuance and date, month and year of its issuance;
10. Number of copies if several copies of a Bill of Lading have been issued;
11. Name or trade name of a carrier; and
12. Seat of main place of business of a carrier.

An electronic Bill of Lading is required to contain detailed information from the paper Bill of Lading and has been regulated to have an effect when a carrier sends it with an e-signature and the charterer or consignor receives it. Korean commercial law is different from the Rotterdam Rules as Korean commercial law demonstrates the recognition of these effects by focusing specifically on sending and receiving, and the Rotterdam Rules recognize the legal effects of issuance, control, and transfer of the electronic transport record in view of the effects.

2.3. The Transfer of the Electronic Bill of Lading

A holder of a right of an electronic Bill of Lading may transfer such right in a way that he drafts an electronic document stating the intention of endorsement, attaches an electronic Bill of Lading thereto, and transmits them to another party through the designated registration authority (*Korean Commercial Act 2007*, Art. 862(3)).

In the revised commercial law, it is mentioned that the holder of an electronic Bill of Lading should write an electronic document in light of an endorsement, and he then can transfer the title by sending it to the other party with the attachment of the related electronic Bill of Lading. However, practically in the case of an electronic Bill of Lading, it is an improper regulation to attach an electronic Bill of Lading since it does not exist in physical form. The Bolero Bill of Lading, as an electronic Bill of Lading in the Bolero Rules, is defined as the original Bolero text with the registration records of relevant rights (Bolero Rulebook, 1999). In other words, it can be said that the functions are performed if there are registration records for related rights and the text of the Bolero Bill of Lading.

Since the specific procedures are designated, it is judged to be lacking inflexibility for legal application to new practices in which an electronic Bill of Lading will be used as well as the operational system for an electronic Bill of Lading which is to be adopted in trade communities on a global basis.

2.4. The Effects of Endorsement and Delivery

If the other party has received an electronic document in which the intention of endorsement is stated according to the method prescribed by paragraph (3), it has the same effect as delivery of a Bill of Lading in Articles 852 and 855 with endorsement, and a holder of a right whom has received an electronic document in accordance with paragraphs (2) and (3) shall acquire the same right as a holder who has received a Bill of Lading of according to Articles 852 and 855 (*Korean Commercial Act 2007*, Art. 862(4)).

Regarding an endorsement and delivery, when a person receives an electronic document with the intention of endorsement, it has a similar effect to the paper Bill of Lading. However, it could cause a problem in future legal applications since the receiver's expression of accepting the endorsement-related document could be more important than just the receipt of the document in the operation of an electronic Bill of Lading.

2.5. Registration Authority

Designation requirements of a registration authority of electronic Bill of Lading, electronic method of issuance and endorsement, specific receiving procedure of cargo and other necessary matters shall be prescribed by Presidential Decree (*Korean Commercial Act 2007*, 862(5)).

Therefore, detailed operation rules are provided by Presidential Decree such as regulations for enforcing the Article 862 (electronic Bill of Lading) in the commercial law that specifies the particular procedures for the registration, issuance, transfer and production of the electronic Bill of Lading. The validity and effect of the electronic Bill of Lading, which is acknowledged in the revised commercial law as aforementioned, is recognized only if it is registered at the designated registration authority known as KTNET.

It is unique in showing that the designation requirements of the registration authority in Korea for the operation of an electronic Bill of Lading, its electronic issuance and endorsement, concrete procedures for the delivery of the goods and other required things are regulated by Presidential Decree.

Many limitations are expected in future legal applications since there is variability in operating mechanisms as well as globalism in the operation of an electronic Bill of Lading.

III. Status of Designation System for the Registration Authority of Korean Electronic Bill of Lading

3.1. Designation Requirement of Registration Authority

According to enforcement regulations, designation requirements of the registration authority are defined as

five components. They consist of the 1) corporation requirement, 2) technical capacity requirement, 3) financial capacity requirement, 4) facility and equipment requirement, and 5) management and operation requirement.

3.1.1. Corporation Requirement

In order to become the registration authority of an electronic Bill of Lading, the entity must be a consolidated corporation. Except for individuals, a corporation is a subject with rights and responsibility by having its capacity of enjoyment of rights recognized under law. A corporation is established based on the regulation of laws, and corporation types vary as a foundation and corporation in terms of components. Further, based on the purpose of its establishment, they are divided into profit-making corporations and non-profit corporations. Based on the standards of objectivity, coercion, proper law, governmental authority, etc., a corporation can also be viewed as a public corporation (government, public organization), private corporation (corporation under commercial and civil laws), and interim corporation (public enterprise). It can also be classified as a domestic corporation, which is established under Korean laws and has the main office in Korea, and a foreign corporation, which is established under foreign laws. As such, every corporation can be designated as a registration authority.

3.1.2. Technical Capacity Requirement

The technical capacity requirement regulates the organization of professional manpower with a professional license, and it mandates the number of following technical manpower to be over 12 people. First, it should contain more than 1 person with national technical capacities such as Information Communication Engineer, Information Processing Engineer and Computer System Application Engineer according to the National Technical Capacity Law, or capacities recognized and publicized by the Minister of Justice as similar to these. Second, there should also be more than 1 person with more than 2 years' experience in the field of Information Security or Operation and Management for Information Communication, recognized and publicized by the Minister of Justice. Third, there should be more than 1 person who completed curriculum on the operation of facilities and equipment certification service, emergency restoration countermeasures and counter-plans for infringement incidents enforced by Korea Information Security Agency under the Act on the Facilitation of Use of Information Communication Network and Information Security under Article 52. Fourth, it should also include more than 1 person with more than 3 years' experience in the field of financial business related to trade or shipping logistics businesses.

3.1.3. Financial Capacity Requirement

Requirements for financial capacity are suggested in two ways. First, it must possess more than 30 billion in net worth (value deducting liabilities from return on assets). Second, it must take out insurance for covering losses resulting from willfulness or errors in the business to users. It is desirable to mandate the methods to protect the users by joining liability insurance related with providing the service of registration authority.

3.1.4. Facility and Equipment Capacity Requirement

The requirements of facility and equipment capacity are first; facility and equipment by which the users of the registration authority such as a carrier, consignor or consignee can accomplish their title such as registration, endorsement, transfer, presentation of electronic Bill of Lading; second, the facility and equipment are required to confirm the times of the sending and receiving of the electronic Bill of Lading and generate and preserve records regarding the electronic Bill of Lading; third, a protective facility and equipment are required to operate safely regarding the issuance and negotiation of an electronic Bill of Lading;

fourth, other facilities and equipment recognized and publicized by the Minister of Justice for smooth and safe issuance and negotiation of electronic Bill of Lading. Noticeably, as a requirement for the facility and equipment which can be used to generate and preserve records regarding an electronic Bill of Lading, this requirement can be regarded as work that is not related to the e-document repository center, which is designated and operated under the Framework Act on E-documents and Electronic Commerce in Korea.

3.1.5. Management and Operation Requirements

Operating rules of registration authority stipulating the procedures and methods in the management and operation of the facility and equipment should be observed according to Article 4 (4), and general matters regarding business transactions such as the preservation of electronic Bill of Lading and related electronic record are found in Article 13.

This business rule can be understood as belonging to the Bolero service in the Bolero Rulebook and are considered operating rules that are essential for providing and operating services of the registration authority, in addition to supplementing the regulations of commercial laws and enforcement regulations.

For the purpose of applying paragraph 1, in the case the registration authority can enter into a contract to use a facility and equipment for 3 years or more with a party that owns the facility and equipment according to Article 1 (4), or has the title related to such a facility and equipment if required by reason of technology or title use, the registration authority is considered as equipped with the facility and equipment according to Article 1.

In the above regulation, the content related to the contract for using the facility and equipment suggests that it is practical to directly have the facility and equipment. Since the service does not end during a short-term period in carrying out tasks, it can be considered an unnecessary article that needs to be further supplemented.

3.2. Designation Procedures of Registration Authority and the Change of Designation Requirement

3.2.1. Procedures for Designating Registration Authority

3.2.1.1. Designation Application and Required Documents

A party that wants to be designated as the registration authority must apply to the Minister of Justice for designation, attaching the documents as follows: 1) bylaws of the corporation, 2) documentary evidence that can confirm technical capacity, financial capacity, facility and equipment, and other necessary particulars in terms of designation requirements under Article 3 (1) 3) the business plan, 4) documents proving the facts and contents of the contract making a contract on the use of the facility and equipment with a service provider related to technical support for operating electronic Bills of Lading according to Article 3 (2).In this case, the Minister of Justice shall confirm the certificate of detailed registration for the corporation and the official transcripts of the resident registration card of representative and executive of corporation by the public use of Administration Information under E-government Act Article 36 (1), and if they do not agree to do so, the Minister of Justice shall require them to attach these documents.

3.2.1.2. Evaluation, Request for Information Document Submission, and Listening to the Opinion of the Applicant

The Minister of Justice can request the applicant to present data or obtain the applicant's opinion if necessary in examining the designation of Registration Authority.

3.2.1.3. Evaluation of Operating Rules and Supplement Request

The Minister of Justice can require the applicant to supplement the operating rules if necessary to do so in examining the rules accordance Article 3 (1)(5), and in this case the applicant shall be in compliance with the requirement where the applicant has no reasonable reason not to do so.

In case of making a request to supplement data, it is recommended that the applicant follows the requirement. Thus, the condition which suggests the content not be supplemented if there is a justifiable reason is considered essential to be revised or deleted later.

3.2.1.4. Designation of Registration Authority

In regard to application to the designation under Sub-Article 1, the Minister of Justice should designate registration authority considering the appropriateness of net assets, technical manpower, facility and equipment.

3.2.1.5. Designation Notice

When the Minister of Justice designates a registration authority, the Minister of Justice shall issue a designation certificate and shall notify the name and address of the designated party, designated date and other particulars that the Minister of Justice considers necessary by means of announcement in the official gazette and on the internet homepage of the Ministry of Justice.

3.2.2. Change of Designation Requirement

The registration authority should notify any change in any designation requirements under the subparagraph of Article 2 (1) to the Minister of Justice without delay along with the documents detailing the changes when the authority will change after designation. When the Minister of Justice is notified under paragraph 1, the Minister of Justice can inspect the technical capacity, financial capacity, and the safe operation of the facility and equipment, of the registration authority and require the registration authority to supplement them.

In terms of this change in the designation requirements, since the designation requirement regulates the minimum requirements for registration authority in providing relevant service, it is necessary to be modified later for the reason that it is not desirable to open the possibility of legally lowering the requirement.

3.3. Supervision and Withdrawal of Designation

3.3.1. Supervision

The Minister of Justice can supervise the authority's compliance within the law and confirm the technical capacity, financial capacity, the safe operation of the facility and equipment of the Registration Authority.

