

Chapter 11

Modernizing Farm Business Management: Comparative Analysis of Japanese and Californian Rice Farming



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Abstract In Japan, farming companies, particularly those that grow rice, have recently been promoted to supersede conventional small farms under increasing competitive pressure. Modernization of farm management is a key concept that measures the extent to which modern enterprise management has evolved from the family farms. We conducted unique benchmarking surveys to compare the degrees of modernization between Japanese rice-farming companies and their major international competitor, Californian rice farmers. It was found that Californian producers outperform those in Japan not only in terms of farm scale and rice yield but also in terms of farmers' capabilities and economic modernization metrics. It was revealed that entrepreneurial advancement, information gathering, and risk-accepting behavior were influential capabilities of Japanese rice farmers with regard to their business innovations. From the perspective of global competitiveness, Japanese rice farmers need to enhance their managerial abilities to further progress in the modernization of their farm business and to get further involved in effective marketing management. Also, our analysis suggests that the research methodologies designed to explore farm management modernization originating from studies in Japan would be worth applying as an international benchmark.

Keywords Farming companies · Farm modernization · International benchmark · Management improvement · Managerial capability

11.1 Introduction

Japanese rice farming must become more competitive to remain viable, particularly if (i) possible trade arrangements stimulate the import from more japonica rice (medium- and short-grain varieties)-growing countries such as the United States and

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Australia and (ii) Japan's five-decade-old rice-reduction program faces abolition in 2018 (Arahata 2014). Contemporary Japanese rice farmers have to revamp their strategies to adapt to such agricultural policy changes.

A number of possible determinants of competitiveness in agricultural sectors have been identified: farm size, factor intensity, farm specialization, human capital, consumer demand, natural environment, density, facilities, public investments in infrastructure, public policies and regulations, and research and development (Organization for Economic Cooperation and Development [OECD] 2011). For any determinants, competitiveness is a relative concept that should be measured according to a benchmark.

Few studies have examined the Japanese rice farming sector from the viewpoint of international competitiveness. There is a particular lack of attention in the literature to internal farm-level factors, such as business strategy, management capability, and innovation, as drivers of farm management modernization. Kinoshita et al. (2015) delineated a comparison of internal farm management factors between Japanese and Australian rice farming. Such a benchmarking survey can be generalized and applied to other competitive countries, and there is the potential for innovating methodologies from the perspective of international competitiveness. Therefore, we assessed the managerial aspects of rice farming by surveying farmers in Japan and in California in the United States, Japan's chief rival in the rice market. We also addressed issues in research methodologies that were applicable to farm management modernization.

The remainder of this chapter proceeds as follows. Section 11.2 describes the Japanese rice industry with some comparisons with California. Sections 11.3 and 11.4 explain the analytical framework and survey methodology. Section 11.5 focuses on a questionnaire administered in Japan and on interviews conducted in California. Sections 11.6 and 11.7 conclude by discussing the results and comparing relative competitiveness across the two countries by their case studies with a viewpoint of internal farm management factors.

11.2 The Rice Industry in California and Japan

California accounts for 20% of all US rice production and is the nation's fourth-largest rice-growing area after Arkansas, the Gulf Coast, and the Mississippi River Delta (Baldwin et al. 2011). California almost exclusively grows high-quality medium-grain and short-grain rice for export and domestic markets. According to the US Census of Agriculture (United States Department of Agriculture [USDA] 1999, 2014), the number of Californian rice farms fell from 1567 in 1997 to 1392 in 2012, whereas land under rice cultivation rose from 208,122 to 227,421 ha within the same timeframe. Accordingly, the size of the average rice farm increased by 23% during this period, reaching 163 ha devoted almost exclusively to rice production. Consolidation and structural change in California's rice sector have occurred in the pursuit of an economy of scale and lower production costs (Baldwin et al.

2011). Indeed, since 1997, rice farms of 200 or more hectares have become more representative in California.

Compared to the national average, the average size of California's rice farms is 16% smaller, and their per-acre production cost is 40% above (Cost of Production Dataset 2015, Economic Research Service, USDA), which reflects the higher cost of land, irrigation, custom operations, and commercial drying in this area. Nonetheless, Californian producers generate 50% more gross value per acre of production than the average US rice farm and are nearly twice as profitable. That profit is supported by substantially higher prices (USD28.97 per 60 kg at harvest) and slightly better yields (9639 kg per planted hectare) than in other US rice-growing areas.

On the other hand, in Japan, rice is an important staple food and so the rice industry operates on a national scale. Although Japanese rice farmers typically produce the best medium-grain rice and satisfy the demands of discerning Japanese consumers, the small-scale farm operations and consequently high costs have weakened the price competitiveness of the Japanese rice industry. Furthermore, an ageing population of rice farmers is jeopardizing the viability of rice farm businesses. Long-term time series data show that both domestic production and consumption of rice are decreasing, implying that Japanese rice is being overproduced.

