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The relationship between entrepreneurial orientation, environmental factors, and manufacturing capability using House of Quality

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ABSTRACT

The purpose of this research is to assess the alignment between environmental factors, manufacturing capabilities, and entrepreneurial orientation in manufacturing SMEs by applying two House of Quality (HOQ) methods. This study used 200 manufacturing SMEs as samples taken in Padang City. The data collection method in this study is a questionnaire. Based on data measurement using HOQ, the innovative dimension has the largest relative weight with a value of 0.236. This indicates that manufacturing SMEs need to prioritize the innovative dimension of entrepreneurial orientation to be able to increase the value of their manufacturing capabilities, which is a strategy for dealing with uncertain environmental conditions.

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INTRODUCTION

Small and Medium Enterprises (SMEs) are one of the sectors that play a major role in the economy. SMEs in aggregate have a large role in the economy, but this is not followed by the ability to adapt to changes in the dynamic business environment. This can be seen through the significant decline in SMEs after the pandemic occurred in Indonesia, especially in the city of Padang. Based on this, in order to remain able to face these conditions, SMEs are required to implement strategies that can adapt to environmental dynamics, turbulence, and fast changes in the business environment (Stalk et al., 1992; Wang & Cao, 2008). In previous studies, it was said that manufacturing capability is influenced by the identification of environmental factors (Wheelwright, 1984), which encourages owners and managers of manufacturing SMEs to be able to design strategies that can improve manufacturing capability through the identification of the environmental factors they face.

Manufacturing capability (MC) has been considered a form of competitive advantage by a company (Wheelwright, 1984). MC refers to the actual strength of manufacturers in the face of competitors (Swink et al., 2007). The suitability between environmental factors and the selection of the focus on the capability dimension can lead to better business conditions. In addition to manufacturing capabilities, another factor that needs to be considered is entrepreneurial orientation (EO), and in previous research,

MC has shown that it can be influenced by entrepreneurial orientation, which is a multidimensional construct (Covin & Slevin, 1991).

Entrepreneurial orientation (EO) is a design strategy that provides companies with a basis for making entrepreneurial decisions and actions (Lumpkin & Dess, 1996). The entrepreneurial orientation dimension has been recognized in the operations management literature as an attribute that can support companies in dealing with changes in the business environment, as in a number of studies showing that the dimensions of risk tolerance, innovation, and proactivity can help companies respond to market opportunities because they can support the development of a manufacturing capability focus to meet rapidly changing consumer needs (Giunipero et al., 2005).

To find an appropriate manufacturing capability strategy, it is necessary to align environmental factors, manufacturing capabilities, and entrepreneurial orientation so that the owner or manager of manufacturing SMEs can obtain a large alignment value so that they can design a strategy that is appropriate to uncertain environmental conditions and what entrepreneurial orientation is most suitable to support implementation of the strategy. Previous studies have shown that EO can support the development of manufacturing capabilities and drive the strategic objectives of SME manufacturing focus, where it was found that the EO dimension encourages the implementation of a quality focus strategy, flexible response, and manufacturing competitive pricing from manufacturing companies (Chavez et al., 2017).

To be able to measure the alignment of the dimensions of EF with MC and MC with EO, we need a tool that can measure the correlation between these dimensions. One easy-to-use tool is the House of Quality (HOQ) matrix from Quality Functional Deployment (QFD), where these two tools are commonly used in new product development to translate consumer needs (what) into appropriate product features (how).The House of Quality matrix can be used to translate and align each variable dimension perfectly compared to other statistical methods (Bottani, 2009), so it is very suitable for assessing alignment. Few literature studies have examined the relationship between environmental factors (EF) and the level of entrepreneurial orientation (EO) on manufacturing capability (MC) in SMEs, motivating researchers to see the relationship and harmony between these factors. Therefore, following Bottani (2009) guidelines, this study applies two HOQ matrix approaches to relate environmental factors, manufacturing capabilities, and entrepreneurial orientation to a number of manufacturing SMEs in Padang City.