3.3.2. Withdrawal of Designation

The Minister of Justice can revoke the designation when the registration authority belongs to one of sub-paragraphs as follows. The reasons for revocation are 1) designation to be made through a lie and other dishonest means, 2) substantial violation of designation requirements under sub-paragraphs of Article 3 (1), 3) closing of the business to owing to a merger, bankruptcy and discontinuance of business of corporation.

The Minister of Justice should hold a hearing for revocation of designation under paragraph 1. The Minister of Justice shall disclose the revocation of the designation without delay by means of announcement in the official gazette and on the Internet homepage of the Ministry of Justice.

The Minister of Justice can take such necessary steps that the registration authority shall continue the related business such as transfers and so on of the electronic Bill of Lading already issued and registered therein before its designation is revoked, hand over the preservation business to another registration authority

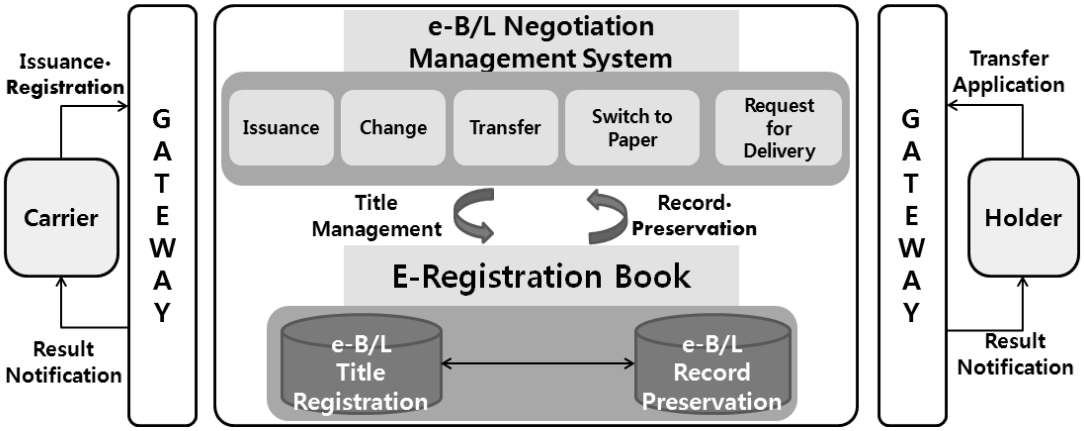
and switch the electronic Bill of Lading to the paper Bill of Lading under the Article 12.

In case that the designation of registration authority is revoked, the statement needs to be further discussed such that the Minister of Justice can continue to do the work related with to the electronic Bills of Lading which were already issued before revocation.

3.4. Status of Designation

Through the notice number 208-98 of the Ministry of Justice on July 18, 2008, notification of requisition is posted for the designation of a registration authority for the electronic Bill of Lading. Based on the application from the Korea Trade Network (KTNET) and proper evaluation, the Minister of Justice publicly announced that KTNET is designated as the registration authority of the electronic Bill of Lading through a notice numbered 208-131 of the Ministry of Justice on September 26, 2008. Based on the government's master plan for general trade automation, KTNET was established though a100% investment of Korea International Trade Association (KITA). KTNET, which is designated as a business operator for trade automation from the government in 1992, is an e-trade based enterprise that provides e-trade service based on the implementation of automated service for the whole process involving the complex tasks of imports and exports by building the infrastructure fore-trade. It officially opened www.eblkorea.or.kr to provide a web-based service for electronic Bills of Lading, which can digitally process the process of negotiation in terms of issuance, registration, transfer, keeping, etc., on March 30, 2009. Thus, Registration Authority is such a Title Registry that was an application that allowed for the creation and transfer of title related to an electronic Bill of Lading (Dubovec, 2005).

Fig. 1. The E-B/L Negotiation Process by the Registration Authority (KTNET) in Korea



Source: Choi and Choi (2014).

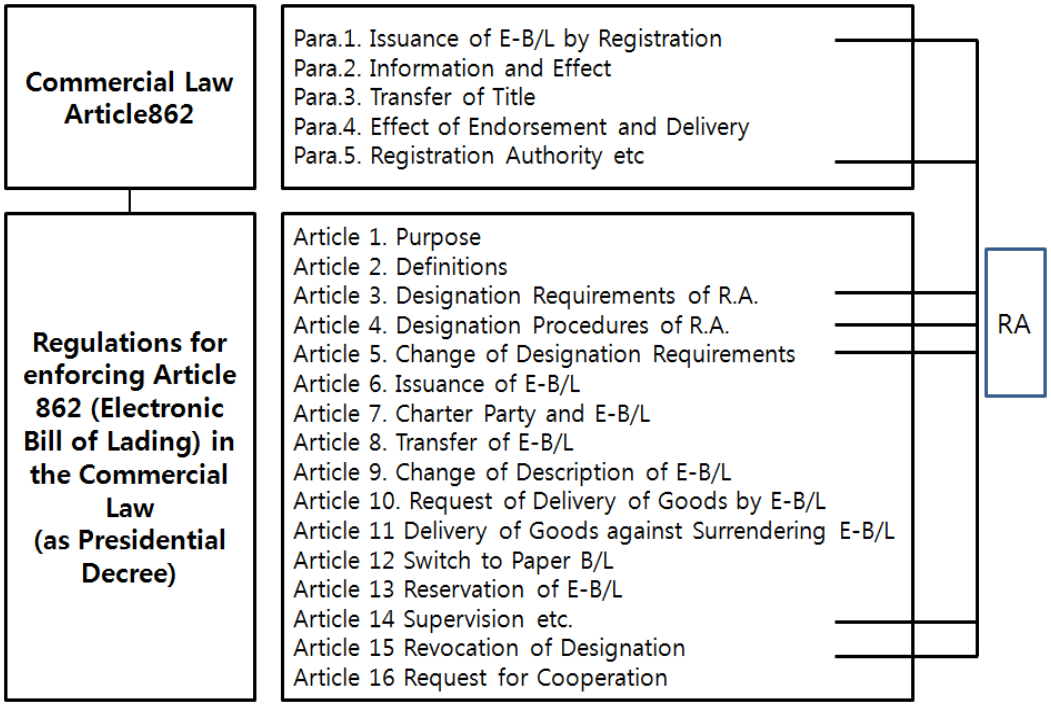
IV. Problems of Designation System of Registration Authority and Resolutions

4.1. Problems

4.1.1. Legal Problems for the Designation Systems of Registration Authority

Laws for the designation system of registration authority in terms of electronic Bills of Lading in Korea are as follows. Regulations for electronic Bill of Lading by registration are addressed in Article 862 of commercial law. Further, the designation system and operating procedures for electronic Bills of Lading are defined in the enforcement regulations of Article 862 of commercial law.

Fig. 2. Laws for the Designation System of Registration: Authority in terms of Electronic Bills of Lading in Korea



There are many problems related to the laws listed above. First, there is a problem with the legal system. It will not be a problem under Article 862 of commercial law, but it can become a problem in the case of enforcement regulations that regulate the detailed business process. Especially, the fact that regulating the procedures, which are similar to details of working practice, as laws refer to create a negative effect on working practices due to laws deeply interfering with working practices. Laws need to establish abroad boundary. Rather, regulating the more detailed procedures do not help working practices (Choi, 2011).

Second, there is a problem of whether the designation of registration authority in Korea is a legal system which meets global trends. Legislation needs to satisfy the characteristics of transparency and openness in terms of applying the laws. However, there is a limitation in applying the laws of electronic Bills of Lading related to the legal system in terms of transparency and openness. This means that the legislation should not be bound to a particular technology and system, at least in order to secure transparency and openness in applying the laws. There is a trend of ever-changing business models and technologies which are used in e-trade and electronic commerce. Every country is showing a tendency to maintain the legal system, which sustains the neutrality of business models, systems, and technology in order to establish laws that are not bound to such business models and technology. Specifically, there is a

characteristic of maintaining such strong tendencies in the case of international treaties. The fact that laws of electronic commerce should maintain technology neutrality was a position of framework for global electronic commerce by the Clinton administration in July 1997 and the EU legislature in 2000. The EU legislature first introduced this concept of technology neutrality in which they argued that regulation should be 'technology-neutral', with as few as possible new regulations, policies and procedures specific to the new services under the European Economic and Social Committee (1998). The concept of technology neutrality is taken from the technology related legislature of the EU.

Therefore, the problem is that the designation system of registration authority, which was introduced in Korea, is not a desirable system in terms of maintaining technology neutrality when considering the global operation of electronic Bills of Lading.

4.1.2. Problems Regarding the Role of the Registration Authority Related to Designation Systems of the Registration Authority

The problems related to the role of the registration authority can be examined as the following. First, the information expressing the identity of electronic Bill of Lading, which is included in the electronic document of application for transfer registration, is not appropriate. When transferring an electronic Bill of Lading, the electronic document application for transfer should be prepared. In the electronic document, information expressing the identity of an electronic Bill of Lading needs to be included. Requiring this information, which is used to express identity, should be written directly as related to the proper tasks of the registration authority. Thus, it can be regarded as 'not appropriate statement' content. Second, the registration authority issues a paper Bill of Lading in replacing the electronic Bill of Lading, but it is the carrier that issues the electronic Bill of Lading. Therefore, it must be the carrier who also issues a paper Bill of Lading in replacing the electronic Bill of Lading. Obviously, in making an issuance by the registration authority, there are preconditions. Carrier's electronically reproduced seal or signature should be noted and they are considered a seal or signature under Article 853 (1) of commercial law. However, when the registration authority issues and delivers the electronic Bill of Lading, especially in the case a foreign transferee requires a paper Bill of Lading, the electronic Bill of Lading, which is issued by ship owner in Korea, is replaced with a paper Bill of Lading issued by the registration authority in Korea. Thus, it is possible that it is not considered a normal Bill of Lading since it shows an electronically reproduced seal or signature from the issuing party, which is abnormal on a paper Bill of Lading.

4.1.3. Limitations in Domestic Negotiation of Electronic Bill of Lading

4.1.3.1. Limitations of Domestic Negotiation of Electronic Bill of Lading Issued from Abroad

The legal effect cannot be recognized if the electronic Bill of Lading is not issued and registered at the registration authority under the commercial laws of Korea in the case of an electronic Bill of Lading that is issued from overseas and transferred domestically. In order to recognize the legal effect, a foreign ship owner who issued the electronic Bill of Lading should issue and register in advance by expecting the transfer to Korea. This increases the problem of inconvenience a great deal in working practice. In the case of oil trading where there is a monopoly in terms of transport by sea, the countries involved in the international negotiation of electronic Bills of Lading are predicted, and issuance and registration are done at the registration authority of electronic Bill of Lading which are already being operated overseas. This is a process which almost cannot occur in working practice. It is realistic to operate this as a central registration systemin the

case of electronic Bills of Lading. The electronic Bills of Lading issued from overseas are used throughout the business enterprise, which provides international operation services of electronic Bills of Lading such as Bolero, etc. It can increase the task and cost burden for dual registration since it needs to be re-registered in Korea in addition to registration with the international registration authority.