At present, the Japanese rice industry includes approximately 1.2 million farms, the majority of which are family-owned and family-operated, whereas land under rice cultivation remains mostly static at 1.6 million hectares. The average area for rice cultivation on a Japanese farm is approximately 1 ha. Rice production costs in Japan are much higher than those in California (Kamegai and Hotta 1991, Yagi 1992), and most rice production cost is associated with machinery and labor expenses. Japanese rice farms produce nearly half the yield (5260 kg per planted hectare) of Californian rice farms (Ministry of Agriculture, Forestry and Fisheries [MAFF] 2016).

Overall, the industry seems to be less competitive in terms of farm size, cost and price of production, and yield compared with California. To address this, the Japanese government has been developing a rice policy, such as promoting the enlargement and corporatization of rice farms to improve competitiveness in the industry. Indeed, the number of farming companies that grow rice and/or other grains in Japan has recently increased to 6540 companies as of 2015 (based on customized data from the Japanese Census of Agriculture and Forestry, MAFF). Japanese farming companies account for less than 1% of all rice farms, but they are, in agricultural policy terms, earmarked to become competitive businesses with larger farms and increasing sales (Kinoshita and Kimura 2016).

11.3 Study Framework

Kimura (2008) and other authors (Kay et al. 2012, Malcolm et al. 2005, Olson 2011) have emphasized that conventional farm management differs from modern enterprise management, and this has been seen as a barrier to their competing on a

global scale. Kimura (2004, 2008) presented a theory of farm business growth in the Japanese context and explained that two domains captured the progression from livelihood farming to enterprise farming: quantitative measures (farm size and sales) and management styles (business strategies, extent of modernization, management practices, innovations, and human resources). Although some quantitative differences between Japanese and Californian rice farms have been established in previous studies that conducted comparative analyses on that basis, differences in the managerial aspects between them remain unclear.

Farm management modernization is an essential concept that examines the extent to which modern enterprise management has developed on family farms. This is an interesting investigation because a family farm has a common business structure in both Japan and California. Modernization refers to the efficient use of time, economic modernization, functional modernization, and spatial modernization; all of these aspects are critical for farmers (Kimura 2004, Kinoshita and Kimura 2016). To better understand farm modernization, this study also focuses on management styles, such as farmers' intentions and managerial capabilities, farm business strategies, marketing management, and innovations, in order to facilitate a benchmarking survey for competitiveness.

Various literatures have emphasized the importance of the "disposition" of the farmer and the role that it plays in his/her approach to farm management, referred to as the farmer style (Kay et al. 2012, Kimura 2008, Malcolm et al. 2005, Maybery et al. 2005, Nuthall 2009a, Olson 2011). Farmers' intentions refer to the underlying goals of management activities, including economic, environmental, cultural, and social objectives that have been identified as pertinent to farming. The farm business strategy is one of the factors that guide management practices as well as farmers' intentions. Specific farm business strategies could differ according to the attributes of the sample groups, for example, by country, region, and product category. However, because we conducted an international comparison between sample groups from Japan and California in this study, we only used more generic questions related to crop farming. Farmers' intentions and strategies refer to strategic management in this study.

Farmers adopt various management practices to implement their strategies. Key practices in this study are production and marketing practices, because rice farmers in both countries have to address current and future market challenges and changes. Production practices fundamentally concern the processes and exchanges executed by farmers for the purposes of supplying suitable products in contemporary market contexts. More specific practices are marketing strategies and customer management. Herein, these refer to production and marketing management.

From the view of human elements, managerial capability is a crucial driver of farm business viability (Kimura 2008, Muggen 1969, Nuthall 2009a, b). In modernized farm business, managerial tasks including planning, organizing, monitoring, and analyzing are more important than physical work in the fields if the business is to grow sustainably (Gasson and Errington 1993, Hutson 1987, Kingwell 2002). With the increasing importance of managerial tasks, the skills required by farmers have been specified in empirical studies. These skills contain entrepreneurship

(Alsos et al. 2011, McElwee and Bosworth 2010, Olsson 1988), information-gathering and information-using skills (Nuthall 2006), and developing a long-term business plan and controlling time schedules (Kingwell 2011, Rikkonen et al. 2013). Kimura (2008) argued that the ideal farm manager has the capability and superior skills required to fulfill the three functions of entrepreneurship, adaptability, and administration. In addition, the managerial capability of a farmer is part of the input factor necessary to generate innovations which are defined as changing how a farm system operates (Castle et al. 1987, Kimura 2004, Malcolm et al. 2005).

11.4 Sample Data

Survey questions explored five issues: operating structure, management attitudes, business strategies, workforce and financial management, and sales and marketing. These questions were common in both the Japanese and Californian surveys we conducted.

A Japanese questionnaire survey was delivered by post to a directory list of 1683 rice-farming companies across Japan in December 2014, generating 618 usable responses by return of post. The population of Japanese rice/other-grains farming totaled 6540 companies, as seen in Sect. 11.2; thus, the capture rate of our sampling frame was 26% of this population, and our final sample size represented nearly 10% of that population. This sample size is sufficient for the purposes of statistical analysis.

