

# Identifying Successful Determinants of the Michinoeki in Kyushu Island in Japan

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**Abstract**—This paper examines determinants of Michinoeki, (a roadside rest station in English), in Japan. With 27 years history, the Michinoeki is a well-known typical successful model for revitalization of regional economy now. To our best knowledge, academic studies about Michinoeki have not been published yet. Gathering data from Kyushu Island, this paper investigates the history, and the current state of Michinoeki. Specifically, the manuscript makes a contribution to the literature by developing a framework of Michinoeki and statistically investigating the relationship between (a) two exogenous variables, viz., sales revenue and number of the purchasers visited, and how they are influenced by 11 determinants that include square meters of land space (SMLS), number of the visited cars (NVC), number of the visited large-size cars and trucks (NVLSCT), square meters of parking area (SMPA), total number of the restroom (TNR), square meters of free rest place (SMFRP), seats of the free rest space (SFRS), weekdays' traffic near the station (WTNS), holidays' traffic near the station (HTNS), population of the city located (PCL); total expenses including maintenance cost (TEIMC) have been analyzed using regression analysis. Based on the results of the hypothesis tests, the findings of the study are described and the managerial implications regarding Michinoeki are addressed.

**Keywords**— Michinoeki (Road-side rest station), SMLS, NVC, NVLSCT, revitalization of regional economy, ecosystem, the RBV.

## I. INTRODUCTION

THE main thrust of Abenomics has been on activating regional economic revitalization, which has become a crucial focus of the Japanese government, to spur the overall national economy. One such successful example is the attempt to rejuvenate and develop the value-chain of the natural food and market [1]. Recently Michinoeki, roadside rest stations, have become new commercial areas that have contributed the development of the regional economies.

To our best knowledge, only a few academic studies about Michinoeki have been published [2-4]. To advance knowledge in this area, this paper make a contribution by: (1) introducing a framework of the Michinoeki, 2) collecting empirical data to

test seven hypotheses that seek to validate the determinants, and 3) based on the findings discussing the managerial implications of the Michinoeki.

This paper is structured as follows: Section 2 introduces the history of the Michinoeki and background literature. In section 3, the paper explicates data collection and the estimation of the regression model using specific internal and external variables. Section 4 shows the results and discusses our findings based on regional comparisons and determinants analysis. The conclusions, directions for further research and managerial implications are proffered in the final section.

## II. BACKGROUND

Many researchers have recognized the importance regional areas play in the development of the innovation ecosystem. For example, Storper [5] stressed that regions are the cornerstones of the global economic organization—just as firms, sectors and nations do. Thus, innovative solutions need to be developed to foster regional economic revitalization. Moreover, Cooke and Morgan [6] indicate that the ability of a region to cope with competitiveness challenges increasingly depends on the extent of collaboration between its firms, and the ability of regional governments in supporting such collaboration.

Michinoeki, roadside rest stations, for those driving automobiles and/or trucks to deliver products and services is a special case of a successful model of an innovative ecosystem. These stations have been developed under the support of residents, farms, and local government. They are located along major national highways and provide free parking space, restrooms, and regional and tourist information for automobile drivers and travelers. Therefore, Michinoeki within a specific area serve the three functions of providing rest space for visitors, spreading information, and allying with regional society. Recently, disaster prevention has also become an important consideration of Michinoeki after the 3.11 Tsunami decimated Fukushima and other towns. The Michinoeki concept was originally proposed by Mr. Kazuaki Sakamoto, President of Funagata Firm in Yamaguchi, in 1990 and by January 2017 has 1,107 locations.

## III. VARIABLE SELECTION AND MODEL BUILDING

Conventional corporate strategy theory indicates that internal resources and external environment of firms are considered two important fields in strategy formation. Based on the resource-based view (the RBV), the internal resources should be analyzed and rooted in Value, Rarity, Inimitability, and

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Organization (VRIO) [7, 8]. For instance, rarity could be the selection and display of goods, whereas inimitability could be location and scale. In addition, the hierarchy and the team are characteristics of the organization. In this paper, we selected seven variables as the internal resources and four variables as external environment. Square meters of land space (SMLS), number of the visited cars (NVC), number of the visited large-size cars and trucks (NVLST), square meters of parking area (SMPA), total number of the restroom (TNR), square meters of free rest place (SMFRP), are included as internal resources. In addition, seats of the free rest space (SFRS), weekdays' traffic near the station (WTNS), holidays' traffic near the station (HTNS), population of the city located (PCL), total expenses including maintenance cost (TEIMC) are selected as external factors. This leads to the formation of the following regression equation:

$$y = a_1 SMLS + a_2 NVC + a_3 NVLST + a_4 SMPA + a_5 TNR + a_6 SMFRP + a_7 SFRS + a_8 WTNS + a_9 HTNS + a_{10} PCL + a_{11} TEIMC + \varepsilon \quad (1)$$

where:

- SMLS: square meters of land space
- NVC: number of the visited cars
- NVLST: number of the visited large-size cars and trucks
- SMPA: square meters of parking area
- TNR: total number of the restroom
- SMFRP: square meters of free rest place
- SFRS: seats of the free rest space
- WTNS: weekdays' traffic near the Michinoeki
- HTNS: holidays' traffic near the Michinoeki
- PCL: population of the city located
- TEIMC: total expenses including maintenance cost
- $\varepsilon$  : error term

The data on the endogenous and exogenous variables were extracted from the internal databases and provided by senior administrators of Michinoeki headquarters.

#### IV. HYPOTHESES

Use The SMLS is defined as the size of the land space including houses and gardens. It is one of the indexes to express the scale of the Michinoeki. NVC means the number of the car visited, and NVLST is a special term referred to the large-size car and trucks visited the Michinoeki during the investigation year. Autos, trucks and tourists visit Michinoeki as they provide a designated space for rest and food. Tourists also have a space to rest, but also buy locally made products, as well as vegetables and fruits. Those two factors have close relationship with square meters of parking area (SMPA) total number of the restrooms (TNR), and square meters of free rest places (SMFRP) which

contribute sales revenue of the Michinoeki. Therefore, we suggest the following hypotheses regarding internal resources:

H1: *The SMLS will have strong impact on sales revenue and/or the number of purchasers.*

H2: *The more NVC and NVLST, the higher sales revenue and/or the number of purchasers.*

H3: *By changing the SMPA and TNR, we will increasing sales revenue and/or the number of purchasers.*

H4: *SMFRP and SFRS will positively affect sales revenue and/or the number of purchasers.*

The WTNS and the HTNS express the weekdays' traffic and holidays' traffic near the station respectively. As external variables of the Michinoeki, the local population is also considered as an important determinant of sales revenue.

Furthermore, the total expenses including maintenance cost is the important variable for its sustainability and survival. Therefore, following hypotheses hold:

H5: *WTNS and HTNS will have strong impact on sales revenue and/or the number of purchasers.*

H6: *The greater the PCL, the higher the sales revenue and/or the number of purchasers.*

H7: *Changing the TEIMC, will be associated with increasing sales revenue and/or the number of purchasers.*

#### V. RESULTS AND DISCUSSIONS

We first calculated the relationship between the 11 variables and Sales Revenue and Number of the purchasers, and determine the significant variables using stepwise backward selection method. Additionally, we compared different regions, and common characteristic of all areas.

##### A. Sales Revenue and the Number of Purchasers

The results of Sales Revenue and Number of the purchasers are shown in Table 1.

We iterated the procedure using stepwise backward selection method in order to identify the significant variables. The results of the sales revenue and the number of purchasers are as Fig.1.



Fig. 1 Determinants of Sales Revenue and Number of the Purchasers.

Table 1 Regression Results of the regression models of sales revenue and number of the purchasers.

	Models			
	Sales revenue		Number of the Purchasers	
	Standardized coefficient	Probability	Standardized coefficient	Probability
SMLS	-0.1411*	0.0764	-0.2153**	0.0077
NVC	0.6526**	0	0.6231**	0
NVLSCT	0.1209	0.1638	0.1178	0.1766
SMPA	0.0994	0.1667	0.1034	0.1523
TNR	-0.1564	0.067	-0.063	0.4589
SMFRP	0.141*	0.0489	0.0265	0.7099
SFRS	0.0876	0.204	0.1479*	0.0341
WTNS	-0.2585	0.0819	-0.1181	0.4256
HTNS	0.4768**	0.0017	0.353*	0.0195
PCL	-0.0349	0.6072	-0.0407	0.5506
TEIMC	-0.1056	0.2229	-0.0473	0.5859
Intercept	0	0.6364	0	0.4937
Coefficient of determination		0.63958		0.63660
multiple correlation coefficient		0.79974		0.79787
Adjusted R-square		0.77292		0.77076
Data number		106		106
AIC		1425.03		2771.94
DW ratio		1.8504		1.7271

Note: \*\*  $p < 0.01$ , \*  $p < 0.05$ .