4.1.3.2. Limitations of Domestic Negotiations of Electronic Bills of Lading Issued Domestically

First, there is the possibility that ship owners will not use the domestic registration authority. In the case of an electronic Bill of Lading, which is issued domestically, it registers with the global registration authority, which has an international operation basis instead of registering at the domestic registration authority with an expectation of international negotiateion. Thereby, this enables a section of means to facilitate an international negotiation. This in turn creates a problem of not using the domestic registration authority in domestic negotiation through the domestic purchasing bank.

Second, in the case of those issued and registered at the domestic registration authority and presented to the domestic purchasing bank, an electronic Bill of Lading should be submitted in replacement for the paper Bill of Lading at the time of issuance and registration if the purchasing bank does not have a system to process the electronic Bill of Lading. Therefore, this can reduce the effectiveness of an electronic Bill of Lading since the domestic issuance and registration become a heavy burden in terms of cost and time.

4.1.4. Limitations in International Negotiations of Electronic Bill of Lading

4.1.4.1. Limitations of International Negotiation of Electronic Bill of Lading Issued from Abroad

If an electronic Bill of Lading is issued from abroad is used in domestic negotiation and is used again in international negotiation, a problem of inconvenience in registering at the registration authority can occur. In this case, a foreign transferee can be reluctant to transfer an electronic Bill of Lading registered in Korea. This is because it is inconvenient for the foreign transferee to exchange electronic documents with the registration authority in Korea with respect to the duties related to electronic Bill of Lading. In the case where the transferring party requires a paper Bill of Lading, an electronic Bill of Lading issued by a foreign ship owner is replaced with a paper Bill of Lading issued in Korea. Further, it is possible that it is not treated as an official Bill of Lading since a signature and issuing party, that are much different from the normality of a paper Bill of Lading, appeared.

4.1.4.2. Limitations of International Negotiation of Electronic Bill of Lading Issued Domestically

Domestically issued electronic Bills of Lading needs to be issued and registered at the registration authority in order to have a legal effect. Issued and registered electronic Bills of Lading in such a way can perhaps not have any problem in domestic negotiation. However, for a foreign transferee, they may be unwilling to accept the electronic Bill of Lading since it is inconvenient for a foreign transferee to exchange the electronic documents with the registration authority in Korea with respect to work related to an electronic Bill of Lading. When a foreign transferee makes a request to register an electronic Bill of Lading at the registration authority in foreign countries, there can occur a problem of deciding who should make the registration at the registration authority in foreign countries.

4.2. Resolution

4.2.1. Resolution for the Legal Problem of Designation System for Registration Authority

First, in the legal system, it is necessary to have business routines uncomplicated due to enforcement regulations by including the important details of enforcement regulations as sub-regulations of Article 862 in commercial law and by having details related to the relevant process handled through the operating procedures of the registration authority. Since this method is handled in the Bolero service, it is a desirable to have the law composed in accordance with the global standard. In the Rotterdam Rules, it is recommended to voluntarily execute the detailed process, which is related to the operation of electronic Bill of Lading in the business routines since the procedures are not specifically regulated and they are in a position of leaving it at the working practice of transportation industry.

Second, a designation system of an electronic Bill of Lading should be supplemented. In order for laws related to the electronic Bill of Lading maintain technology neutrality, it is recommended that the 'legal effect can be recognized if the registration is done at the registration authority in Korea' should be modified to 'legal effect is recognized if the registration is done at the authenticated registration authority or its equivalent role-carrying registration authority in Korea'. In this case, an electronic Bill of Lading, whether is issued and registered by the registration authority in Korea or the registration authority from overseas, can both be recognized to have legal effect. Therefore, it is possible to use the electronic Bill of Lading based on the Bolero service, which provides international service, and there is no problem of using the electronic Bill of Lading for legal means.

4.2.2. Resolution for the Role-related Problem of the Registration Authority

First, it is desirable to modify information which verifies the identity of an electronic Bill of Lading and needs to be included in the electronic document of transfer application with a reference number of an electronic Bill of Lading. It is better to consider the verification of identity as the task which the registration authority executes for transferee. Second, the revision should be made to say that the carrier makes an issuance from the registration authority making an issuance of the paper Bill of Lading. In principle, since the party that issues an electronic Bill of Lading is the carrier, it can be certain to assume that the party which issues a paper Bill of Lading is also the carrier. It can be seen as appropriate for a business routine and in complying with global standards which are referred to as de facto standard. In the Bolero rulebook, when a Bolero Bill of Lading is issued, a carrier is required to issue a paper Bill of Lading by complying with the requirement in the case that it is replaced with a paper Bill of Lading (Bolero International, 1998).

4.2.3. Resolution for the Limitation of Domestic Negotiation of Electronic Bill of Lading

4.2.3.1. Resolution for the Limitation of Domestic Negotiation Involving the Electronic Bill of Lading Issued from Foreign Countries

When an electronic Bill of Lading is issued from overseas is used in domestic negotiation, it is necessary to enable domestic negotiation service by registering the records related to the relevant electronic Bill of Lading at the registration authority in Korea and by transmitting the related detail from the foreign registration authority to registration authority in Korea. In such a case, it is necessary to make an interworking agreement of the registration service among the registration authority in order to avoid the cost burden and work burden such as dual registration. In the case where business cooperation among registration authorities is not facilitated properly, methods for foreign ship owner re-registering at the domestic registration authority could be considered.

4.2.3.2. Resolution for the Limitation of Domestic Negotiation Involving an Electronic Bill of Lading Issued Domestically

In order for the domestic ship owner to resolve the potential problem of an electronic Bill of Lading not

being issued by using the domestic registration authority, overburden of cost and work should be avoided by providing sufficient incentives to ship owners. The work scope should be confined to just issuing the paper Bill of Lading in general. Relevant measures, which can be used in international negotiation by registering at a domestic registration authority through an interworking business agreement with global registration authority, for solving the problem of domestic ship owner registering at the global registration authority and issuing electronic Bill of Lading should be sought out.

4.2.4. Resolution for the Limitation of International Negotiation of Electronic Bill of Lading

4.2.4.1. Resolution for the Limitation of International Negotiation Involving the Electronic Bill of Lading Issued from Abroad

Considering the case of an electronic Bill of Lading issued from abroad being used in domestic negotiation and being reused in international negotiation, it can solve the problem of inconvenience in the process of being used in domestic negotiation if the relevant registration authorities make a business agreement for interworking. There will not be a problem of inconvenience in international negotiation if the related records go through the process of re-registration at the designated registration authority in Korea when the registration authority from a particular country or global registration authority notifies the relevant fact and the transferee accepts it in the case of foreign transferor designating the transferee in Korea and completing a transfer.

4.2.4.2. Resolution for the Limitation of International Negotiation Involving the Electronic Bill of Lading Issued Domestically

A domestically issued electronic Bill of Lading should essentially be used in international negotiation. In the case a foreign transferee wants to transfer an electronic Bill of Lading through a separate registration authority, if the transferor writes in the registration authority which the transferee has designated and presents the transfer intention to registration authority in Korea, the domestic registration authority notifies the relevant fact to the foreign designated registration authority. Then, in the case the transferee accepts it, if the records related to domestic electronic Bill of Lading go through the process of re-registration at the designated registration authority in the foreign countries, it will not cause much inconvenience in international negotiation.

V. Conclusion

In order to resolve the risks associated with the electronic Bill of Lading in Korea, the regulations, which are related to a sea waybill and electronic Bill of Lading, are established in the revised commercial law of 2007. Further, enforcement regulation is separately enacted and enforced as an enforcement ordinance in order to supplement the regulations of an electronic Bill of Lading in the commercial law. We examined the problems in that the registration authority of an electronic Bill of Lading is fundamentally designated according to the commercial law and its enforcement regulations and that the electronic Bill of Lading, which is issued and registered by this registration authority, can only have the legal effect. Unless the related regulations are revised and its legal system is reorganized, the designation system of the registration authority for electronic Bill of Lading in Korea will be discredited as only a registration authority for electronic Bill of Lading for domestic purposes. Therefore, a situation will eventually arise where people turn away from it. Consequently, Korean commercial law needs to be revised by sustaining the technology neutrality of the regulations of an electronic Bill of Lading and its enforcement regulations by establishing detailed procedures under the operating procedures of the registration authority. By establishing the legal effect in case of a foreign registration authority and the global

registration authority in addition to the domestic registration authority, an international negotiation for an electronic Bill of Lading should be efficiently supported through the interworking agreement of correct registration business among the registration authority. To do this, the registration authority in Korea should contribute to the facilitation of an electronic Bill of Lading through the international interworking service by reaching a business agreement with global services such as the Bolero service. Further, it is important to prepare measures to ensure a base for operating the electronic Bill of Lading, at least in Northeast Asia, by establishing the Northeast right registration authority through mutual investment among the electronic trading service companies in Northeast Asia.

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Accounting Practices and International Accounting Standard (IAS)/Philippine Accounting Standard (PAS) 41 Compliance of Cattle Farms: Evidence from the Philippines

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ABSTRACT

IAS/PAS 41, a set of accounting standards which regulates the accounting treatment of agricultural activities, provides the accounting benchmark relative to agricultural activity and includes the transformation of biological assets to agricultural produce. In the Philippines, it was implemented in 2005, but many companies were not yet compliant then with the required accounting treatment. Given that there is a dearth of studies about IAS/PAS 41 compliance, this study was conducted to assess the accounting practices of cattle farms based on the provisions of IAS/PAS 41, including their IAS/PAS 41 compliance relative to past international studies, determine the factors that influence adoption of such accounting practices and capture cattle farmer perceptions on IAS/PAS 41. A descriptive research design was employed involving the conduct of a survey of 81 cattle farms, frequency analysis and an evaluation of compliance vis-à-vis an IAS 41 checklist. Study findings show diversity in the accounting practices of cattle farms depending on the size of operation, business organization and nature of business. Backyard farmers did not maintain records and, therefore, were not IAS/PAS 41 compliant but used the fair market value approach utilized by commercial farms in the valuation of cattle inventories.

Keywords: accounting practices, biological assets, cattle farms, fair market value, valuation
JEL Classifications: L26, M41

I. Introduction

Due to the nature of inputs and demand for agricultural commodities, agriculture plays an essential role in the global economy (Herbohn & Herbohn, 2006). But in spite of the importance of the agricultural sector in the global economy, accounting in agriculture

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receives little attention from researchers and regulators of accounting standards until the implementation of IAS 41, the accounting standard for agriculture in 2003.