Table 11.1 summarizes the Japanese respondents included in this study. Respondents constituted a tolerably balanced sample in terms of rice industry locations, which mainly included *Hokuriku*, *Tohoku*, and *Chugoku* regions, while there were relatively fewer respondents from *Kinki* and *Kyusyu* regions. Drawing from official MAFF data, 43% of Japanese farming companies (including those of non-rice) stand as a limited liability company, 28% as a stock company, and 27% as an agricultural producers' cooperative company. Respondents were thus reasonably balanced in terms of farm legal status, although agricultural producers' cooperative companies were overrepresented and limited liability companies underrepresented.

Lately, given an execution rate of 40% in the Japanese rice-reduction program, it was estimated that all Japanese rice-farming companies had, on average, 23.2 ha of total farmland. This value was calculated from MAFF data (2017), and it showed that an average of 13.9 ha was allocated to rice planting out of the total farmland area. Therefore, the Japanese respondents were likely to be reasonably consistent with the overall Japanese population in terms of farmland scale, with a mean scale of 37.7 ha and a median scale of 23.8 ha. According to the Statistics Bureau of Japan (2014), the mean number of workers (including non-regular workers) on a Japanese rice-farming company was 12, whereas respondents listed just six (excluding non-regular workers). However, differences in the number of workers between respondents and the population diminish if non-regular workers on the sampled farms are taken into account. Through the same statistical reference, the mean sale of a

Table 11.1 Characteristics of sampled Japanese rice-farming companies

Sample size	618
Response rate	37%
Responses by region	
<i>Hokkaido</i>	8%
<i>Tohoku</i>	18%
<i>Hokuriku</i>	35%
<i>Kanto/Tozan</i>	9%
<i>Kinki</i>	4%
<i>Chugoku</i>	16%
<i>Kyusyu</i>	5%
Others	5%
Organization type	
Limited liability companies	21%
Stock companies	24%
Agricultural producers' cooperative companies	47%
Others	8%
Farmland scale	
Mean	37.7 ha
Median	23.8 ha
Mean regular workers	6.4 people
Sales ^a	
Mean	58 million yen
Median	40 million yen

^aOne Japanese yen was approximately equivalent to USD 0.01

Japanese rice-farming company was 41 million yen¹, which again corresponds sufficiently with our sample where the mean sale amount was 58 million yen with a median of 40 million yen.

Data from the Californian sample were compared with standard Japanese rice-farming companies, in order to be applied to the Japanese context. We interviewed six Sacramento Valley rice farmers in April 2014, assisted by an influential rice farmer. However, the six farms represented by our data are not fully representative in statistical terms, given that there are approximately 1400 rice farms in California. Respondents' farms were sequenced by acreage and labelled A–F (Table 11.2). Of the 22 rice-growing counties in California, the rice industry is primarily located in the northern counties of *Colusa*, *Glenn*, *Sutter*, *Butte*, and *Yuba*. Despite the small sample size, respondents were relatively balanced in terms of rice farm locations, which included *Colusa*, *Glenn*, *Butte*, and *Yuba*.

According to USDA statistics for California (2014), three-quarters of the primary operators on rice farms were aged 45 years or older, whereas the modal age class was 55–64 years old. Given this, our respondents constituted a relatively bal-

¹One Japanese yen was approximately equivalent to USD 0.01.

Table 11.2 Characteristics of sampled Californian farms

Farm	A	B	C	D	E	F
Respondents' age	66	59	60	59	52	52
Farm area (hectares)	101	287	342	583	686	1336
Full-time workers (Male/Female)	M 1	M 2	M 2	M 3	M 5	M10
			F 2	F 1	F 1	F 1
Part-time (P-D)	90	60	110	65	240	800
Full/part-time farm	Part-time		Full-time			
Organization type ^a	PS		FM		PS	CO
Crops excluding rice	None				Oats, vegs, legumes	

^aFM indicates a family operation, PS a partnership, and CO a corporation

anced sample in terms of rice farm manager age, which ranged from 52 to 66 years old. Furthermore, the majority of primary operators on Californian rice farms spent more than half of their working time on farming which, again, is not inconsistent with our sample.

Using the same statistical reference, 56% of Californian rice farms were organized as family/individual, 31% as a partnership, and 8% as a family-held corporation; by way of comparison, our respondents comprised two family operations, three partnerships, and one family-held corporation. Half of the Californian rice farms covered 40–200 ha and around 40% of the farms covered 200 ha or more. Therefore, our sample is biased in terms of this metric; five of the six farms were greater than 200 ha, the exception being Farm A. Farm F was a top producer and highly reputed in the region.

Considering these statistical references, it would be worth comparing the samples from the two countries. The respondents from Japanese farming companies comprised a group that presumably exhibited relative advantages and high performance compared with other such farms across Japan. They are, therefore, a critical and competitive benchmark in terms of management and suitable for comparison to our sample of rice farms in California, where, at the population level, the competitive superiority of rice farms in the United States vis-à-vis their Japanese counterparts is well established.