The results reveal that the two models are similar. The value of SMLS is significant with negative value, while NVC and WTNS are significant with positive value in Fig. 1. Based on Fig. 1, H2 and H5 hold, but H1 is not supported because SMLS shows negative relationship with sales revenue and the number of purchasers. The differences between sales revenue and the number of purchasers are: 1) the value of NVLSV, and SMFRP have a positive impact, while TNR has a negative influence on sales revenue, whereas the value SMPA, SFRS and HTNS have strong positive impact on the number of purchasers. Therefore, H2 and H4 holds for sales revenue, and H3, H4 and H5 holds for the number of purchasers. One of the most interesting findings is that the value of SMLS for sales revenue and the number of purchasers and TNR for sales revenue are negative, which are addressed in the next section.

### B. Arear analysis

Finding the common and unique characteristics of different areas is also important. Fig. 2 illustrates the results of Fukuoka and Miyazaki areas.

The determination coefficients of Fukuoka and Miyazaki are 0.99 and 0.84, respectively. Thus, H2 holds because the values of NVC and NVLSCT are positive. This means that the number of autos and large-size vehicles or trucks contribute the sales revenue of Michinoeki in Fukuoka and Miyazaki. WTNS are significant with negative values, and the value of HTNS is positive in Miyazaki. Most of the drivers and passengers buy something on holidays, take a rest or just do window-shopping during weekdays. Compared with Miyazaki, the value of TNR, SERS and PCL are negative significantly. It means that not only the tourists, but also the local residents buy something even their

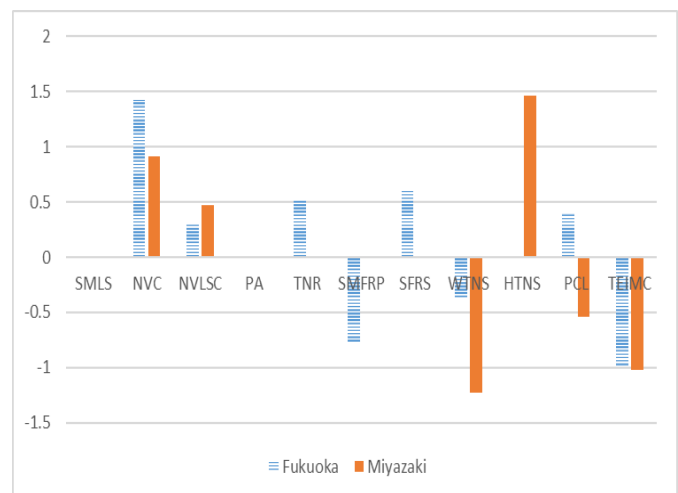


Fig. 2 Determinants of Fukuoka and Miyazaki.

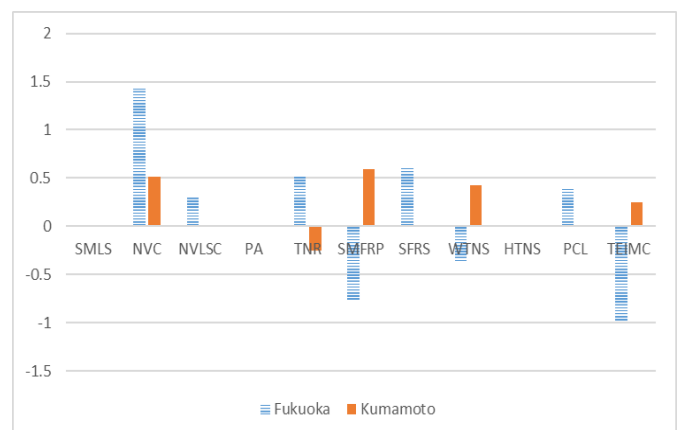


Fig. 3 Determinants of Fukuoka and Kumamoto.

Table 2 Determinants of all areas in Kyushu Island.

	Fukuoka	Saga & Nagasaki	Kumamoto	Oita	Miyazaki	Kagoshima
SMLS						1.0094*
NVC	1.4267**		0.5182**	0.5132**	0.9109**	
NVLSCT	0.3106*				0.4756*	
PA		0.34*				0.5359*
TNR	0.5151*		-0.254*			0.8449*
SMFRP	-0.7722*		0.592**	0.6415**		
SFRS	0.6209**			-0.6007**		
WTNS	-0.3827*		0.4263**	0.4559**	-1.2246**	
HTNS		0.7172**			1.4604**	0.6848*
PCL	0.39**				-0.5359**	-1.5494**
TEIMC	-0.98**		0.251*		-1.023**	-1.4651**

Note: \*\* p<0.01, \* p<0.05.

purpose is just take a rest. Therefore, Michinoeki in Fukuoka are for tourists and local residents while the Michinoeki in Miyazaki have visited mainly by tourists. The values of TEIMC are negative and statistically significant. This suggests that maintenance fees should be allocated accordingly.