International Accounting Standard (IAS) 41 or Philippine Accounting Standard (PAS) 41 provides the benchmark for accounting relative to agricultural activity which includes the transformation of biological assets (living plant and animals) into agricultural produce (harvested product of entity's biological assets). It regulates the accounting treatment, the representation in the financial statements, and the disclosures for agricultural activities. PAS 41 was implemented in 2005. Prior to this, agricultural companies used the U.S.-based accounting standards that utilize the traditional historical cost approach in measuring the value of the biological asset (Joyno, 2003).

This study was conducted to address this research gap of limited studies relative to IAS/PAS 41 compliance by adding to the literature with a case study on a different agricultural commodity, that is, cattle, from two distinct perspectives: those of backyard and commercial farms. It assessed the accounting practices and ascertained IAS/PAS 41 compliance of cattle farms in the Philippines. Cattle farms were chosen as the subject of the study because the life cycle of the animals is longer than one business cycle where their transformation is evident. Moreover, by using the life cycle of cattle, the movements into different transfer points are visible. Therefore, the provisions in the standard can easily be evaluated.

II. Objectives of the Study

The general objective of the study was to assess the accounting practices of selected cattle farms in Batangas and Laguna Provinces in northern Philippines based on the provisions of IAS/PAS 41 in terms of measurement of biological assets, financial statement presentation and disclosure of biological transformation. Specifically, it presented the profile of cattle farms in Batangas and Laguna Provinces and identified the factors that influence the accounting practices and perceptions of cattle raisers relative to IAS/PAS 41. In assessing the accounting practices of cattle farms, the level of compliance was evaluated based on the provisions of IAS/PAS 41, and these were compared with international studies on IAS 41compliance. Lastly, the study offered insights and possible solutions to improve existing agricultural accounting practices.

III. Literature Review

Lloyd and Malcolm (1997), as cited in Muhammad and Ghani (2013), stated that agriculture has long been known to have a place in economic development due to its nature of demand for agricultural commodities and nature of inputs. Within this industry, a range of commodities exist consisting from animals to plants for food and their produce or material. These animals and plants are highly influenced by their nature and geographical factors and, therefore, from the accounting perspectives, need to be valued independently rather than valuing these as a whole (Bakir, 2010). The agricultural sector supplies the raw materials for the industry sector. That is why greater attention must be given to the agricultural sector (Sharma, 2012).

Investors and lenders take higher risks in capitalizing agricultural investments due to different factors present in the environment. Therefore, the agriculture sector's goal is to increase its investments through efficient credit facilitating services. Providing reliable and timely information increases the confidence among decision makers within the company and enables them to make good business decisions directly affecting growth and profitability. Such information affects decision makers outside the entity such as shareholders, investors and lenders, who must decide where and with what risk to place their money.

Empirical work by Garcia, Sonka and Mazzaccoin 1983 (as cited in Argiles & Slof, 2010) found that farmers who used a formal record system over time

improved their ability to use the kind of information the system produced. For example, they observed that farmers who prepared financial statements were more likely to make cash flow projections than those who were not involved in financial accounting. Hence, accounting is a necessary precondition to generate useful information for decision making, and it is also a good complement for management information systems. Moreover, accounting information will be a significant contribution in explaining and predicting the success and failure of farms.

3.1. International Accounting Standard 41, Agriculture

International Accounting Standard or IAS 41, Agriculture, is the first standard that specifically covers accounting for the agricultural sector. IAS 41 was issued in December 2000 and first applied to annual periods beginning, or after, January 1, 2003. The standard represents the rules for the registration and measurement of the biological assets and of the agricultural produce (Lefter & Roman, 2007). Its objective is to prescribe the accounting treatment and disclosures related to agricultural activity composed of the management of the biological transformation of biological assets for sale into agricultural produce, or into additional biological assets over a diverse range of activities: for example, raising livestock, forestry, annual or perennial cropping, cultivating orchards and plantations, floriculture, and aquaculture, including fish farming (IASPlus, n.d.).

IAS 41 (IASCF, 2001) applies to biological assets represented by living animals or plants that undergo biological transformation which is the process of growth, genetic transformation, production, and procreation, both from a qualitative perspective and from a quantitative point of view. Moreover, it is also applied to the harvested products obtained during the agricultural activity of the biological assets only at the point of harvest. IAS 2 Inventories should be applied when the processing of the agricultural produce after harvest takes place. It is very important to evaluate the agricultural activity at the point of harvest because its transformation process will be immediately represented in the financial statements, and then the investors have the possibility of estimating the future economic benefits.

Under IAS 41, biological assets can be classified as consumable or bearer biological assets. Consumable biological assets are those that are to be harvested as agricultural produce or sold as biological assets. Examples of consumable biological assets are livestock intended for the production of meat, livestock held for sale, fish in farms, crops such as maize and wheat, and trees being grown for lumber. On the other hand, bearer biological assets are those other than consumable biological assets; these are not agricultural produce, but, rather, self-regenerating assets. Examples are livestock from which milk is produced, grape vines, fruit trees, and trees from which firewood is harvested while the tree remains (IASCF, 2001).

Bohusova, Svoboda, and Nerudova (2012) mentioned that the problem of valuation of consumable biological assets with long production cycles will be a serious problem in the near future. IAS 41 introduces a fair value model which is a major shift from the traditional cost model widely applied in primary industry. It will particularly affect those agricultural activities where the income-producing biological assets are expected to have economic lives that stretch beyond one accounting period (Riley, 2002).

According to Dogan, Arslan and Koksal (2013) discrepancies in agricultural accounting practices may occur due to the specific characteristics of agricultural enterprise. These include different sizes of agricultural enterprises, dependence of agricultural enterprises on seasons and climate, strong link among the farmer family members, sustainability of versatile agricultural activities, abundance of investments for future terms in agricultural enterprises, confusion on the detection of current (liquid) and fixed assets, excess payment in goods, and insufficient significance given to accounting information systems in agricultural enterprises.

In the United States (U.S.), the accounting profession has provided only limited-specific guidance for agricultural issues. Though farm financial reporting and analysis in U.S. has evolved due to the influence of the agricultural lending community, accountants, financial analysts, and the land grant universities, still, there was no formal attempt of standardizing the process in agriculture. The guidelines published by the Farm Financial Standards Council (FFSC), an organization in the U.S. committed to promote uniformity and integrity in farm financial reporting and analysis, represents the largest and the most aggressive effort towards a consistent accounting process for agriculture (Farm Financial Standards Council, 2011).

Recognition and reporting of agricultural activities in the U.S. was guided by the Financial Accounting Standard Board (FASB) Codification Topic 905 Agriculture (Fischer & Treba, 2013). It provides recognition criteria for developing animals, animals available and held for sale, multiple products, and disclosure requirements. All costs incurred (direct and indirect) by the developing animals are accumulated until the animals reach maturity and are transferred to a productive function. Animals are accounted for at the lower cost or market (LCM) but, if the animal is classified as available for sale, the fair market value approach should be used. This approach differs from IAS 41 which requires the use of fair value reporting for purchased and produced biological assets.

In Europe, prior to IAS 41, guidance for farm accounting could be found from the AICPA and the Canadian Institute of Chartered Accountants (CICA, 1986). Both provide interesting definitions and recommendations for valuation of agricultural assets and gave detailed guidelines for the accounting of agricultural transactions and the presentation of financial statements. It is believed that IAS 41 introduces important improvements which are related to the definition, valuation and presentation of biological assets and agricultural produce, both of which are of great importance for the transformative capabilities of agricultural business and generation income (Argiles & Slof, 2010).

With the arrival of IAS 41, there is an opportunity to change the accounting practices for agricultural enterprise (Argiles & Slof, 2010). Its contribution is mainly on a conceptual level; therefore, additional tools for implementation will be required. Moreover, IAS 41 is highly controversial, not only because it prescribes a full-fledged fair value accounting model for agricultural entities, but the departure from historical costs accounting is very radical as these trigger a broad range of theoretical and practical problems which affect its adoption across the world.

As mentioned by Nishikawa (2000), "E65–Agriculture" preferred reporting of the changes in the fair value of biological assets in equity. He suggested that costs directly related to the sustenance of biological assets (except administration cost) should not be reported in the net profit or loss when incurred; instead it should be charged directly to equity until harvest, and it should be removed from equity and reported in the net profit or loss for the period at harvest to avoid inconsistencies. Furthermore, fair value should be used in presenting the carrying amount of biological assets in the balance sheet, and the change in the fair value should not be reported in the net profit or loss because it takes time for some biological assets to reach the form in which they might be readily convertible into cash in the market. In addition to this, if the active market does not exist in determining the fair value of biological assets, more estimation elements should be taken into consideration. Likewise, agricultural activities are inherently highly susceptible to natural disasters and diseases, and, as a result, the change in the fair value of biological assets has a relatively low probability of reflecting in the expected cash flows rather than in other assets. He believes that the change in the fair value of biological assets prior to the realization is not an indicator of performance of an enterprise engaged in agricultural activities.

Agricultural companies have existing accounting practices for agriculture that may be consistent with that of the U.S., or with those pronouncements issued by the International Accounting Standards Committee

or with those issued by other professional organizations or industry accounting practices that are unique but simple and practical to apply (Joyno, 2003).

In Malaysia, a study on 43 plantation entities showed that there is a difficulty in implementing IAS 41; particularly, in identifying the attributes of biological assets, the cost of fair valuation, volatility and/or lack of relevant information (Bhakir, 2010). Most companies disclose biological assets in the balance sheet, but the fair market value approach was not used in measuring the biological assets.

The study of Elad and Herborn (2011) on the implementation of fair value accounting in the agricultural sector showed that the level of compliance with the disclosure requirements of IAS 41 is higher in Australia than in the United Kingdom (UK) and France. Prior to the adoption of IAS 41, Australian agricultural entities were already using an accounting standard which is broadly similar to those of IAS 41. Furthermore, about 50 percent of the French companies have an extremely poor level of compliance with the mandatory disclosures for entities that use historical cost under IAS 41. When the fair market value of the biological asset cannot be measured reliably, historical cost can be used. With this situation, it is unlikely for small and medium entities to change their accounting practice and apply the fair value model for biological assets of small and medium-sized entities as it will be a burden on small agricultural businesses. Most agricultural businesses are represented by small and micro enterprises; therefore, appropriate financial reporting systems that will reflect the specifics of agriculture should be designed (Bohusova, Valouch, & Svoboda, 2012).