11.5 Results

11.5.1 Strategic Farm Management

Factors that guide management practices include farmers' intentions and their strategies. Kimura (2008) reported that farmers' intentions could be delineated into four categories: (i) a desire to continue family tradition, (ii) a desire to maintain a rewarding and enjoyable livelihood, (iii) a desire to achieve business profit, and (iv) a desire to maintain a socially acceptable business, following the pattern of business

objectives. Seven questions investigated business objectives: (1) to pass the farm to children, (2) to earn a livelihood, (3) to earn income on a par with other industries, (4) to optimize profit, (5) to enjoy being an innovative farmer, (6) to satisfy consumer demand and appreciation, and (7) to expand the business.

More simply, in this study by using the same questions, farmers' intentions were integrated into the following: (I) traditional-directed, that is, they wish to pass their farms to children; (II) life-orientated, that is, their objective is to earn a livelihood or income commensurate with other industries, and they expressed no intention to pass the farm to children; and (III) business-minded, that is, they had higher-level objectives without the intention to pass the farm to children and without objectives of earning a livelihood or income commensurate with other industries. Responses that constituted our data and on which we based conclusions were self-rated, subjective, five-item Likert scales.

Table 11.3 summarizes business intention responses and shows all results from the Japanese sample and the proportion of positive responses. In summary, positive responses included "agree" and "strongly agree." By categorizing their responses into their intentions, it was found that as much as 71% of Japanese respondents were tradition-directed, 24% were life-orientated, and the remaining 5% were business-minded. By contrast, the Californian respondents were more devoted to life-orientated farming rather than tradition-directed. Unlike the other Californian respondents, Farms A and B were tradition-directed. All other respondents were life-orientated. No Californian respondent identified its sole objective as satisfying customer demand or sustaining growth. Business-minded farming comprised the lowest intention among both the Japanese and the Californian groups.

Table 11.3 Farmer intentions

Variable/Item	Japan ^a (N = 611) ^b	California ^c					
		A	B	C	D	E	F
Farming focus		Tradition-directed		Life-oriented			
Business objectives							
(1) to pass farm to children	70.9%	+	+	0	--	-	-
(2) to earn enough income to make a living on the farm	85.1%	+	0	++	++	+	++
(3) to earn income from farming on a par with other industries	85.1%	-	+	+	+	0	+
(4) to optimize net profit	81.2%	0	+	+	0	0	+
(5) to derive enjoyment from being an innovative farmer	86.1%	+	0	++	+	+	+
(6) to satisfy consumer demand and appreciation	94.3%	0	-	+	+	+	+
(7) to grow and expand the business	86.7%	-	+	++	+	+	+

^aThe percentage of positive responses ("agree" and "strongly agree") is used to summarize the Japanese sample

^bSeven Japanese respondents were excluded from the tabulation due to data unavailability

^c++ strongly agree, + agree, 0 neutral, - disagree and --strongly disagree

While farm business strategies cover a variety of basic directions after a farmers' intentions, they are generalized as capital-intensive farming strategies (connected with expanding farm acreage or intensifying mechanization), technological innovation strategies (investing in technology), market adaptation strategies (expanding sales/marketing activities and product differentiation, or initiating food processing business), restructuring strategies (developing off-farm investments or rethinking the overall enterprise mix), external management strategies (reducing price risk or less-intensive farming for environmental reasons), or a human resource strategy. Table 11.4 itemizes such farm business strategies and those most selected are reported.

The proportion of positive responses to business strategies in the Japanese sample are indicated in Table 11.4. The Japanese respondents showed a greater inclination toward capital-intensive farming by expanding acreage and investing in machinery rather than by technological innovation. Market adaptation strategies, including vertical diversification and active marketing, were also prominent. As for the human resource strategy, personnel development was a notable strategy among the Japanese respondents.

Increasing acreage and investing in advanced technologies were common among Californian respondents. That finding coincides with long-observed efforts to streamline production and minimize costs. Market adaptation strategies were not as prominent among the Californian respondents as they were among the Japanese respondents, and only Farm F was an active marketer pursuing such strategies as promoting its processing business and branded products.

It should be noted that there are two strategies that require farm-level investment but they have different effects: "investing in technology" and "intensifying mechanization." The latter merely increases fixed capital of the existing technologies, whereas the former leads to innovation in production processes with the introduction of new or more advanced technologies. Specific technologies in rice farming vary, but some examples are precision farming in California and direct-seeded farming in Japan.

