Title
Relationship between Entrepreneurial Indicators among Innovation-Driven Economies and Its Implications for Japan

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Relationship between Entrepreneurial Indicators among Innovation-Driven Economies and Its Implications for Japan

Mitsuhide Hoshino

Abstract

This study surveys the relationship between entrepreneurial indicators among innovation-driven economies and its implications for Japan. This study surveys specifically the relationship between Total Entrepreneurial Activity (TEA), which is a key indicator, and other indicators. The results reveal a strong correlation between TEA and the following indicators: perceived capabilities, entrepreneurial intention, know startup entrepreneur rate, media attention, informal investors’ ratio, and discontinuity of business. Weak correlations exist between TEA and the following indicators: perceived opportunities, fear of failure, high status successful entrepreneurship, and entrepreneurship as desirable career. With the exception of perceived capabilities, entrepreneurship related indicators’ contribution to TEA is not efficient in Japan. More efficient utilization of entrepreneurial intention, entrepreneurial network, media attention, and informal investors’ activity could contribute to increasing Japan’s TEA and activating entrepreneurial activity.

Keywords: entrepreneurship, startups, international comparison

JEL classification: L, M
1. Introduction

Based on Hoshino’s study, which utilizes data from the global entrepreneurship monitor (GEM) to survey Japan’s entrepreneurship characteristics in comparison to other innovation-driven economies, this study examines the relationship between entrepreneurial indicators among innovation-driven economies, utilizing the GEM. Specifically, this study reports the correlation coefficient between TEA, which is the most general indicator of entrepreneurial activity, and other indicators of each survey year and the mean of the survey years. This study also graphically presents the relationship between TEA and other indicators, utilizing the mean of the survey years and considers its implications for Japan.

2. Data

The study uses data from the GEM, which is the world’s largest study of entrepreneurial dynamics. The GEM has grown into an association of more than researchers from approximately economies during its year history. The comprised economies. The GEM database provides internationally comparable data beginning in . This database is available free at and provides important international public information. The database indicators encom-

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1 Takahashi et al.

2 I have followed Isobe and Yahagi for its method of graphical presentation and correlation coefficient table presentation.

3 GEM

4 Xavier et al., Global Entrepreneurship Monitor (GEM) Global Report
pass entrepreneurship activity, attitudes, and aspirations. The present study focuses on economies identified as innovation-driven economies, which are updated based on a list in Isobe and Yahagi that many experts have expressed the opinion that international comparison is needed among economies in the same general stage of economic development.

3. Description of TEA

Total entrepreneurial activity is a key indicator signifying the level of entrepreneurial activity by the percentage of the population aged that are either a nascent entrepreneur or owner-manager of a new business.

4. Relationship between TEA and Attitude Related Indicators

Relationship between TEA and Perceived Opportunities

Perceived opportunities signify the percentage of the population aged that identify good opportunities to start a firm in their locality. Table reports that the correlation coefficient is statistically significant neither in nor in the mean of the survey years. This result is

5 All the data sourced from the GEM Database were accessed and downloaded from the GEM homepage in July.

6 GEM classifies economies into three groups by stage of development: factor-driven, efficiency-driven, and innovation-driven, each in sequence representing a more advanced stage.

7 To determine statistical significance, I have referred to Hoel and Siegle.
not consistent with the previous literature. For example, Isobe and Takahashi report that preceding GEM surveys have revealed a close relationship between perceived opportunities and entrepreneurship. Takahashi et al., utilizing large scale microdata of firms, report that the TEA of a group with perceived opportunities is higher than that of a group without perceived opportunities in the US, France, Italy, UK Germany, and Japan. I acknowledge that for these six economies, Takahashi et al.'s results are more convincing because their result is based on the population that perceives opportunities and their sample size is much larger.

Table 1 Correlation Coefficient between TEA and Perceived Opportunities

<table>
<thead>
<tr>
<th>Country</th>
<th>TEA</th>
<th>Perceived Opportunities</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>0.5</td>
<td>0.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Korea</td>
<td>0.7</td>
<td>0.9</td>
<td>0.6</td>
</tr>
<tr>
<td>USA</td>
<td>0.9</td>
<td>0.8</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Note: Boldface means the correlation coefficient is statistically significant at the 0.05 level. Despite the negative figure in the USA, I have used a one sided test, based on the assumption that the alternative to zero correlation would be the positive correlation. Even if a two sided test is used, the same figures would be statistically significant.
than that of this study. Figure depicts the relationship between TEA and perceived opportunities, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that perceived opportunities are not efficiently utilized to contribute to entrepreneurial activity.