3.2. Agricultural Accounting Practices in the Philippines

The Philippines' generally accepted accounting principles (GAAP) were patterned after the U.S. GAAP. In 1997, the Accounting Standards Council (ASC), the body responsible for promulgating accounting standards in the Philippines, started adopting standards based on the International Accounting Standards (IAS) issued by the International Standards Committee (IASC) to replace the accounting standards issued by the U.S.-based Financial Accounting Standards Board (FASB). Prior to this, the Philippines' GAAP standards were patterned after the U.S. GAAP. In November 2004, the Accounting Standards Council approved the issuance of the new and revised Philippine Accounting Standards (PASs) and the new Philippine Financial Reporting Standards (PFRSs) which directly correspond to the International Accounting Standard Board's International Accounting Standard (IAS) and International Financial Reporting Standard (IFRS) (Fajardo, 2008). The standard for agriculture, which is PAS 41, was adopted as of January 1, 2005.Based on the study of Chavez, Mendoza and Piguing (2011), PAS 41 was not yet vastly implemented in the Philippines, six years after its implementation.

3.3. Philippine Accounting Standard (PAS) 41, Agriculture

In the Philippines, IAS 41 is adopted as the Philippine Accounting Standard (PAS) 41. The objective of PAS 41 is the same as IAS 41 which is to establish standards of accounting for agriculture activity—the management of the biological transformation of biological assets (living plants and animals) into agricultural produce (harvested product of the enterprise's biological assets).

According to Joyno (2003), there is diversity in the accounting practices of cattle-raising companies in Regions X and XI in southern Philippines. The accounting practices of these cattle-raising companies were influenced by different factors such as training in finance and accounting of owners and key accounting personnel, needs of external users of financial statements, cost and benefit, ease in calculation, industry practice, and recommendations and suggestions of external auditors. The results of the study showed that the needs of primary external users, cost and benefit constraint, ease in calculation and recommendations and suggestions of external auditors contribute extensively to the adoption of accounting

practices, while training in finance and accounting of owners and key accounting personnel only contributed fairly. Poor in extent is the contribution of industry practice to the accounting practices of cattle-raising companies.

Chavez, Mendoza, and Piguing (2011) conducted a descriptive and exploratory research that examined the implementation of PAS 41 with regards to the measurement, recognition, presentation, and disclosure of biological assets of 30 poultry and livestock corporations in the Philippines and their impact on profitability. Based on the results of the study, it was evident that PAS 41 was not yet widely implemented in the Philippines. The level of compliance with regards to recognition, measurement and presentation was low because not all companies measured biological assets using fair market value due to the difficulty of measuring biological assets using "active markets" which led to the inability of the companies to recognize gains and losses arising on initial recognition of biological assets at fair market value. As for level of compliance with regards to the disclosure requirement, this was assessed to be very low because the corporations failed to provide extensive disclosure requirements prescribed by PAS 41. Furthermore, the results also showed that the level of compliance with PAS 41 has had no significant impact on profitability.

The study of Clavano (2014) revealed that, despite the controversies associated with fair valuation and the confirmed challenges faced by both company auditors and accountants with respect to fair valuation of biological assets, the banana and coconut plantations have proven that the fair valuation method is already vastly applied in the Davao region in southern Philippines. But in the case of piggery, poultry and other livestock companies, these enterprises still preferred the historical cost approach. The study has further shown that a number of companies use a combination of historical cost and fair valuation for their biological assets. Moreover, the study of 45 companies has proven that the valuation choice of agricultural companies is significantly associated with firm size and with the company auditor's perspective with respect to fair value measurement of biological assets. The level of compliance with IAS 41 mandatory disclosure requirements of banana and coconut companies was high while the piggery, poultry and other livestock companies had a low level of compliance. In examining the factors influencing the extent in compliance, it was found that the company auditor's perception on the importance of mandatory IAS 41 disclosure and role in the preparation of financial statements is significant.

According to Argiles and Slof (2010), all farms would like to use GAAP standards but ran into difficulties when trying to apply these standards to specific situations, thus prompting them to improvise solutions. It is obvious that, if someone should want to compare the financial statements of these farms, he or she would encounter problems understanding such statements because of evident inconsistencies. Both users and preparers would, therefore, benefit from more guidance and standardization.

IV. Methodology

Descriptive and frequency analyses were done to present the profile of the cattle farmers and farms as well as accounting practices. These analytical methods were also used to determine the factors that influence the adoption of accounting practices and standards, the perceptions of cattle farms on IAS/PAS 41 and the level of the compliance of each farm with respect to the provisions of IAS/PAS 41. Such compliance assessment was compared with the extant literature.

Primary data on the personal profile of the farmers, farm owners, farm managers and accountants, ownership, production system, farm and accounting practices and factors that influence adoption of accounting practices and standards were collected through survey questionnaires. In addition, an IAS checklist adopted from Deloitte Touche Tohmatsu (IASPlus, 2014) was used to check the level of compliance of each farm relative to the presentation

and disclosure requirements of International Accounting Standards (IAS) 41.

Secondary data gathering included the collection of five-year financial statements of commercial farms and inventory monitoring records to corroborate the accounting practices of respondents based on the primary data. To further elaborate the accounting practices of commercial farms, notes appended to the financial statements were likewise used.

The study focused on the accounting practices of 76 beef cattle backyard farmers in Rosario, Batangas Province and five (5) commercial cattle farms in Lipa City and Calatagan in Batangas Province, and Calauan, Laguna Province, which are predominant areas for cattle raising in the Philippines. Cattle farms were chosen as the subject of the study because the life cycle of the animals is longer than one business cycle. The life of cattle from calf to bull extends beyond two years where the biological transformation such as growth, degeneration, and procreation is very evident. Using the life cycle of cattle, the movements into different transfer points are visible. Therefore, the provisions in the standard can easily be evaluated using cattle as the biological assets which are the objects of examination. Moreover, using the life cycle of animals makes it possible for the researchers to classify whether such animals are biological assets or considered as inventory. If the life of the animal is less than one year, it is classified as inventory because the intention is for such livestock or animal to be available for sale. If the life of the animal is more than one year, then these are considered biological assets as the intention is to use the animal for dairy or farm work over the long term.

V. Results and Discussion

5.1. Personal Profile

Study results showed that the age of backyard farmers ranges from 21 to 80 years old. For the commercial farms, the age of farmers ranges from 40 to 61 years old. Sixty-two (84.2%) backyard farmers were male and twelve (15.97%) were female. In the case of commercial farms, three were male and two were female. The reason for the domination of the male population in the farm was attributed to the fact that cattle farming requires physical work. The majority of the backyard farmers were married (88.16%). Most of the backyard farmers' highest educational attainment was the elementary or primary level (50%), followed by the high school level (38.16% or 29 farmers). Six farmers were able to take up college and one (1.32%) had a master's degree. Unfortunately, two (2.63%) had no response. On the other hand, in the case of commercial farms, all farmers were college graduates.

5.2. Farm Profile

Fifty four (66.67%) respondents (49 of which were backyard farmers) were members of organizations related to cattle farming. Such organizations include BAFC, Farmers Association, SAMAKA, ERPAT, Multi-Purpose Cooperative, Samahan ng Magbabakna ng Batangas, Samahan ng Magbabaka ng UPLB, NDA, Federation of Cattle Raisers Association of the Philippines. Forty-five (45) backyard farmers solely own their cattle business; thirty-three were in partnership agreement (31 of which were under the *paiwi* system [6]); two farms were registered as corporations while another was a cooperative. The average number of years in cattle farming was 28 years for backyard farmers (minimum number of years was 2 years, while the maximum was 78 years) and 21 years in the case of commercial farmers (minimum years was three years, while the maximum was 35 years). Backyard farmers engage in cattle farming because they want to earn additional income while

[6] A farmer-farmer agreement in cattle raising in which one party provides the capital for the stock and other expenses like feeds while the other party will be the one responsible in raising the animal. The profit gained after selling the animal will then be divided equally among themselves (Climacosa, 2014).

allowing them to perform multitasking activities. For the commercial farmers, the main reason why they engaged in cattle farming was their passion for agriculture, particularly cattle. All of the respondents showed interest in cattle farming when they were still young and decided to convert and continue their hobby into a business.

Capitalization or investments would vary depending on the weight, age, gender, and breed of the cattle. Such capital can be sourced from their own savings (48.08%), followed by engaging in the *paiwi* system (28.85%), relatives (21.15%), and from loans (1.92%). The average capital needed to raise one head of cattle was PhP18,000 (USD 390). The minimum capital was PhP10,000 (USD 217) and the maximum was PhP50,000 (USD 1,083). But, for commercial farms, large capitalization was needed to support the operation. According to the farm owner of Farm 2, an initial capital of PhP 5 million (USD 108,262) was needed to start operating a dairy farm.

5.3. Accounting Practices of Cattle Raising Farms

The accounting practices in the study refer to the measurement of biological assets and financial statement presentations of biological transformation and agricultural produce, including the recordkeeping and valuation of the inventories of purchased and raised breeding cattle, classification of biological assets in the financial statements and recognition and measurement of biological transformation in the financial statements.

Record keeping may depend on the size and scale of operation of the business. Based on the results of the survey, all 76 backyard farmers do not maintain formal records of their cattle and related transactions. No formal record keeping was done to list down their accounting transactions. Most of the backyard farmers write on a calendar they keep at home or on a piece of paper any earned revenue and incurred expenses. If they were under the *paiwi* system, the owner of the cattle maintained the record. Furthermore, backyard farmers only managed a small number of cattle involving a few transactions like feed and vitamin purchases and sale of the cattle.

The five commercial farms interviewed maintained records of sales, expenses, accounts receivables and accounts payable. Inventory monitoring through inventory movement sheets were also used in the business. However, not all commercial farms prepared financial reports such as a Statement of Financial Position and Income Statement. Farm 2 does not have financial statements, but has sales and expenses records. Farm 4 has its own accounting system adopted from the Herd Management System introduced by their consultant.

5.3.1. Valuation of Biological Assets

Increasing and replenishing cattle inventories can be done through purchase or performing inside-farm breeding. All dairy farms purchase and breed their own cattle while the breeder farm raises their inventories through inside-farm breeding. Farms 1, 2, and 3 purchase cattle from the National Dairy Authority (NDA) under the agency's Dairy Animal Distribution Program. The value of the purchased and raised breeding cattle can be recorded based on the following: at historical costs, at market value, at lower of cost or market value, at accumulated costs and expenses, at estimated value, at market price less estimated cost of disposal.

Three dairy farms (Farms 1, 2, 3) recorded their purchased cattle based on market value which was determined by the NDA and based on the landed cost if the cattle is imported. NDA's cost was the landed cost plus transportation cost. As of April 2016, the total amount was PhP145,000 (USD 3,140) per pregnant heifer. In the case of Farm 4, the cost of the purchased value was equal to the landed cost plus freight cost and other costs. Farm 5 does not purchase cattle; instead, it breeds cattle.

Raised cattle inventories refer to the offspring of breeders that are handled until these are ready for disposal, and the cattle is intended for production (Joyno, 2003). The calf was recorded initially at cost and adjusted based on the fair market value. All five

farms valued the calves at accumulated costs and expenses. However, two farms assigned value the moment the calf was born. The additional costs based on accumulated expenses will be added until cattle disposal. Unlike the other three farms, they started at zero cost on a one-day-old calf plus incurred expenses up to its disposal.