LITERATURE REVIEW

Environmental factor

Environmental factors refer to the level of changes in the company's environment, such as technological changes and market uncertainty (Dess & Beard, 1984), which will form the basis of the company's strategy through managers' perceptions of environmental uncertainty (Mishra et al., 2014). Companies that are in conditions of high environmental uncertainty will face a lot of risk and variability, which can have a positive or negative impact on the company (Fayezi et al., 2017). Environmental factor measurement consists of three indicators proposed by (Jaworski & Kohli, 1993):

1. Market turbulence
   Market turbulence assesses the extent to which an organization's composition and customer preferences tend to change over time
2. Technological turbulence
   Technological turbulence taps the degree to which technology is in an industry in a state of flux
3. The intensity of competition
   Competitive intensity assesses competitors' behavior, resources, and ability to differentiate

Manufacturing capability

Capabilities are defined as a set of decisions and practices that encompass operational structures and infrastructure (Wheelwright, 1984). Manufacturing capability refers to the real competitive strength of manufacturing, especially in facing competitors (Swink et al., 2007). In the operations management literature, there are several core dimensions of manufacturing capability put forward by Jacobs et al., (2007) and Swink et al., (2007), namely as follows:

1. Quality
   Quality has been considered one of the keys to helping companies gain trust. Quality in manufacturing is generally described as the level of a product that meets manufacturing specifications.
2. Shipping/delivery
   Delivery is a time-based performance construct that is defined as a company's capability to deliver products at a predetermined time.
3. Flexibility
   Flexibility is the capability to adapt and respond to changes in production activities such as changes in production volume as well as changes due to new products.
4. Costs
   Costs in manufacturing are defined as low costs incurred for the production of products or services at prices that are acceptable in the market

Entrepreneurial orientation

Entrepreneurial orientation is a concept that refers to the strategies, practices, and decision-making styles used by entrepreneurs in conveying their entrepreneurship (Lumpkin and Dess 1996) There are five that have been put forward by Lumpkin & Dess, (1996):

1. Proactive
   Proactivity is an initiative to anticipate and pursue new opportunities related to future demands.
2. Innovation
   Innovation refers to a company's tendency to engage in new ideas and creative processes that can lead to the development of existing products as well as the development of new products.
3. Risk-taking
   Risk-taking refers to a company's readiness to venture into unknown territory.
4. Autonomy
   Referring to independent actions or individual or team initiatives aimed at giving birth to business concepts and visions that will lead to improvement without experiencing constraints from the company.
5. Competitive aggressiveness
   Competitive aggressiveness refers to efforts to outperform competitors, this is characterized by an aggressive attitude aimed at increasing position or competitive advantage in the market.

Alignment of environmental factors, manufacturing capabilities, and entrepreneurial orientation

Alignment of environmental factors and manufacturing capabilities. The role of competition has changed over time on an ongoing basis. In order to remain capable of facing competition, companies are required to change their strategy so that they can adapt to turbulence and fast changes in the business environment (Stalk et al., 1992; Wang & Cao, 2008). Manufacturing capability has been considered a source of a company's competitive advantage. This manufacturing capability refers to the actual strength of manufacturing in the face of major competitors. A number of studies have shown that the identification of

environmental conditions will affect a company's manufacturing capabilities (Swink et al., 2007; Wheelwright, 1984), so that an analysis of environmental harmony with manufacturing will become the basis for designing what strategies are suitable for dealing with uncertain environmental conditions.

Alignment of manufacturing capabilities and entrepreneurial orientation In a number of literatures, entrepreneurial orientation (EO) has become a central construct in the entrepreneurial literature. EO refers to the processes and methods used in acting entrepreneurially (Rauch et al., 2009). Entrepreneurial characteristics have an important role in helping companies improve manufacturing competence and develop capabilities such as flexibility, agility, quality, and efficiency (Handfield et al., 2009). Entrepreneurial dimensions such as risk tolerance, innovation, and proactivity can help companies respond to market opportunities by developing manufacturing capabilities to meet rapidly changing needs (Giunipero et al., 2005). Entrepreneurial actions drive strategic goals and facilitate enterprise and technology development processes through which specific capabilities can be built (Covin & Lumpkin, 2011; Ojha et al., 2016; Rosenbusch et al., 2013). Thus, it can be argued that EO supports a company's strategic goals (e.g., quality focus, flexible response, competitive pricing) and supports the development of the means by which manufacturing capabilities are built to achieve those goals.