Table 11.4 Major strategies

Variable/Item	Japan (N = 616) ^a	California					
		A	B	C	D	E	F
Maintain with no changes	5.7%	✓					
Develop off-farm investments	6.3%		✓				
Expand farm acreage	60.6%		✓	✓	✓	✓	✓
Invest in technology	21.3%	✓	✓	✓	✓	✓	
Intensify mechanization	54.1%			✓	✓		
Expand sales/marketing activities	39.9%						
Expand product differentiation	15.7%						✓
Initiate food processing business	19.8%						✓
Hire qualified staff	37.8%						✓

^aTwo Japanese respondents were excluded from the tabulation due to data unavailability

11.5.2 Production and Marketing Management

Farmers adopt management practices in order to implement their farm business strategies. Production practices for marketing are fundamentally important ideas for supplying their products that are suitable for the changing markets they face. More specific practices are marketing strategies and customer management. Marketing strategy is an aspect of sales competition in which farmers place the most emphasis, and includes season, marketing channel, cost-cutting, and product differentiation. Customer management is the end-user-orientated practice, not the rice industry itself; individual farmers have adopted such practices to attract and retain customers.

Table 11.5 indicates the proportion of positive responses to production practices for marketing in the Japanese sample. It shows that around 40% of Japanese respondents maximized the use of natural advantages on their farm. Practices such as time of harvest and selling to and addressing customers' needs were not so popular among them, whereas they were more likely to have introduced traceability systems (or agricultural product tracking). Product safety and quality are essential values among Japanese consumers.

Table 11.5 also reveals that the majority of Californian respondents optimized the use of natural advantages. They were also more likely to have a realized harvest time and selling to and addressing customers' needs compared with the Japanese sample. Overall, the Californian respondents' production practices for marketing were scattered. Only two have introduced a traceability system, Farms E and F, which had done so because they were committed to organic farming. Farm F also pursued product differentiation.

The proportion of positive responses to customer management in the Japanese sample is shown in Table 11.6. It shows that 56% of the Japanese respondents engaged in customer management, but no specific practice was popular. In the Japanese market, rice products are very common and it is difficult to create sales competition. The mediation sale of rice via agricultural cooperatives rather than direct selling by rice farms is a highly dominant marketing channel. Therefore, it is

Table 11.5 Production practices for marketing

Variable/Item	Japan (N = 616) ^a	California					
		A	B	C	D	E	F
Exploit natural advantages	40.4%		✓	✓	✓	✓	✓
Time harvesting and selling	27.9%			✓	✓	✓	✓
Produce to customer demands	26.1%		✓	✓	✓		✓
Commit to organic farming	31.0%		✓			✓	✓
Use special materials or methods	18.8%			✓			✓
Introduce traceability	44.6%					✓	✓
Develop differentiated products	18.5%						✓

^aTwo Japanese respondents were excluded from the tabulation due to data unavailability

considered that the limited number of Japanese respondents who customize their products is dependent on different uses, such as for the table, food service industry, and feed for livestock. Trust in producers is an essential value among Japanese consumers as well as product safety and quality.

Table 11.6 also demonstrates that half of the Californian respondents follow no specific marketing strategy. This finding was expected because they generally sell to mass markets, including cooperatives and contract pools. Even so, Farm D concentrates on seasonal sales and grows a specialty product (rice seeds), and Farms E and F target channels such as direct sales and offer value-added products (organic foods or rice crackers). No Californian respondent sells his/her products after cutting costs or by differentiating against his/her rivals. Table 11.6 shows that the Californian respondents generally did not distinguish themselves in customer-management practices, although Farms E and F tailor products to customers and encourage visits.

11.5.3 Modernization of Farm Management

Basically, since family-owned and family-operated farms are a common business structure, farm entities often represent a “farm–household complex” as individuals, partnerships, and, occasionally, private companies (Nuthall 2011). Thus, there is an intimate relationship between the farm and the family, which naturally leads to conflict over capital and labor allocation. A further difference between the farm–household complex and public company arrangement is that the owners of the former are not usually separated from the business spatially or in management, whereas those of the latter are. Thus, the modernization of farm management is considered to involve practices that allow a farm to be split from the farm–household complex and managed as a business to reduce conflict between the families.

Our survey questions inquired about four aspects of modern farm management: (I) time modernization, (II) economic modernization, (III) functional moderniza-

Table 11.6 Marketing strategy and customer management

Variable/Item	Japan (N = 616) ^b	California					
		A	B	C	D	E	F
Marketing strategy ^a					S	C	C
Customer management							
Offer new products to meet demand	23.4%		✓		✓	✓	✓
Alter production to meet demand	20.6%					✓	✓
Provide farm tours to customers	16.9%					✓	✓
Maintain mail communications	19.3%						✓
Provide information over the internet	23.9%						✓
No specific practice	44.0%	✓		✓			

^aS indicates selling during specific seasons. C indicates selling in specific channels

^bTwo Japanese respondents were excluded from the tabulation due to data unavailability

tion, and (IV) spatial modernization. Time modernization includes clearly segregating business hours from private hours. Economic modernization includes controlling accounting and finance practices and isolating business budgets from household budgets. Functional modernization relates to organizing and coordinating work duties and the separation of work and family relationships. Spatial modernization is evidenced by a separate business and work space.

Indicators for each of these dimensions are explained in Table 11.7. We evaluated responses from these indicators on a five-point scale and combined them. The possible score of each dimension was 0–25 points (Fig. 11.1). Overall, the Japanese respondents demonstrated moderate degrees of modernization, without any remarkable aspects. However, these are farms which have been corporatized and it was anticipated that they would adhere well to modernization criteria and objectives.