### Relationship between TEA and Perceived Capabilities

Perceived capabilities represent the percentage of the population aged who believe they have the required skills and knowledge to start a business. Table reports that the correlation coefficient is statistically significant in of the survey years and in the mean of the survey years. This result is consistent with the previous literature. For example, Isobe and Yahagi report that perceived capabilities are very important for entrepreneurs. Takahashi et al., utilizing large scale microdata, report that the TEA of a group with perceived capabilities is higher than that of a group without perceived opportunities in the US, France, Italy, UK, Germany, and Japan. Figure presents relationship between TEA and perceived capabilities, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies just above the trend line, suggesting that perceived capabilities are efficiently utilized to contribute to entrepreneurial activity.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Mean</td>
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</tr>
</tbody>
</table>

*Note: Boldface means the correlation coefficient is statistically significant at the % level.*
The fear of failure rate signifies the percentage of the population aged 18-65 with positive perceived opportunities who indicate that fear of failure would prevent them from starting a business. Table 1 reports that the correlation coefficient is statistically significant neither in any of the survey years nor in the mean of the survey years. This result is not consistent with the previous literature. For example, Takahashi et al. utilizing large scale microdata of the US, France, Italy, UK, Germany, and Japan. I acknowledge that for these six economies, Takahashi et al’s results are more convincing for the aforementioned reason. Figure 1 depicts the relationship between TEA and fear of failure, utilizing the mean of the survey years. The trend line indicates a negative correlation. Japan’s figure lies below the trend line, suggesting that
given the level of fear of failure, Japan’s entrepreneurial activity is stagnant. For example, although Hong Kong’s fear of failure rate is a bit higher than that of Japan, its TEA is higher than Japan’s. Thus, fear of failure could be a sufficient obstacle for entrepreneurial activity in Japan.

Table 1  Correlation Coefficient between TEA and Fear of Failure

<table>
<thead>
<tr>
<th>Country</th>
<th>TEA 80%</th>
<th>TEA 70%</th>
<th>TEA 60%</th>
<th>TEA 50%</th>
<th>TEA 40%</th>
<th>TEA 30%</th>
<th>TEA 20%</th>
<th>TEA 10%</th>
<th>TEA 0%</th>
<th>Fear of Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: Boldface means the correlation coefficient is statistically significant at the 1% level. Despite positive figures in TEA 70%, TEA 80%, and TEA 60%, I have used a one sided test, based on the assumption that the alternative to zero correlation would be a negative correlation. If a two sided test is used, only the TEA 80% figure would be statistically significant.

**Figure 3. Relationship between TEA and Fear of Failure Rate among Innovation-Driven Economies in the Mean of 2001-2012**

(Note) The line in the diagram is the trend line.

###  Relationship between TEA and Entrepreneurial Intention

Entrepreneurial intention signifies the percentage of the population aged 18-64 excluding individuals involved in any stage of entrepreneurial
activity that intend to start a business within three years. Table reports that the correlation coefficient is statistically significant in % of the survey years and in the mean of the survey years. This result is consistent with the previous literature. For example, Xavier et al. describe entrepreneurial intention as a precedent phase of TEA. Figure depicts the relationship between TEA and entrepreneurial intention, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that entrepreneurial intentions are not efficiently utilized to contribute to entrepreneurial activity.

Table Correlation Coefficient between TEA and Entrepreneurial Intention

| Note | Boldface means the correlation coefficient is statistically significant at the level |

![Figure 4: Relationship between TEA and Entrepreneurial Intention among Innovation-Driven Economies in the Mean of 2002–2012](image-url)
Relationship between TEA and the Know Startup Entrepreneur Rate

The rate of knowing a startup entrepreneur signifies the percentage of the population aged that personally know someone who started a business in the preceding two years. This rate reflects the level of the entrepreneur network. Table reports that the correlation coefficient is statistically significant in of the survey years and in the mean of the survey years. This result is consistent with the previous literature. For exam-

Table Correlation Coefficient between TEA and Know Startup Entrepreneur Rate

|  |  |  |  |  |  |  |  |  |  |  |  | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  |

Note Boldface means the correlation coefficient is statistically significant at the level.
ple, Takahashi et al. ¹ëü³íó, utilizing large scale microdata ³øëúøù, reports that the TEA of a group that personally knows someone who started a business in the preceding two years is higher than that of a group that does not know such a person in the US, France, Italy, UK, Germany, and Japan. Figure ³depicts the relationship between TEA and know startup entrepreneur rate, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that the entrepreneurial network level does not efficiently contribute to entrepreneurial activity.