Research Model

The following is a model for assessing the alignment of environmental factors, manufacturing capabilities and entrepreneurial orientation using HOQ1 and HOQ2:

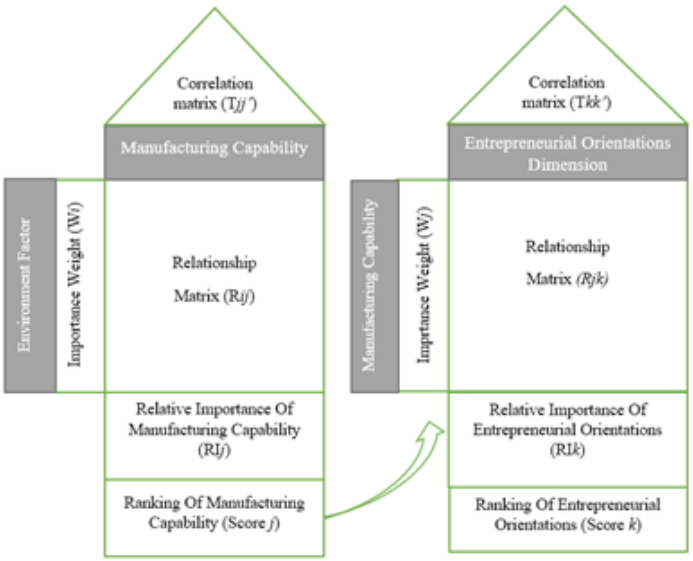

Figure 1. Model of Two House of Quality

METHOD

The study employs an explanatory sequential mixed method design to align MC with environmental factor and entrepreneurial orientation. Researchers try to align the relationship that is created between the dimensions of environmental factors, manufacturing capabilities, and entrepreneurial orientation that are adapted to the conditions of SMEs in the city of Padang, which aims to provide knowledge to SME businessmen about how important each of these dimensions is in the business activities they carry out and make business people know what variable dimensions need to be prioritized in dealing with uncertain environmental conditions.

The population of this study is 200 SMEs in the city of Padang who are engaged in manufacturing. The sampling technique was carried out using purposive sampling. Collecting data using a questionnaire with a Likert scale and Rating scale. The sampling technique in this study used a purposive sampling method, namely a sampling technique with certain considerations.

The data used in this study were obtained through primary data. Primary data was obtained directly by distributing questionnaires to SMEs in the city of Padang which contained answers about environmental factors, entrepreneurial orientation and manufacturing capabilities. To test the attributes of this study statement using the face validity and to test the validity and reliability of this study using the SPSS 16.

The data analysis technique used to process primary data obtained from distributing questionnaires to a number of SMEs in the city of Padang was carried out using two HOQs (Bottani, 2009), namely as follows:

1. Identify input variables for HOQ1 and HOQ2.
   The first step is to obtain input variables from the literature. Indicators of environmental factors, competitive intensity, technological turbulence, and market turbulence are aligned with the four indicators of manufacturing capability, quality, delivery, production quality, and cost variables in HOQ1. Furthermore, HOQ2 aligns manufacturing capability variables with entrepreneurial, proactive, innovative orientation, competitive aggressiveness, risk-taking, and autonomy.
2. Assign the value of the attribute statement of interest according to the Likert scale value of 1 to 5 in assessing the weight of interest in HOQ1.
3. Determine the value statement of the strength of the relationship between environmental factors and manufacturing capabilities according to the rating scales 1, 3, and 9 in assessing the strength of the relationship between variable dimensions in HOQ1.
4. Developing the House of Quality 1 (HOQ1) matrix
   The following are the steps for developing HOQ1:
   a) Perform an assessment of the importance weight of each attribute of the Environmental Factor (EF) and Manufacturing Capability (MC) dimension statements by using the following equation:

$$X = \frac{\text{(total attribute value of each statement)}}{\text{(number of statement attributes} \times \text{number of respondents)}}$$

   b) After obtaining the average value of each statement of interest in the dimensions of environmental factors and manufacturing capabilities, in order to be able to determine the normal value of each dimension, it is necessary to normalize the average results of each dimension. Normalization is calculated from the average value of the dimensions divided by the total average dimensions, by using the following equation:

$$\text{Normalization} = \frac{\text{dimension average}}{\text{total dimension average values}}$$

   c) Correlate between environmental factors and manufacturing capabilities by multiplying the weight of the importance of capabilities by the strength of the relationship between environmental factors and manufacturing capabilities, by using the following equation:

$$Ri_j = Ri \times T_{jj\ j=1,\ \ldots,\ m,}$$

Note: Ri is the strength of the relationship between environmental factors and manufacturing capability obtained from the respondents, and T_(jj j = 1,...,m) is the importance weighted value of each dimension of manufacturing capability that has been obtained.

d) After determining the correlation value between environmental factors and manufacturing capabilities, do the calculations to get the relative weight values of the dimensions of environmental factors and manufacturing capabilities. To obtain the relative weight value, do the calculation by multiplying the correlation value with the environmental factor importance weight that has been obtained, by using the following equation:

$$RI_j = \sum_{i=1}^{n} w_i \times R_{ij\ j=1,\ \ldots,\ m,}$$

Note: wi is the importance weight of the i-th environmental factor, and Rij is the correlation value between manufacturing capability and the i-th environmental factor.

e) Normalize the RI_j results in order to obtain normal values that can be used to view dimension ratings.

5. Developing a House of Quality 2 (HOQ2) Matrix

The following are the steps for developing HOQ2:

a) Use the value of the relative weight of manufacturing capability that has been normalized into a dimension that will be aligned with an entrepreneurial orientation.

b) Perform an assessment of the importance and weight of each attribute of the entrepreneurial orientation dimension statement. To be able to find out the weighted value of importance in each dimension of entrepreneurial orientation, it is necessary to determine the average value of each dimension obtained from the sum of the total attribute values of the statements divided by the number of attribute statements and then multiplied by the number of respondents, by using the following equation:

$$X = \frac{\text{total attribute values for each statement}}{\text{number of statement attributes} \times \text{jumber of respondents}}$$

c) After obtaining the average value of each statement of interest in the entrepreneurial orientation dimension, in order to be able to determine the normal value of each dimension, it is necessary to normalize the average results of each dimension. Normalization is calculated from the average value of the dimensions divided by the total average dimensions.

d) Perform a correlation between manufacturing capability and entrepreneurial orientation so that the alignment can be seen by multiplying the weight of the importance of entrepreneurial orientation by the strength of the relationship between manufacturing capability and entrepreneurial orientation which is formulated as follows:

$$Rj_k = Rj \times T_{kk\ k=1,\ \ldots,\ m,}$$

Note: Rj is the strength of the relationship between manufacturing capability and entrepreneurial orientation obtained from respondents and T_(kk k=1,...,m,) is the importance weight value of each dimension of entrepreneurial orientation that has been obtained

e) After the correlation value between manufacturing capability and entrepreneurial orientation, then do the calculations to get the relative weight values between the

dimensions of manufacturing capability and entrepreneurial orientation in order to obtain alignment. To obtain the relative weight value, do the calculation by multiplying the correlation value with the weight of the importance of entrepreneurial orientation that has been obtained which can be formulated as follows:

$$RI_k = \sum_{j=1}^{m} \omega_j \times R_{jk} \quad k=1,...,p$$

f) Normalize the RI_k results, in order to obtain normal values that can be used to view dimension ratings.