Among the Californian respondents, modernization was evident in all dimensions among larger farms, particularly Farm F. Moderate modernization was the overall norm for California, although economic modernization was more advanced on Farms C, D, E, and F. Economic modernization mainly included financial diagnosis and analysis and clarification of accounting and financial targets, although we did not analyze data using these disaggregated terms. Only one of the farms kept double-entry records, which is not legally required, and single-entry is sufficient for tax purposes (Internal Revenue Service, 2013).

We also did not disaggregate analyzing personnel practices, but hiring seasonal workers and clarifying work roles was common. As more workers were hired (Table 11.1), more workforce management practices were implemented. As seen in Fig. 11.1, Farms D, E, and F exhibit time and functional modernization. Examples of moderate spatial modernization include the creation of office space.

If Japanese rice-farming companies are to be taken beyond the level of modernization seen among the Californian respondents, they need to be seriously examined. Specifically, one Californian respondent, Farm C, exhibits levels of modernization similar to the Japanese respondents, as seen in the figure, whereas progress in economic modernization is nonetheless noteworthy. Again, we refrained from disaggregated analyses vis-à-vis the Japanese respondents, but slow economic modernization is mainly due to a lack of accounting and financial target clarification, despite the extensive use of double-entry records. Poor time modernization is largely due to time poverty issues: overworking on farms, insufficient holidays taken, and seasonal workers not being hired.

11.5.4 Managerial Capabilities

Farm managers need superior skills in entrepreneurship, adaptability, and administration capability (Table 11.8). Table 11.8 summarizes the results from the 10 questions that explored managerial capabilities. Responses that constituted our data and on which we based conclusions were, again, self-rated Likert scales with five levels.

Table 11.7 Viewpoints on management improvements intended to modernize farm management

(I) Time modernization
Holidays are periodically set and taken
Time management is practiced (e.g., fixed daily work hours and breaks)
Employees are hired to reduce overworking during busy seasons
Work is spread over the year to mitigate seasonal slack
A systematic work plan is established and implemented
(II) Economic modernization
Periodic (e.g., monthly) salaries are paid to family workers
Managers are paid to manage
Farms are managed based on financial targets such as revenues and expenses
Accounting and financial management employ double-entry bookkeeping
Results are analyzed, diagnosed, and adopted in succeeding plans
(III) Functional modernization
Work roles are classified according to the technical level of difficulty
Work roles are classified as managerial- or production-based
Supervisors are assigned as required and provided the necessary authority
Farmers receive training
Positions in the workplace and the duties of each member are documented
(IV) Spatial modernization
Establishment of an office area
Construction of a management office
Streamlining of experimental fields
Acquire a trade name
Job titles (director, department head, and section manager) are assigned

Ten points were given for each capability-related question if the response was positive. Positive responses included “agree” and “strongly agree.” The points were then combined for each respondent so that the possible range of capability score was 0–100 points. Table 11.8 demonstrates the combined results from the Japanese sample and average points associated with each capability-related question, which ranged from 0 to 10. The average capability score for the Japanese respondents was approximately 48 points.

Fig. 11.1 Modernization of farm management
 *Three Japanese respondents were excluded from the analysis due to data unavailability

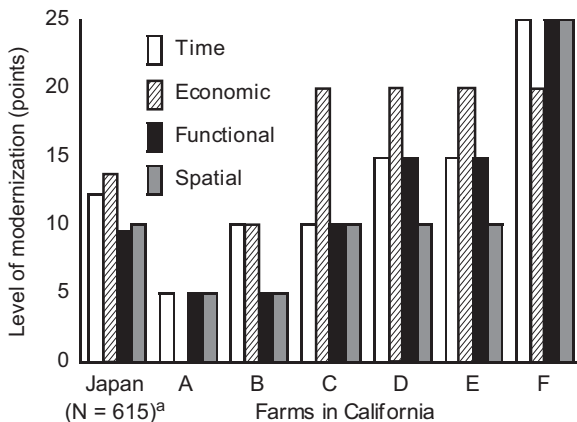


Table 11.8 Farmer managerial capabilities

Variable/Item	Japan (N = 615) ^a	California ^b					
		A	B	C	D	E	F
Entrepreneurship							
(1) Values, hope, and vision	5.9 points	+	+	+	++	+	+
(2) Setting aggressive targets	5.7 points	0	+	0	+	-	-
(3) Entrepreneurial advancement	3.4 points	0	0	+	+	+	+
(4) Risk-accepting behavior	4.9 points	0	-	+	0	+	+
Adaptability							
(5) Curiosity	5.4 points	+	-	+	+	+	+
(6) Information-gathering	5.0 points	+	0	+	++	+	+
(7) Predictive ability	2.0 points	-	+	+	++	+	+
(8) Preparedness	5.6 points	+	0	+	++	0	+
Administration capability							
(9) Rational thinking	5.2 points	+	+	++	+	+	+
(10) Analytic behavior	4.7 points	+	+	+	+	+	+
Total score	47.8 points	60	50	90	90	80	90