Table 1. Summary of Valuation Methods of Cattle Farms

Farm Practices							
				Valuation of Calf		**Valuation of Agricultural Produce**	
Farms	**Sources of Cattle**	**Production System**	**Types of Cattle Sold**	**Male**	**Female**	**Consumable**	**Bearer**
Backyard (76 farms)	From Padre Garcia	Breeder/ grower-fattener	Bull (Brahman/ Native)	NA	NA	YES	NO
Farm 1	NDA	Breeder/Dairy	Male Calf	Accumulated costs and expenses	Accumulated costs and expenses	YES	YES
Farm 2	NDA	Breeder/Dairy	Male Calf	PhP 2,000 or USD 43 (1 week old) + PhP150/kg or USD 3.2 live weight	Accumulated costs and expenses	YES	YES
Farm 3	NDA	Breeder/Dairy	Male Calf	PhP 1,000 or USD 22	PhP 20,000 or USD 433 + accumulated costs and expenses	YES	YES
Farm 4	New Zealand	Breeder/Dairy	Male Calf	Accumulated costs and expenses	Accumulated costs and expenses	YES	YES
Farm 5	Inside-farm breeding	Breeder	Brahman bull and Cow	PhP 15,000 or USD 325 + accumulated costs and expenses	PhP 15,000 or USD 325 + accumulated costs and expenses	YES	NO

Farms	**Valuation of Biological Assets**		**Exception in the Valuation**	**Method of determining the FMV**	**Compliance to IAS/PAS 41: Recognition and Measurement**
	Initial Recognition	**At the period it arises**			
Backyard (76 farms)	Fair Market Value	Fair Market Value	NONE	Eyeball estimates	YES-only to the measurement of biological assets (Fair Market Value)
Farm 1	Fair Market Value	Fair Market Value	Milking cow – Depreciated	Eyeball estimates and competitor's prices	YES
Farm 2	Fair Market Value	Fair Market Value	Milking cow – Depreciated	Eyeball estimates, competitors' prices, and going rate price	YES
Farm 3	Fair Market Value	Fair Market Value	Milking cow – Depreciated	Eyeball estimates and competitors' prices	YES
Farm 4	Fair Market Value	Fair Market Value	NONE	Use an automated system for valuation	YES
Farm 5	Fair Market Value	Fair Market Value	NONE	Competitors' prices, and going rate price	YES

Farm 3 and Farm 5 assigned a value to the one-day-old calf because, according to them, the mother cow must be raised in good condition before calving. Costs were already incurred; therefore, the calf should account for a portion of the value of the cow. Conversely, Farm 1, Farm 2 and Farm 4 value the calves based on the total amount of expenses the calves incurred.

For dairy farms, the male calf was intended to be disposed of as soon as possible because it will compete with the resources to be given to other cattle. The cost was based on the accumulated costs and expenses it incurred from the day it was born. On the other hand, female calves were raised until these reached the

milking stage. For breeder farms (Farm 5), both male and female calves will be raised for a number of months until these calves can be sold or are ready to enter the breeding herd. However, if there are willing buyers, they are sold at a price of PhP 15,000 (USD 325) per head.

5.3.2. Valuation of Agricultural Produce

Under IAS 41.44 (IASCF, 2001), biological assets can be classified as consumable biological assets or bearer biological assets. Consumable biological assets are those that are to be harvested as agricultural produce or sold as biological assets, while bearer biological assets are those other than consumable biological assets. As seen in Table 1, the backyard farmers and Farm 5 classified their cattle as consumable biological assets because those cattle were intended for sale; therefore, these were also their agricultural produce. While in the case of the dairy farms, biological assets were classified as consumable and bearer. Those cattle classified as consumable assets were the male calves which were sold immediately. On the contrary, those which produce milk were called the bearer biological assets. The raw milk produced was the agricultural produce which was recorded as inventory in the Statement of Financial Position and will be used as raw materials for the processed products.

5.3.3. Determination of Fair Market Value

In the Philippines, there were no regulating bodies that determine the fair market value for cattle. Based on the results of the study, the fair market value was determined using eyeball estimates, competitor pricing, and going-rate prices available at Padre Garcia, Batangas Province, known as the "Cattle Trading Capital of the Philippines." The result of the study showed that eyeball estimates is a common method in determining the value of cattle since farmers do not have their own weighing scales. Also, years of experience in cattle farming helps them easily assess the value of cattle. The going-rate pricing was used by Farm 2, Farm 4, Farm 5 and backyard farmers, while competitor pricing was used by Farm 5 only.

5.3.4. Animal Groupings

In IAS/PAS 41 (IASCF, 2001), a group of biological assets is an aggregation of similar living animals or plants. Age groupings are an easy and convenient way to form groupings (Wheeling, 2008). Cattle are grouped according to ages such as: calves, weanlings, yearlings, heifers, cows, and bulls. All commercial farms grouped their cattle based on age. Also, each age group has its own location (pen/cage) and they use tags (for branding) so it would be easy to monitor the animals. In the case of backyard farmers, age grouping was not applicable due to the small number of cattle raised.

5.3.5. Change in Value of Raised Breeding Livestock Due to Age Progression

Each successive year, breeding livestock move through each age group until they are put into production or are sold. The value of the animals changes as the animals proceed through each different age group while they remain in the herd. The movement from one age category to the next is referred to as moving through transfer points (Wheeling, 2008). As a result, there is a change in value of cattle due to age progression.

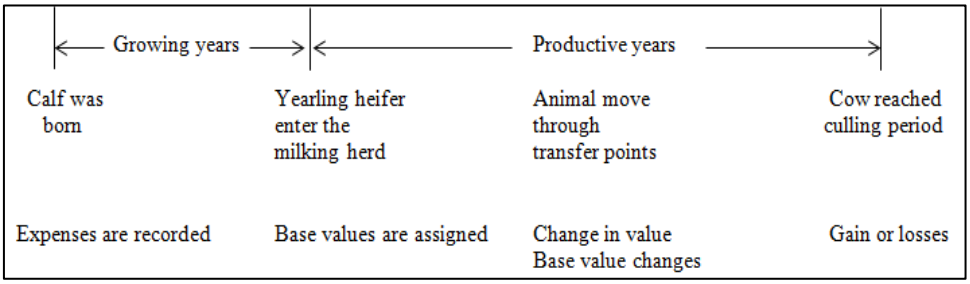
Under IAS/PAS 41 (IASCF, 2001), biological transformation comprises the process of growth, degeneration, production, and procreation that causes qualitative or quantitative changes in a biological asset. Growth means increase in quantity or improvement in

the quality of an animal or plant, degeneration means a decrease in quantity or deterioration in quality of an animal or plant, and creation of additional living animal or plant is procreation. For cattle, growth was signified by the increase in quantity due to age progression. Degeneration was shown by mortality, and birth was for procreation.

Fig. 1 and Fig. 2 show the accounting practices for dairy and beef cattle at different transfer points, respectively. Transfer points refer to the age at which the value of the animal changes. For dairy cattle, the calves which were about 0-3 months will enter the next transfer point which is the weanling to yearling heifer. Once they become yearling heifers (14 to 22 months) they can enter the milking herd. Accumulated expenses, including vitamins and minerals, starter feeds, concentrates and other expenses will be incurred during its growing years. Base values were also assigned per age group. As dairy cattle progress from calves to heifers to cows its base value, which is the fair market value, changes. Therefore, gain or loss from change in fair market value should be recognized (Fig. 1).

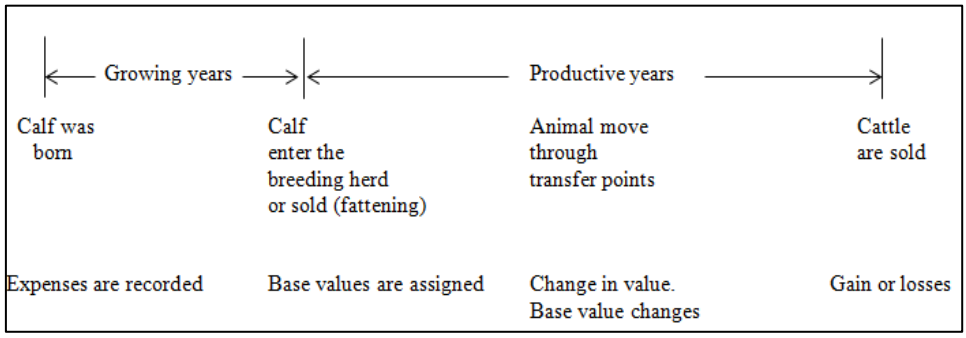
For breeding cattle, the same accounting procedures apply. Expenses are incurred during the growing years, and base values are assigned per age group. As the cattle progress through the age groups, its base value changes, resulting in recognition of gain or loss from change in fair market value.

Fig. 1. Accounting for Dairy Cattle at Different Transfer Points



Source: Adapted from Wheeling (2008).

Fig. 2. Accounting for Breeding Cattle at Different Transfer Points



Source: Adapted from Wheeling (2008).

Table 2 shows the movement of cattle inventory of Farm 1 relative to biological transformation. The quantity in one age group will increase if there are additional births, transfers or purchases, and changes in status. On the other hand, it will decrease due to mortality, sales and changes in status (refers to age progression; or a movement from one age group to another). Based on the inventory movement of Farm 1

as seen in Table 2, there were changes in the status of heifer calves to weanling heifers, dry to milking cows and milking cows to dry cows. Sixteen heifer calves reached their age limit as calves (0-3 months); therefore, they were moved to weanling calves (3-7 months). As they moved, there was a deduction of 16 heads in the heifer calves age group and an addition of 16 heads to the weanling calves age group. For the dry and milking cows, 15 dry cows were transferred to the milking cow group. On the other hand, there was also a deduction of 15 under the milking cow group because these were transferred to the dry cow group. The change status column in the addition and deduction must always be equal. Change of status columns in the addition and deduction columns will be affected if there is a movement. The total ending inventory must be equal to beginning inventory plus total additions minus total deductions.

Table 2. Inventory Movement of Farm 1

		ADDITIONS			DEDUCTIONS			
Classification	Beginning Inventory	Birth	Transfer/Purchase	Change Status	Mortality	Sales	Change Status	Ending Inventory
BULLS								
Sr. Bulls	4							4
Jr. Bulls	0							0
Yearling Bulls	0							0
Growing Bulls	0							0
Weanling Bulls	0							0
Bulls Calves	16	9			1	2		22
COWS								
Milking	137			15	1		15	136
Dry	62			15			15	62
Pregnant								
Heifer	0							0
Non-Pregnant								
Heifer	89							89
Yearling								
Heifer	17				1			16
Growing								
Heifer	0							0
Weanling								
Heifer	2			16				18
Heifer Calves	46	12			3		16	39
Total	**373**	**1**	**0**	**46**	**6**	**2**	**46**	**386**

Source: Field Survey (2016).