RESULTS AND DISCUSSION

Descriptive analysis

The results of the calculation of the frequency distribution to measure environmental factors with three dimensions and 15 statement attributes obtained an average accumulated score of 3.56 and a TCR of 71.2%, so it can be concluded that the achievement of environmental factor respondents in SMEs in Padang City can be categorized as sufficient. The frequency distribution to measure manufacturing capability with four dimensions and 17 attribute statements obtained an average accumulated score of 4.06 and a TCR of 81.8%, so it can be concluded that the performance of respondents on manufacturing capability in SMEs in Padang City can be categorized as high. The results of the calculation of the frequency distribution to measure entrepreneurial orientation with five dimensions and 17 statement attributes obtained an accumulated average score of 3.60 and a TCR of 72.1%, so it can be concluded that the achievement of respondents with entrepreneurial orientation in SMEs in the city of Padang can be categorized as sufficient.

Instrument test

The validity test was carried out to find out whether or not the questionnaires were distributed correctly and to find out whether there were questions on the questionnaire that deviated or had to be discarded because they were deemed irrelevant. The purpose of the validity test is to determine the accuracy of each element of the tool. Table 1 shows the results of environmental factors validity.

Table 1. Environmental Factor Validity

Attribute Code	R table	R	Description
X1.1	0.138	0.486	Valid
X1.2	0.138	0.620	Valid
X1.3	0.138	0.687	Valid
X1.4	0.138	0.529	Valid
X1.5	0.138	0.657	Valid
X1.6	0.138	0.621	Valid
X1.7	0.138	0.605	Valid
X1.8	0.138	0.658	Valid
X1.9	0.138	0.545	Valid
X1.10	0.138	0.624	Valid
X1.11	0.138	0.387	Valid

Attribute Code	R table	R	Description
X1.12	0.138	0.681	Valid
X1.13	0.138	0.570	Valid
X1.14	0.138	0.580	Valid
X1.15	0.138	0.334	Valid

Source: Primary Data, 2023

Table 2 shows the results of manufacturing capability validity:

Table 2. Manufacturing Capability Validity

Attribute Code	R table	R	Description
X2.1	0.138	0.229	Valid
X2.2	0.138	0.430	Valid
X2.3	0.138	0.390	Valid
X2.4	0.138	0.520	Valid
X2.5	0.138	0.317	Valid
X2.6	0.138	0.492	Valid
X2.7	0.138	0.463	Valid
X2.8	0.138	0.399	Valid
X2.9	0.138	0.607	Valid
X2.10	0.138	0.660	Valid
X2.11	0.138	0.558	Valid
X2.12	0.138	0.683	Valid
X2.13	0.138	0.715	Valid
X2.14	0.138	0.593	Valid
X2.15	0.138	0.582	Valid
X2.16	0.138	0.548	Valid
X2.17	0.138	0.520	Valid

Source: Primary Data, 2023

Table 3 shows the results of entrepreneurial orientation validity.

Table 3. Entrepreneurial Orientation Validity

Attribute Code	R table	R	Description
X3.1	0.138	0.516	Valid
X3.2	0.138	0.646	Valid
X3.3	0.138	0.650	Valid
X3.4	0.138	0.548	Valid
X3.5	0.138	0.556	Valid
X3.6	0.138	0.727	Valid
X3.7	0.138	0.702	Valid
X3.8	0.138	0.712	Valid

Attribute Code	R table	R	Description
X3.9	0.138	0.637	Valid
X3.10	0.138	0.661	Valid
X3.11	0.138	0.597	Valid
X3.12	0.138	0.636	Valid
X3.13	0.138	0.691	Valid
X3.14	0.138	0.634	Valid
X3.15	0.138	0.725	Valid
X3.16	0.138	0.721	Valid
X3.17	0.138	0.648	Valid

Source: Primary Data, 2023

The number of samples taken was 200 respondents using IBM SPSS Statistics 16. The validity results using SPSS 16 show that all the dimensional attributes in this study are valid. The basis for decision making in the reliability test is if the value of Cronbach's Alpha > r table then the questionnaire is declared reliable and if the Cronbach's Alpha value is <r table then the questionnaire is declared not reliable. Table 4 shows the results reliability test.