³ëü. Relationship between TEA and High Status Successful Entrepreneurship

A perceived high status of successful entrepreneurship signifies the percentage of the population aged øýû who agree with the statement that in their country, successful entrepreneurs enjoy high status. Table ³reports that the correlation coefficient is statistically significant neither in any survey year nor in the mean of the survey years. Previous researches have not addressed this correlation among innovation-driven economies. Figure ³depicts the relationship between TEA and high status successful entrepreneurship, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that the perception of a high status of successful entrepreneurship does not efficiently contribute to entrepreneurial activity. In other words, given the level of perceived high status of successful entrepreneurship, Japan’s entrepreneurial activity is stagnant. For example, although the Czech Republic’s level of perceived high status of successful entrepreneurship is lower than that of Japan, its TEA is much higher than Japan’s.
Relationship between Entrepreneurial Indicators among Innovation-Driven Economies and Its Implications for Japan

Table 2  Correlation Coefficient between TEA and High Status Successful Entrepreneurship

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th></th>
<th>Mean</th>
<th></th>
<th>Mean</th>
<th></th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Note: Since boldface means the correlation coefficient is statistically significant at the 5% level, no figure is statistically significant.

Figure 6 Relationship between TEA and High Status Successful Entrepreneurship among Innovation-Driven Economies in the Mean of 2003–2012

(Note) The line in the diagram is the trend line.

Relationship between TEA and Entrepreneurship as Desirable Career

The perception of entrepreneurship as a desirable career choice signifies the percentage of the population aged 15–64 who agree with the statement that in their country, most people consider starting a business as a desirable career choice. Table 2 reports that the correlation coefficient is statistically significant neither in any of the survey years nor in the mean of the survey years. Previous researches have not addressed this correlation.
among innovation-driven economies. Figure 7 depicts the relationship between TEA and entrepreneurship as desirable career, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that perceiving entrepreneurship as a desirable career does not efficiently contribute to entrepreneurial activity. That is, given the level of Entrepreneurship as Desirable Career, Japan’s entrepreneurial activity is stagnant.

Table 7 Correlation Coefficient between TEA and Entrepreneurship as Desirable Career

<table>
<thead>
<tr>
<th>Country</th>
<th>TEA</th>
<th>Entrepreneurship as Desirable Career</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>0.5</td>
<td>0.3</td>
</tr>
<tr>
<td>USA</td>
<td>0.8</td>
<td>0.7</td>
</tr>
<tr>
<td>France</td>
<td>0.6</td>
<td>0.5</td>
</tr>
<tr>
<td>Italy</td>
<td>0.4</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Note: Boldface means the correlation coefficient is statistically significant at the 0.05 level.

(Note) The line in the diagram is the trend line.


 Relationship between TEA and Media Attention for Entrepreneurship

Media attention for entrepreneurship signifies the percentage of the population aged 26--49 who agree with the statement that in their country, one often sees stories in the media about successful new businesses. Table 3 reports that the correlation coefficient is statistically significant in 9% of the survey years and in the mean of the survey years. Previous researches have not addressed this correlation among innovation-driven economies. Figure 8 depicts the relationship between TEA and media attention for en-

Table 3 Correlation Coefficient between TEA and Media Attention for Entrepreneurship

<table>
<thead>
<tr>
<th>TEA</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Boldface means the correlation coefficient is statistically significant at the 9% level.
entrepreneurship, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that media attention for entrepreneurship does not efficiently contribute to entrepreneurial activity. In other words, given the level of media attention for entrepreneurship, Japan’s entrepreneurial activity is stagnant.

5. Relationship between TEA and Activity Related Indicators

Informal Investors Rate

The informal investors rate signifies the percentage of the population aged 16–64 that have personally provided funds for a new business started by someone else in the preceding three years. Table reports that the correlation coefficient is statistically significant in % of the survey years and in the mean of the survey years, suggesting that funds availability could contribute to entrepreneurial activity. This result is consistent with the previous literature. For example, Isobe and Yahagi find a strong positive correlation between TEA and the informal investors rate. Figure depicts the relationship between TEA and informal investors rate, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that informal investors’ activity does

<table>
<thead>
<tr>
<th>Table</th>
<th>Correlation Coefficient between TEA and Informal Investors Rate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Boldface means the correlation coefficient is statistically significant at the % level.
not efficiently contribute to entrepreneurial activity.