5.3.6. Presentation of Biological Assets in the Financial Statements

In this study, all dairy farms classified biological assets as noncurrent assets because they utilized these in milk production. In the case of a breeder farm (Farm 5), biological assets are classified as current assets because the cattle raised were intended for sale. Farm 4 started adopting IAS/PAS 41 in 2009. Before that year, they presented the biological asset under the account name "Livestock Animals" which was part of total fixed assets. In the case of Farm 5, it was in the year

Table 3. Farm 4 Statement of Financial Position and Financial Presentation of Biological Assets, (December 31, 2013-2014)

FARM 4		
Statement of Financial Position		
As of December31		
(In PhP)	**2014**	**2013**
ASSETS		
Current Assets		
Cash and cash equivalent	7,723,261	9,062,837
Trade and Other Receivables	30,851,326	24,615,941
Inventories	25,969,203	22,246,691
Due from Affiliates	-	8,280
Other Current Assets	17,002,020	1,198,445
Total Current Assets	81,545,810	57,132,194
Noncurrent Assets		
Investments in Subsidiary Companies	19,375,708	74,985
Investments in Associated Companies	1,950,000	-
Property and Equipment	406,271,864	275,857,433
Biological Assets	11,459,704	13,114,622
Other Non-Current Assets	3,050,246	1,854,246
Total Non-Current Assets	442,107,522	290,901,286
TOTAL ASSETS	523,653,332	348,033,480
LIABILITIES AND EQUITY		
Current Liabilities		
Accounts Payable – Trade	18,415,572	9,410,613
Accruals and Other Payables	1,217,220	424,745
Taxes Payable	473,433	311,119
Due to Affiliates	-	-
Loans Payable	140,736,250	17,036,250
Total Current Liabilities	160,842,475	27,182,727
Noncurrent Liabilities		
Retirement Benefit Obligation	1,703,334	-
Total Noncurrent Liabilities	1,703,334	
Total Liabilities	162,545,809	27,182,727
Equity		
Capital Stock	552,472,829	488,712,105
Retained Earnings	(191,365,303)	(167,862,352)
Total Equity	361,107,526	320,849,753
Total Liabilities & Stockholder's Equity	523,653,335	348,032,480

Source: Field Survey (2016).

2015 when they started adopting IAS/PAS 41. Thus, there was no value for 2014 and the preceding years. The biological assets were classified as part of their total inventories. For Farm 1, its accountant mentioned that they only applied the fair market value approach in 2015, but no financial statements were provided as proof.

Table 4. Farm 5 Statement of Financial Position Financial Presentation of Biological Assets (December 31, 2013 – 2015)

FARM 5 **Statement of Financial Position** **As of December 31** **(In PhP)**	**2015**	**2014**	**2013**
ASSETS			
Current Assets			
Cash	3,241,452	3,780,394	2,598,130
Trade and Other receivables	3,928,230	3,214,802	2,514,711
Biological assets	23,357,549		
Inventories	910,477	25,361,644	27,381,299
Other current assets	123,234		
Total current assets	31,560,942	32,356,840	32,494,140
Noncurrent assets			
Property and equipment, net	40,641,987	40,078,648	40,002,615
Investment in shares of stocks	41,324,581	59,450,109	59,441,220
Refundable deposits			
Deferred tax assets	5,771,464	1,100,570	1,324,104
Total noncurrent assets	87,738,032	100,629,327	100,767,939
Total Assets	119,298,974	132,986,167	133,262,079
Liabilities and Equity			
Current liabilities			
Trade and other payables	2,017,521	2,269,407	784,679
Advances from shareholders	4,350,432	5,350,432	5,350,432
Income tax payable		46,484	32,875
Total current liabilities	6,367,953	7,666,323	6,167,986
Noncurrent liabilities			
Retirement liability	1,794,753	1,573,264	1,368,157
Deferred tax liability	1,924,793	2,402,791	3,114,846
Deposit for future stock subscription			
Total noncurrent liabilities	3,719,546	3,976,055	4,483,003
Total liabilities	10,087,499	11,642,378	10,650,989
Equity			
Share capital	96,521,000	96,521,100	96,521,100
Retained earnings	12,690,285	24,822,689	26,089,990
Total equity	109,211,285	121,343,789	122,611,090
Total Liabilities and Equity	119,298,784	132,986,167	133,262,079

Source: Field Survey (2016).

Table 5. Farm 4 Schedule of Carrying Amount of Livestock and Statement of Comprehensive Income (December 31, 2013-2014)

FARM 4 **Carrying Amount of Livestock** **As of December 31** **(In PhP)**	**2014**	**2013**
Dairy cattle fair value at January 1	13,114,622	9,991,620
Gain (loss) from change in fair value less costs to sell	(735,579)	833,883
Increase due to purchase	375,486	2,412,119
Decrease due to cow culling and mortality	(1,294,825)	(123,000)
Dairy cattle fair value at December 31	11,459,704	13,114,622
FARM 4 **Statement of Comprehensive Income** **For the Year Ended December 31** **(In PhP)**	**2014**	**2013**
Sales Revenue, net	158,338,918	130,893,549
Cost of sales	107,705,753	93,141,406
Gross Profit	50,633,165	37,752,143
Other income (expense), net	2,139,202	1,925,476
Total Income	52,772,367	39,677,619
Sale and Marketing Expenses	32,211,053	23,375,022
Administrative Expenses	19,089,489	18,329,853
General Farm Expenses	13,564,347	7,693,129
Research and Development Expenses	3,738,532	3,155,391
Finance and Other Expenses	4,178,894	1,127,909
Total Expenses	72,782,315	53,681,304
Net Incomes (Loss)	(20,009,948)	(14,003,685)
Gain (Loss) from Change in Fair		
Value of Biological Assets	(735,579)	833,883
Pension Costs	(1,703,334)	
Net Comprehensive Income (Loss) before Tax	(22,448,861)	(13,169,802)
Provision from Income Tax	1,055,090	809,917
Net Comprehensive Income (Loss) after Tax	(23,503,951)	(13,979,719)

Source: Field Survey (2016).

5.3.7. Recognition, Measurement and Financial Presentation of Biological transformation of Cattle Raising Farms

Physical changes such as growth, characteristic changes, production, and procreation are considered biological transformation in IAS 41/PAS 41 (IASCF, 2001). These also include the process of growth, characteristic changes, production and reproduction that lead to qualitative and quantitative changes in the biological assets (Lalic, Peric, & Jovanovic, 2012). Since biological transformation was recognized and measured using the fair market value approach, the fair value changes are recorded during the entire period. As shown in Table 5 and Table 6, the difference between the beginning and ending value of the cattle at the end of the year was recorded as unrealized gains/losses resulted from biological transformation presented in the Income Statement.

Table 6. Farm 5 Schedule of Carrying Amount of Livestock and Schedule of Other Expenses (December 31, 2013 – 2015)

FARM 5			
Carrying Amount of Livestock			
As of December 31			
(In PhP)	**2015**	**2014**	**2013**
Balance at January 1	24,554,549	27,007,339	26,856,269
Increase due to direct costs	6,941,554	6,180,534	5,316,077
Loss on change in fair value of livestock	(1,593,328)	(2,373,518)	(696,447)
Decrease due to sales	(6,545,226)	(6,259,806)	(4,468,560)
Balance at December 31	23,357,549	24,554,549	27,007,339
FARM 5			
Other Expenses, Net			
As of December 31			
(In PhP)	**2015**	**2014**	**2013**
Events	460,000	280,000	49,464
Dividend Income	55,556	55,556	50,000
Gain on sale of scraps	14,483	46,623	71,505
Charcoal sales	-	38,340	91,190
Fuel and oil	28,792	36,892	41,346
Bookkeeping fee	26,000	22,000	24,000
Mango sales	75,000	21,000	22,925
Gain (loss) on change in fair value of investments in shares of stocks		8,889	(322,222)
Landing fees	5,293	2,786	2,314
Truck rental	18,750	750	59,346
Loss on change in fair value of livestock		(2,373,518)	(696,447)
Miscellaneous income	63,471	54,890	20,263
Finance income	34,177		
Gain on sale of investments in shares of stock	128,219		
Gain on reversal of liabilities	122,344		
	1,032,085	(1,805,792)	(586,316)

Source: Field Survey (2016).

5.3.8. Disclosure of Biological Assets in the Financial Statements

Farms should disclose how biological assets were presented in the financial statements. As stated in IAS 41.47 (IASCF, 2001), methods and significant assumptions applied in determining the fair value of each group of agricultural produce at the point of harvest and each group of biological assets shall be disclosed. Only Farm 4 and Farm 5 were evaluated since they were the only ones that provided financial statements. Based on the financial statements presented during the interview, both farms have disclosures about the treatment of the biological assets; however, it was only Farm 5 which gave a quantitative description of the biological assets and distinguished such as either consumable or bearer biological assets. Farm 4 only mentioned the recognition and measurement under the fair market value approach.

Table 7. IAS/PAS 41 Recognition and Measurement Requirements of Cattle Farms

Provisions: Recognition and Measurement Requirement	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Back yard	Frequency YES	NO	NA
Involved in agricultural or farming activities or own or control biological assets.	✓	✓	✓	✓	✓	✓	5		
Recognize biological assets when all the conditions are met.	✓	✓	✓	✓	✓	X	5	1	
Initially measure biological assets at fair market value.	✓	✓	✓	✓	✓	✓	6		
Agricultural produce harvested from the entity's biological assets measured at its fair value less cost to sell at the point of harvest.	✓	✓	✓	✓	✓	✓	6		
Biological assets or agricultural produce been grouped for the purpose of measuring their fair value.	✓	✓	✓	✓	✓	✓	6		
Entered into contracts to sell any of its biological assets or agricultural produce at a future date.	✓	✓	✓	✓	✓	✓	6		
Biological assets physically attached to land have no separate market	X	X	X	X	X	X			6
Use information regarding the combined assets to measure the fair value of the biological assets.	✓	✓	✓	✓	✓	X	5	1	
Gains/losses arising at initial recognition of biological assets included in profit or loss for the period it arises.	✓	✓	✓	✓	✓	X	5	1	
Gains/losses arising at from changes in fair value included in profit or loss for the period it arises.	✓	✓	✓	✓	✓	X	5	1	
Gains/losses arising at initial recognition of agricultural produce included in profit or loss for the period it arises.	✓	✓	✓	✓	✓	X	5	1	
Unable to measure at initial recognition the fair value of any of its biological assets reliably.	X	X	X	X	X	X		6	
Biological assets are measured at cost less any accumulated depreciation and any accumulated impairment losses when the fair value measurement for a biological asset has been rebutted.	✓	✓	✓	✓	✓	X	5	1	
Fair value of biological asset, previously carried at cost less depreciation and impairment subsequently become reliably measurable.	✓	✓	✓	✓	✓	X	5	1	
Received government grants, subsidies or subventions related to biological assets.	✓	✓	✓	X	X	X	3	3	

Source: Field Survey (2016).