Table 4. Reliability Test

Attribute	Cronbach's alpha	N of Item	Description
Environmental factor	0,850	15	Reliable
Manufacturing capability	0,834	17	Reliable
Entrepreneurial orientation	0,909	17	Reliable

Source: Primary Data, 2023

The results of reliability testing on environmental factors, capabilities, manufacturing show that all attributes in this study are reliable.

Analysis house of quality

The following is an assessment table of the alignment of the relationship between environmental factors and manufacturing capabilities as follows:

Table 5. House of Quality 1

Dimension	Weight	PQ	D	F	C
Competition Intensity	0.319	2.088	1.456	1.337	1.426
Market Turbulence	0.353	1.648	1.266	1.253	1.282
Technology Turbulence	0.329	1.694	1.370	1.278	1.328
Relative Weight		1.803	1.361	1.288	1.343
Normalization		0.311	0.235	0.222	0.232

Note: PQ= Product Quality, D=Delivery, F=Flexibility, C=Cost

It is known that alignment between the dimensions of environmental factors consisting of competition intensity, market conditions and technological changes with the manufacturing capability dimensions which include production quality, delivery, production flexibility and cost. The alignment of each of these dimensions shows that the relative weight of production quality is the largest on each dimension of

environmental factors, in which it can be concluded that in the face of intense competition, market turbulence and technological turbulence, the SME owner/manager can prioritize product quality strategies. whose relative weight value is 0.311.

The following is an assessment table of the alignment of the relationship between manufacturing capability and entrepreneurial orientation as follows:

Table 6. House of Quality 2

Dimension	Weight	I	RT	P	AC	O
Product Quality	0.311	1.418	1.383	1.275	0.821	1.168
Delivery	0.235	1.188	0.995	1.042	0.686	0.950
Flexibility	0.222	1.261	1.188	1.204	0.711	1.115
Cost	0.232	1.400	1.319	1.286	0.809	1.117
Relative Weight		1.325	1.234	1.207	0.762	1.093
Normalization		0.236	0.220	0.215	0.136	0.195

Note: I= Innovative, RT= Risk Taking, P= Proactive, AC= Aggressive in Competing, O= Otonomy

It is known that the level of alignment between the dimensions of manufacturing capability which consists of production quality, delivery, production flexibility and cost with an entrepreneurial orientation which includes innovation, risk taking, proactive, aggressive in competing and autonomy. The alignment of each of these dimensions shows that the relative weight of innovative is the greatest on each dimension of manufacturing capability, where it can be concluded that in supporting product quality, delivery, flexibility and cost strategies, SME owners/managers can prioritize the development of innovative entrepreneurial orientation dimensions that can supports the implementation of various manufacturing capability strategies with a relative weight value of 0.236.

Alignment between environmental factors and manufacturing capability in manufacturing SMEs

The main purpose of using House of Quality 1 (HOQ1) is to assess the alignment of environmental factors and manufacturing capabilities in manufacturing SMEs so that, through the assessment carried out, it can be seen directly the suitability between environmental uncertainty conditions and the manufacturing capability strategy and it can be determined what dimensions need to be prioritized by the owner or manager of the manufacturing SMEs. Assessment of the alignment of the relationship between environmental factors and manufacturing capabilities as measured in HOQ1 obtained the results that the largest relative weight is product quality with a relative weight value of 0.311, followed by delivery at 0.235, cost at 0.232, and flexibility at 0.222. So it can be concluded that in the face of intensity competition, market turbulence, and technology turbulence, SME owners and managers can prioritize product quality strategies that have the most suitable correlation values in various conditions of environmental uncertainty and have the largest relative weight compared to other manufacturing capability dimensions.