^aThree Japanese respondents were excluded from the tabulation due to data unavailability

^b++ indicates strongly agree, + agree, 0 neutral, - disagree, -- strongly disagree. ++ and + count for 10 points

The average capability score for the Californian respondents was 77 points, with a minimum score of 50 and maximum score of 90. Those who manage farms full time (Farms C–F, as seen in Table 11.2) had evidence of high managerial capabilities. The Californian respondents scored high for administration. Overall, respondents displayed greater adaptability, curiosity, information-gathering skills, and predictive ability, although intra-sample adaptability scores differed. The Californian respondents lagged slightly in entrepreneurship. In particular, they did not set aggressive targets and avoided risk-accepting behavior.

Total capability scores of all Californian respondents were higher than the average score for the Japanese respondents. The Californian respondents had an overwhelming edge in managerial capabilities, specifically in self-reported stronger entrepreneurial advancement and predictive ability. Administrative capabilities were also lower among the Japanese respondents.

11.5.5 Innovations and Managerial Capabilities

In OECD and EUROSTAT (2005), innovations were delineated into four types: product innovation, process innovation, marketing innovation, and organizational innovation. Product innovation was defined as the introduction of a goods or service that was new or significantly improved with respect to its characteristics or intended uses. Process innovation was defined as the implementation of a new or significantly improved production or delivery method. Marketing innovation was defined as the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing. Organizational innovation was defined as the implementation of a new organizational method in the firm's business practices, workplace organization, or external relations.

We questioned whether farms had accomplished any innovation of these types, and Table 11.9 shows the result only from the Japanese respondents. The majority of them had accomplished some type of innovation. Process innovation was the most popular and 62% of the respondents had accomplished this, although product, marketing, or organizational innovations were limited, accomplished by $\leq 30\%$. All of the sampled Californian farms other than Farm F accomplished only process innovation, whereas Farm F accomplished all types of innovations (data not shown). Thus, process innovation was possibly dominated in both groups although our survey covered a limited number of Californian farms.

Table 11.9 also reveals the relationship of innovations to capabilities of the Japanese farm managers. Positive correlations were observed between each type of innovation and clear differences in the total average capabilities' score (the same as that evaluated in the previous subsection) between the accomplished and non-accomplished respondents were demonstrated. This implies that managerial capability is part of the input factor that leads to any innovation at the farm level.

Furthermore, we applied multivariate analyses using a logit model for binary data to the Japanese sample to identify the significant capabilities out of the 10 capabilities surveyed that influence innovation. Table 11.10 summarizes the results, although we abbreviated the model equation and statistical details due to a space constraint. Information gathering and entrepreneurial advancement were important capabilities that influenced any innovation. Interestingly, specific capabilities varied for different innovation types. Values, hope, and vision, analytic behavior, and entrepreneurial advancement were important for process innovation.

Table 11.9 Relationship between capability score and innovation (616 samples from Japan)

Type of innovation	Accomplished sample	Total capability score		Correlation ratio
		Accomplished	Non-accomplished	
Any innovation	78.6%	52.7 points	30.2 points	0.31
Process innovation	61.5%	53.9 points	38.2 points	0.26
Product innovation	29.1%	59.4 points	43.1 points	0.25
Marketing innovation	25.8%	61.0 points	43.2 points	0.26
Organizational innovation	26.0%	59.9 points	43.6 points	0.24

Table 11.10 Significant capabilities that influence innovation (Japanese sample)

Type of innovation	Capabilities
Any innovation	Information gathering, entrepreneurial advancement
Process innovation	Values, hope, and vision, analytic behavior, entrepreneurial advancement
Product innovation	Information gathering, risk-accepting behavior, setting aggressive targets, (rational thinking) ^a
Marketing innovation	Information gathering, risk-accepting behavior
Organizational innovation	Information gathering, curiosity

^aText in parenthesis indicates a negative factor for the innovation

Unlike process innovation, information gathering and risk-accepting behavior were significant capabilities consistently through product and marketing innovations, while setting aggressive targets was positive but rational thinking was of negative importance, particularly for product innovation. Adaptability such as information gathering and curiosity is significantly influential in organizational innovation.

11.6 Discussion

One way to improve competitiveness is the application of a benchmarking to current farm management. As repeatedly pointed out by Jack (2009), an important approach for farm managers to bring about “change” was to clarify the criteria for obtaining results (profits) earlier than others do. This was accomplished by generating the motivation to change, showing the vision after the change, showing data/evidence/success examples that could bring a willingness to change, and identifying the methods that could bring about the change. The introduction and development of a process benchmarking could serve as a useful tool in this respect (Ronan and Cleary 2000).