The determination coefficient is 0.85 in Kumamoto. The determinants of Fukuoka and Kumamoto regions are shown in Fig 3.

The values of NVC, SMERO, WTNS, and TEIMC are positive. Then H2, H3, H4, H5 and H7 hold. The value of TNR is negative. It means there are enough restroom in Kumamoto. Compared with Fukuoka, it is obvious that the maintenance fee is used effectively because it contributes the sales revenue.

The determination coefficient of Kagoshima is 0.76. Fig. 4 depicts the detailed information of the parameters of each variable.

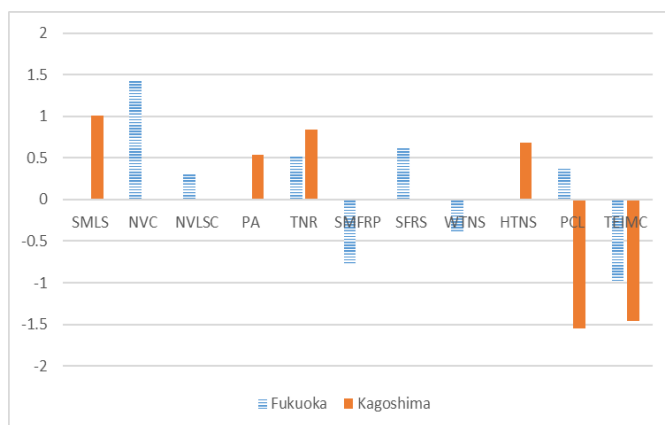


Fig. 4 Determinants of Fukuoka and Kagoshima.

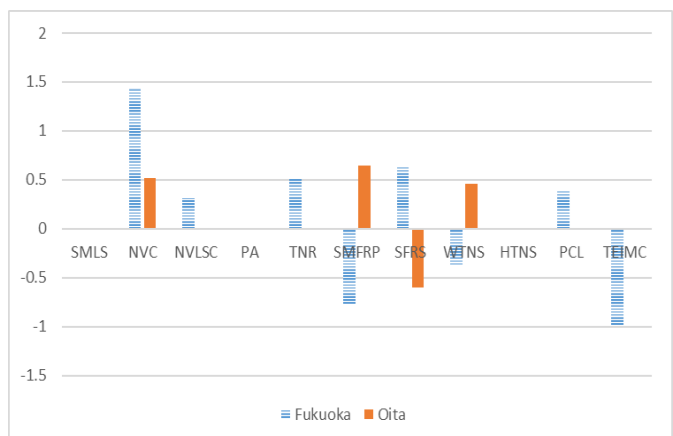


Fig. 5 Determinants of Fukuoka and Oita.

When comparing these results with Fig. 2, we find that Kagoshima is similar with Miyazaki. The value of SMLS, SMPA, TNR, and HTNS are positive while PCL and TEIMC are negative significantly. Therefore, the main contributors of sales revenue are tourists.

The determination coefficient of Oita is 0.89. The detailed results are reported in Fig. 5.

The value of SFRS is negative means the more visitors sitting in rest space, the less sales revenue. H4 does not hold for Oita. Most visitors having a break in Oita just consider Michinoeki as a stopping spot, but not a shopping center.

The determination coefficient of Saka and Nagasaki is 0.76. The value of SMPA and HTNS are positive. Therefore, it is possible to conclude that sales revenue are determined by tourists.

The determinants of all areas is listed in Table 2.

Based on the analysis mentioned above and Table 2, there is

strong to moderate support for all hypotheses except H1 and H7. The sales revenue of Michinoeki do not depend on its scale of land space. Does it mean that the size of all Michinoeki is large enough? To find answers to this question, additional data is required.

Most of the coefficients of TEIMC are negative, which is contrary to our expectation. The maintenance fee will be useful to renew its facilities, and maintain the quality of its services. Thus, additional research is required to explain why negative relationships exist.

## VI. CONCLUSIONS

In this paper, we proposed seven hypotheses for finding effective determinants of the successful Michinoeki. We collected the data from Kyushu area and find that all hypotheses hold except H1 and H7. However, future research and data is required for identifying additional important factors. Furthermore, as internal and external variables are not limited to 11 variables, much more factors, such as assortments, quality, price and services of Michinoeki, should be investigated. In the future, the models tested in this study should be investigated using data drawn from other areas, such as Honshu and Hokkaido, which will allow for comparative research as well as replicating the current findings.

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