This is consistent with previous research, which explains that in an uncertain environment, a product quality strategy is a consistent and appropriate strategy to use because it produces a competitive advantage (Covin et al., 2000).The purpose of this section is to state your findings and make an interpretation and/or opinions, *explain* the implications of your findings, and make suggestions for future research. Its main function is to answer the questions posed in the Introduction, explain how the results support the answers and, how the answers fit in with existing knowledge on the topic. The Discussion is considered the heart of the paper and usually requires several writing attempts.

Alignment between manufacturing capability environmental factors with entrepreneurial orientation in manufacturing SMEs

Assessment of the alignment of the relationship between manufacturing capability and the orientation measured in HOQ2 results obtained that the largest relative weight is innovative with a relative weight value of 0.236, then followed by risk taking 0.220, proactive 0.215, autonomy 0.196 and the lowest is aggressive in competing with a value of 0.136, it can be concluded that the innovative dimension occupies the first position in supporting the strategy of manufacturing capability, so that owners/managers of manufacturing SMEs can prioritize the development of innovative approaches from the entrepreneurial orientation dimension which based on the alignment assessment in HOQ2 shows the largest relative weight value of 0.236. This finding is in line with previous studies that show that companies with a high level of innovative orientation are able to support corporate strategies in dealing with environmental uncertainty by predicting future market conditions, exploiting opportunities that arise in the market, and utilizing the information obtained (Chang et al., 2007; Mishra & Mishra, 2019). In addition, the innovative orientation dimension also influences how SMEs respond to uncertain environmental changes, where the innovative dimension helps in using intuition and experience to make the best choice of several existing alternatives in response to emerging environmental changes (Kandemir & Acur, 2012).

Risk taking occupies the second position in supporting the manufacturing capability strategy through boldness in exploring risky territory to support the manufacturing capability strategy in terms of products, processes, and technology. This finding is in line with previous studies, which explain that companies in an environment of environmental uncertainty tend to invest in market segments that have not been explored and develop product variations and new products quickly (Hsu et al., 2011). Proactive occupies the third position in supporting manufacturing capability strategies through a proactive approach to developing capability strategies, such as applying various techniques, tools, and practices that can support SME's manufacturing capability strategies. This is in line with previous studies, which suggest companies proactively apply various tools, techniques, and practices, such as module design for manufacturing and process control for capabilities (Chang et al., 2007; Hsu et al., 2011). Autonomy occupies the fourth position in supporting the manufacturing capability strategy, where the autonomy approach relates to decision-making in the manufacturing capability strategy, but this has a relatively low weight value compared to other entrepreneurial orientation dimensions. In line with previous studies that state that companies with a high degree of autonomy can facilitate product development through independent planning, decision-making, and implementation of decisions (Mishra et al., 2016). Aggressive in Competing occupies the last position, fifth, in supporting manufacturing capability strategy, where an aggressive approach to competing is not suitable for supporting SME manufacturing capability strategy because it has the lowest relative weight value and its application is not suitable for manufacturing SMEs. This is in line with previous studies, which explained that aggressive competition causes companies to spend a lot of money on market expansion in terms of product lines and consumers (Chang et al., 2007).

CONCLUSION

Based on the weighted assessment of the importance of environmental factors and manufacturing capability in House of Quality 1, the results show that the owners and managers of manufacturing SMEs consider that the dimensions of market turbulence from environmental factors and product quality dimensions from manufacturing capabilities are the most important dimensions. In the assessment of the alignment between environmental factors and manufacturing capabilities, correlation results were obtained, showing that the product quality dimension of manufacturing capability can be an appropriate strategy for use in various environmental factors because it has the highest correlation value in each dimension of environmental factors and has the largest relative weight of 0.311. In House of Quality 2,

which assessed the alignment of manufacturing capabilities in HOQ1 with entrepreneurial orientation, the results showed that the innovative dimension of entrepreneurial orientation was considered to be the most important entrepreneurial spirit for owners and managers of manufacturing SMEs.

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