Discontinuity of Business

Figure 9 depicts the relationship between TEA and discontinuity of business in Japan. The correlation coefficient is significant at the 9% level, suggesting that more active entrepreneurial activity tends to cause more discontinuity of business. This result is consistent with the previous literature. For example, Honjo finds a tendency for industries experiencing active entrepreneurial activity to have many business discontinuities. The trend line indicates positive correlation. Japan’s figure lies below the trend line, suggesting that given the rate of business discontinuity, Japan’s entrepreneurial activity is stagnant.

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9 Isobe and Yahagi
6. Summary and Conclusions

Table 6 summarizes the statistical significance of the correlation coefficient between TEA and other entrepreneurial related indicators.

Table 6 Summary of Statistical Significance of Correlation Coefficient between TEA and Other Entrepreneurial Related Indicators

<table>
<thead>
<tr>
<th>Indicators</th>
<th>% of statistical significance of the survey years</th>
<th>Statistical significance of the mean of the all survey years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Related Indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Opportunities</td>
<td>□□%</td>
<td>No</td>
</tr>
<tr>
<td>Perceived Capabilities</td>
<td>□□%</td>
<td>Yes</td>
</tr>
<tr>
<td>Fear of Failure</td>
<td>□□%</td>
<td>No</td>
</tr>
<tr>
<td>Entrepreneurial Intention</td>
<td>□□%</td>
<td>Yes</td>
</tr>
<tr>
<td>Know Startup Entrepreneur Rate</td>
<td>□□%</td>
<td>Yes</td>
</tr>
<tr>
<td>High Status Successful Entrepreneurship</td>
<td>□□%</td>
<td>No</td>
</tr>
<tr>
<td>Entrepreneurship as Desirable Career</td>
<td>□□%</td>
<td>No</td>
</tr>
<tr>
<td>Media Attention for Entrepreneurship</td>
<td>□□%</td>
<td>Yes</td>
</tr>
<tr>
<td>Activity Related Indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informal Investors Ratio</td>
<td>□□%</td>
<td>Yes</td>
</tr>
<tr>
<td>Discontinuity of Business</td>
<td>□□%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

(Note) The line in the diagram is the trend line. Figures for Greece and Israel and those for France and Belgium are exactly the same.
A strong correlation exists between TEA and the following indicators: perceived capabilities, entrepreneurial intention, know startup entrepreneur rate, media attention informal investors’ ratio, and discontinuity of business. A weak correlation exists between TEA and the following indicators: perceived opportunities, fear of failure, high status successful entrepreneurship, and entrepreneurship as desirable career.

**Table 1 Summary of Entrepreneurship Related Indicators’ Contribution to Japan’s TEA**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Contribution to TEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Related Indicators</td>
<td></td>
</tr>
<tr>
<td>Perceived Opportunities</td>
<td>Not efficient</td>
</tr>
<tr>
<td>Perceived Capabilities</td>
<td>Basically efficient</td>
</tr>
<tr>
<td>Fear of Failure</td>
<td>Sufficient obstacle</td>
</tr>
<tr>
<td>Entrepreneurial Intention</td>
<td>Not efficient</td>
</tr>
<tr>
<td>Know Startup Entrepreneur Rate</td>
<td>Not efficient</td>
</tr>
<tr>
<td>High Status Successful Entrepreneurship</td>
<td>Not efficient</td>
</tr>
<tr>
<td>Entrepreneurship as Desirable Career</td>
<td>Not efficient</td>
</tr>
<tr>
<td>Media Attention for Entrepreneurship</td>
<td>Not efficient</td>
</tr>
<tr>
<td>Activity Related Indicators</td>
<td></td>
</tr>
<tr>
<td>Informal Investors Ratio</td>
<td>Not efficient</td>
</tr>
<tr>
<td>Discontinuity of Business</td>
<td>Relatively low TEA</td>
</tr>
</tbody>
</table>

With the exception of perceived capabilities, given the level of other indicators, Japan’s TEA is low. That is, entrepreneurship related indicators’ contribution to TEA is not efficient. Fear of failure may thus be a sufficient obstacle. However, we must acknowledge that Takahashi et al’s conflicting results for perceived opportunities and know startup entrepreneur rate is more convincing for the same reason. The inefficient utilization of other factors could explain Japan’s low TEA. That is, if these factors were used more efficiently, Japan’s TEA would be higher.

The results of Tables 1 and 2 suggest that more efficient utilization of entrepreneurial intention, entrepreneurial network, media attention, and informal investors’ activity could efficiently contribute to increasing Japan’s
TEA and activating entrepreneurial activity.

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