5.4. Assessment of Compliance to IAS/PAS 41

As for the level of compliance to IAS/PAS 41, this was measured using the IAS 41 checklist of Deloitte Touche Tohmatsu. The recognition and measurement requirements of the standards cover the provisions related to the fair market value approach to the biological assets and agricultural produce and the

treatment of gains or losses from change in the fair market value. Table 7 shows that, based on survey results, all farms, including the backyard farmers, engaged in agricultural activity and who did not keep records, recognized biological assets and agricultural produce as well as measured these at fair market value. However, with regards to the recognition and measurement of gains or losses from changes in fair market value, only the commercial farms were compliant. The gains or losses were recorded in the income statement. The backyard farmers were not compliant because they do not prepare financial statements.

Similarly, relative to the presentation and disclosure requirements of IAS/PAS 41 in Table 8, only Farm 4 and Farm 5 were evaluated because they were the only ones who provided financial statements. Both farms disclosed quantitative information regarding the methods and significant assumptions applied in determining the fair market value of biological assets and agricultural produce. However, only Farm 5 disclosed a description about the classification of biological assets as either consumable or bearer biological assets.

Table 8. IAS/PAS 41 Presentation and Disclosure Requirements of Cattle Farms

Provisions: Presentation and Disclosure Requirement	**Farm 4**	**Farm 5**	**Frequency**		
			YES	**NO**	**NA**
Disclose the aggregate gain or loss arising during the current period of initial recognition of biological assets and agricultural produce from the change in fair value less costs to sell of biological assets.	✓	✓	2		
Provide description of each group of biological assets.	✓	✓	2		
Provide a quantitative description of each group of biological assets, distinguishing between consumable and bearer biological assets or between mature and immature biological assets, as appropriate.	X	✓	1	1	
Disclose the basis for making the distinctions between consumable and bearer biological assets, or between mature and immature biological assets, as appropriate.	X	✓	1	1	
Disclose financial risk management.	X	X		2	
Present reconciliation of changes in the carrying amount of biological assets between the beginning and the end of the current period.	✓	✓	2		
The production cycle more than one year.	✓	✓	2		
Disclose separately, by group or otherwise, the amount of change in fair value less costs to sell of biological assets included in profit or loss due to physical change and due to price changes.	✓	✓	2		
Disclosure of nature and amount of events that give rise to a material item of income or expenses.	✓	✓	2		
Additional disclosure where fair value of biological assets cannot be measured reliably.	✓	✓	2		

Source: Field Survey (2016).

5.5. Factors Influencing the Accounting Practices of Cattle Farms

In this study, the most extensive factor that influences the accounting practices of cattle farms were the recommendations and suggestions of the external auditor. Auditors play an important role in ensuring that financial statements are prepared in accordance with accounting standards (Joyno, 2003). The auditor's opinions and recommendations appear to highly influence the accounting practices of cattle farms, thus confirming Joyno's (2003) findings. The result of the study showed that the valuation of biological assets was changed because their auditors introduced to them the standard, and they were required to follow it. Before, they valued cattle based on accumulated costs and, soon thereafter, this was changed to the fair value approach upon introduction of the said standard. Also, industry practices influence the accounting practices of cattle farms/farmers. Consistency in the financial statement is needed to be comparable within the industry. Aligning to what was used in the industry may also have an impact on the financial status of the business.

Another factor that affects the adoption of accounting practices and standards of cattle farms is the size of the business. According to Goncalves and Lopes (2013), size of the business operation is a determinant of compliance with reporting standards. Small-scale operators (e.g., backyard farmers) do not maintain formal record keeping that explains non-compliance with accounting practices/standards. On the other hand, commercial farms are big cattle farms that keep sales and expenses records as well as prepare formal financial statements. Farms 4 and 5, both being Securities and Exchange Commission (SEC)-registered companies are required to provide audited financial statements which are prepared in accordance with accounting standards (i.e. Philippine Financial Reporting Standards and Philippine Accounting Standards).

5.6. Perceptions on IAS/PAS 41

According to the Chief Financial Officer of Farm 4, IAS/PAS 41 was a not a clear standard after all. The standard was hard to implement because some of the provisions were not applicable. First, the fair market value was hard to determine. There were no regulating bodies that determine the fair market value of cattle. Second, there were no literature or studies that discuss the valuation of cattle in different production systems. Lastly, even though the dairy industry has been existing for a long period of time, still it does not have standard accounting practices that can be readily used by different farms.

On the other hand, the owners of Farms 2 and 3, and farm managers of Farms 1 and 4 have no full knowledge of the IAS/PAS 41 accounting standard. All they know is that cattle should be valued based on fair market value. They became aware only of the standard when it was mentioned by the major researcher.

VI. Insights and Summary of Implications

After assessing all farms, it was seen that there was diversity in the accounting practices of cattle farms depending on the size of operation, form of business organization, and nature of business. The scale of operation of backyard farmers was small and most are sole proprietors who do not require recordkeeping. They used the fair market value approach in valuing cattle when they traded in the auction market, but this does not signify that they were complying with the IAS/PAS 41 accounting standard. Moreover, they were not aware of the standard as well as the presentation and preparation of financial statements, but they showed willingness to consider having a formal recording of all their transactions. Given these factors, the level of compliance of backyard farmers was low.

Table 9. Summary of Compliance to IAS/PAS 41 General Provisions

Farms	Summary of Provisions			
	Engaged in Agricultural Activity	**Recognize Biological Assets at FMV**	**Agricultural Produce**	**Manner of Determination of Fair Market Value**
Backyard (76 farms)	Yes	Yes	Cattle	Eyeball estimates
Farm 1	Yes	Yes	Raw Milk	Eyeball estimates and competitors' prices
Farm 2	Yes	Yes	Raw Milk	Eyeball estimates, competitors' prices, and going rate price
Farm 3	Yes	Yes	Raw Milk	Eyeball estimates and competitors' prices
Farm 4	Yes	Yes	Raw Milk	Uses an automated system for valuation
Farm 5	Yes	Yes	Cattle	Competitor pricing, and going rate price

Farms	Summary of Provisions			
	Government Grants	**Presentation of Biological Transformation**	**General Disclosure**	**Level of Compliance**
Backyard (76 farms)	NA	NA	NA	NA
Farm 1	YES	Noncurrent Assets	No financial statements presented	Compliant in terms of Recognition and Measurement
Farm 2	YES	Noncurrent Assets	No financial statements presented	Compliant in terms of Recognition and Measurement
Farm 3	YES	Noncurrent Assets	No financial statements presented	Compliant in terms of Recognition and Measurement
Farm 4	NO	Noncurrent Assets	With quantitative descriptions of the methods and assumptions used determining the FMV except on the distinction of the classification of biological assets.	Compliant to IAS/PAS 41
Farm 5	NO	Current Assets	With quantitative descriptions of the methods and assumptions used determining the FMV	Compliant to IAS/PAS 41

On the other hand, in the case of commercial farms, provisions of IAS/PAS 41 were vastly applied due to the size of their business operations and influence of their auditor's decision to comply. The level of compliance for both Farms 4 and 5 was high because they followed the provisions of the standard, and this was reflected in their financial statements. In addition, Farms 4 and 5 are SEC-registered businesses required by law to provide audited financial statements which are prepared in accordance with the different accounting standards. As for Farms 1, 2, and 3, the level of compliance was moderate for the reason that they were evaluated only at the recognition and measurement requirements of the standard. They may have different methods and assumptions used in measuring biological assets and presenting biological

transformation, but all were in compliance in different provisions.

It is evident in this study, as well as in the study of Clavano (2014) and Joyno (2003), that an auditor's perspective has a high influence in the adoption of accounting practices and observance of standards by cattle farms. The recommendations and suggestions of internal and external auditors are significant to the recognition and measurement of biological assets and preparation of financial statements. The size and nature of the business operation also matters because these determine the propensity to comply with the accounting practices/standard by farms/farmers.

When compared with global compliance, the level of compliance with regards to usage of the fair market value approach was high in the Philippines compared to the level of compliance in Australia, France, and the UK as mentioned by Elad and Herbohn (2011). The fair market value of the biological asset was determined using eyeball estimates, competitor pricing, and going-rate price.

Even though some provisions were applicable, they still considered the provisions of IAS/PAS 41 too general. Most of the provisions of the standard are not congruent to the production cycle of the animals and current farm practices. Consequently, the nonexistence of regulating bodies that will guide the enterprises in implementing IAS/PAS 41 contributed to the implementation problems of the standard.

It is recommended that a series of training workshops on accounting for agriculture should be provided to backyard farmers, owners, and farm managers by the local and national authorities such as the country's Department of Agriculture, NDA, municipality- and barangay-level local government units in addition to the Philippine Institute of Certified Public Accountants (PICPA). Specifically, backyard cattle farmers need training sessions on recordkeeping and basic accounting. Cattle organizations and federations may also help in establishing standard practices relative to accounting for agriculture and should spread awareness on the importance of the standard among farmers, managers and owners. They should have full knowledge about biological assets and its accounting-related activities since their activities involve biological assets which serve as long-term investments that take time to recover. This could be done through the facilitation of their accountants as well as their internal and external auditors in partnership with PICPA.

Furthermore, a review of the provisions of the standard should be done by different accounting bodies, such as the Financial Reporting Standards Council (FRSC) and PICPA. Last June 2014, the IASB issued an "Amendment to IAS 16 and IAS 41," which states that bearer plants (biological assets which are used solely to grow produce over several periods) should be accounted for in the same way as property, plant and equipment is accounted for under "IAS 16 Property, Plant and Equipment," because the operation of bearer plants is similar to that of manufacturing. Hence, according to IASPlus (2014), bearer plants are usually scrapped at the end of their productive lives. Once a bearer plant is mature, apart from bearing produce, its biological transformation is no longer significant in generating future economic benefits, and the only significant future economic benefits it generates come from its agricultural produce which it creates.

The provisions of IAS/PAS 41 should be in line with what is currently used in the business (e.g., valuation of calves and milking cows). Provisions of the standard should be specific as to the type of biological assets (plants or animals). In that way, improvements and/or amendments to IAS/PAS 41 can be made and will result in proper observance and application of the agricultural accounting standard. Consultation with industry players will also be helpful in identifying the applicable accounting practices for agriculture. Lastly, further studies on the accounting practices and implementation of IAS/PAS 41in all the other agricultural commodities should be done to extend the knowledge and application of the standard.

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