We found clear differences in farm business strategies among Japanese and Californian rice farmers. The Japanese are not only production-driven managers

pursuing low-cost strategies but also marketing-driven and are able to adapt to markets. They accommodate their business environments by exploiting their proximity to markets. Nonetheless, they make poor use of such marketing opportunities in their management practices. Arguments can be made that these conclusions are reasonable and robust given our large sample size of Japanese farmers and the fact that the prevailing conditions in the rice market are common to all Japanese farms. The selling environments in Japan and California are markedly different; most Californian rice is sold overseas and most Japanese agricultural produce is sold within Japan. Thus, Japanese rice farmers are closer to the customer and should directly and more readily grasp their needs. Porter (1990) pointed out that the demand condition is an industry advantage, and discerning Japanese consumers of rice possibly provide a competitive edge for the Japanese rice industry.

On the other hand, the sampled Californian managers were especially production-driven, pursuing low-cost strategies. They accommodate their business environments by exploiting favorable production conditions. Together they constituted a biased sample with a larger scale in terms of farm size compared with population level norms. Even so, most Californian rice farmers would be likely to adopt the same strategies because the higher production costs (see Sect. 11.2) trigger cost-reduction strategies, and this is more likely on smaller-sized farms (compared with our sample farms), which are not in a position to reap substantive benefits in terms of economies of scale.

In this study, the Californian group were primarily family farms, whereas the Japanese group were farming companies. Due to differences in the legal farm status, we anticipated that the Japanese group would demonstrate higher levels of farm management modernization than the Californian group. However, we did not reach the conclusion that Japanese rice-farming companies have progressed comprehensively and remarkably in terms of farm modernization. Both groups exhibited a degree of management that was modernized, and the challenge remains for further farm modernization. The modernization level may be lower in the population of Californian rice farms compared with that in our sample, because the Californian group was biased toward larger farms and scores were higher for larger and more sophisticated producers. More importantly, well-organized management remains unrealized even in Japanese rice-farming companies, although such management is believed to occur when a farm is corporatized.

Another issue for Japanese rice farmers is how to enhance their managerial capabilities. The sampled Californians exhibited far higher managerial capabilities than Japanese managers of rice-farming companies. Similar to farm management modernization, capabilities may be more generally limited in Californian rice farmers compared with our sample. Even if that is the case, Japanese rice farmers need to develop human resource policies and invest in facilities for business management to sharpen their competitive edge. This is particularly important because Japanese rice farming, with its tendency to a smaller scale, generally cannot compete by expanding its acreage under cultivation without substantial developments in other aspects of the business.

Business evolves as a process of innovation (Schumpeter 1934), and this also applies to the farm business. While market changes provide opportunities for inno-

vation at a starting point (Malcolm et al. 2005), accomplishing innovations requires three types of inputs from managers to their business: entrepreneurship, risk-bearing capacity, and fund of information (Aoki and Itami 1985). Based on the results stated in Table 11.10, it would be worth considering the relationship between such necessary inputs and farmer capabilities in Japanese rice-farming companies that accomplished innovations.

Specifically, process innovation, which was the most popular type among the Japanese (and presumably the Californian) rice farms, was influenced by values, hope, and vision, analytic behavior, and entrepreneurial advancement. This is because production efficiency is a critical issue for Japanese rice farms addressing societal and economic pressures by intensifying mechanization with less labor and cost saving. Again, it should be noted that this is still led by increases in fixed capital of the existed technologies, rather than by strategic investments in the new or more advanced technologies that prevail in the Californian context. After process innovation, product and marketing innovations were significantly influenced by information gathering and risk-accepting behavior. Innovators in product and marketing areas have to understand the unknown needs of customers and manage market uncertainty beyond the production level. That would be true particularly because rice sales of the Japanese farmers were too dependent on the agricultural cooperatives to develop more favorable marketing, and the producers made few product appeal points except for product safety and quality. Thus, among a variety of managerial capabilities, entrepreneurial advancement, information gathering, and risk-accepting behavior are necessary human element inputs to generate innovations on Japanese rice farms.

11.7 Concluding Remarks

People in the rice industry pay more attention to international competitiveness if progress in economic globalization boosts the trade in rice. This study analyzed and compared managerial aspects rather than production/technological aspects among Japanese and Californian rice farmers. In Japan, rice-farming companies are generally expected to supersede many small family farms because of their relative competitiveness. Therefore, we took a novel approach to investigate their relative competitiveness by comparing Japanese rice-farming companies with their international eminent rival, Californian rice farmers.

Our survey covered only six Californian rice farms and is not designed for or amenable to generalizable inferences; a larger survey sample and a more comprehensive questionnaire are needed to support the findings of our study. Nonetheless, the analysis herein suggests that the research methodology of farm management modernization originating from studies in Japan would be worth applying to an international benchmark among competing rice-growing countries/areas such as Japan, California, and Australia (first applied in Kinoshita et al. 2015). Moreover,

the findings from this study may possibly give farmers from surveyed countries/ areas an unprecedented perspective and specific ideas to improve their understanding of management in terms of global competitiveness. Further development of a farm managers' capability is a challenge for increasing competitiveness as well as for generating innovation in Japanese agriculture.

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