Validity and Reliability Test to Analyze Effects of Environment and Managerial Characteristics on Small Industries Performance

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Abstract

We conducted validity and reliability tests prior to the data collection and analysis. The tests are known to be very important in a research in which its data source is obtained using questionnaires. In this research we found that the sets of questions which are representing operational environment, internal environment, managerial characteristics, cost advantage strategy, differentiation strategy, financial and non-financial performance, valid and reliable.

Keywords: Validity, Reliability, Cronbach, Small industry
1 Introduction

Pearce and Robinson [5] categorized business environment into external environment which is to refine the analysis, and internal environment in order to identify the company a competitive advantage. External environment is divided into a remote environment, industrial environment, and operational environment. Meanwhile, the internal environment implied a greater emphasis on resources. Internal environment which are located within the company's organizational structure is grouped into: structure, culture, and resources, [20].

Requirement to achieve a competitive advantage of a company as an organization, is strong managerial capability which is required in order to master the four (4) key areas, namely: 1) cost, 2) quality, 3) time, and 4) innovation, [8]. The increasingly strong competitive advantage which is possessed by the company, it will further increase the sale value and profits derived by an enterprise, [19].

In Indonesia, industrial sector is the main sector in the Indonesian economy since it is the largest contributor to GDP in Indonesia over the last ten years. Especially for small industries, there is a trend of increasing number of workers where in 1989 the number of workers in small industry sector and 7,334,874 people at the end of 2003 increased to 11,643,072.

In this study, we will conduct validity and reliability analysis for a questionnaire to be used for analyzing effects of environment and managerial characteristics on small Industries performance. The analyses are required prior to analysis and test of the influence of managerial characteristics on the performance of small industry to ensure that the data obtained with the appropriate enough for the research conducted.

2 Environmental Variables,

Conceptually, environmental are factors or dimensions which are located around companies, both internal and external environment, and one of the important factors for the success of the company in the face of competition, [13]. Environmental changes should be continuously anticipated since their significant influence determine appropriate actions of strategies or even will influence company’s mission and vision, [5]. The environmental variables and indicators used for this research can be explained as follows:

a) Operational environment or task are factors in the competitive situation which is directly related to and affecting the success of small industrial enterprises in obtaining the resources needed to market products or small industrial companies, [12]. These variables are measured by assessing the position of a competitor, customer satisfaction, relationship with suppliers, loan procedures, the relationship between workers, and government support.

b) Internal environment are environment factor which are inside the company
itself. In this study, they are measured using functional approach, [18]. Those variables are the marketing of products, production processes, product development, labor quality, quality of financial management.

2.1 Variables for Managerial Characteristics

Managerial characteristic is interpreted as attributes or individual characteristics of the company manager, [6]. The indicators were developed for the measurement of managerial characteristics variables include: level of education, personal qualities, marketing experience, business competence, task orientation and success, as well as business sense, [17].

2.2 Variables for Competitive Advantage Strategy

A company can be said to have a competitive advantage in an industry both current and future conditions if it has the strength of competing factors, such as: price, product quality, premium image, customer service, network distribution, timely reliability, technology, and productivity, [7]. Indicators which are developed to measure competitive advantage strategy variables in this study include: cost efficiency, economies of scale, lower prices, product innovation, product design, and quality priority.

2.3 Variables for Small Industries Performance

Performance plays an important role for companies, because through the company's performance, it can monitor against the objectives of the company for both short and long term. Indicators which are developed to measure the performance of small industries in this study are: profitability, economic value added, wealth growth, customer loyalty, timely delivery, and quality improvement, [6].

3 Methodology

Research questionnaire which is submitted to respondent consist of a list of questions related and relevant to the data. It contains a number of items which are closed-questions and will be asked to the owner/manager (respondents) about their response and perception on items related to the variables of the operational environment, $x_1$, internal environment, $x_2$, managerial characteristics, $x_3$, cost advantage, $y_1$, differentiation strategy, $y_2$, financial performance, $y_3$, and non-financial performance, $y_4$, of small bamboo industry. In this study, questions or statements in the questionnaire were measured using a 5-point Likert scale.
which has a value (score) 5 for strongly agree to support the claim, and value (score) 1 for strongly disagree to the statement.

3.1 Validity Test

Validity test is done to ensure that each of the items in the research instrument capable of measuring the variables defined in a study. An instrument is said to be valid, if it is able to measure what is desired and disclose data from the variables studied precisely, [1]. The validity of each item of an instrument can be determined by comparing the index of Pearson product moment correlation. Sample Pearson product–moment correlation coefficient, \( r \) of two variables \( x \) and \( y \), is calculated as follows, [2]:

\[
r = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 \sum_{i=1}^{n} (y_i - \bar{y})^2}}
\]

If the results of the \( p \) value of correlation coefficient is smaller than alpha, we should declare that the research instrument is valid.

3.2 Reliability Test

Reliability test is intended to determine whether the measurement results remain consistent when a particular statement (item) is done repeatedly using the same measuring instrument. The reliability test in this study uses Cronbach alpha. It is a measure of squared correlation between observed scores and true scores. Let \( n \) be the number of items (or questions), \( s_{Yi}^2 \) is sample variance associated with item \( i \), and \( s_X^2 \) is the variance associated with the total (or sum) of all \( n \) item scores. Cronbach alpha is mathematically written as follows, [4]:

\[
\alpha = \frac{n}{n-1} \left( 1 - \frac{\sum_{i=1}^{n} s_{Yi}^2}{s_X^2} \right),
\]

The instrument can be said to be reliable if the reliability coefficient is 0.6 or more. The Cronbach’s alpha can be standardized of the form:

\[
\alpha = \frac{n \bar{c}}{(\bar{c} + (n-1)\bar{c})}.
\]
In that equation, $\bar{v}$ and $\bar{c}$ are the average variance and the average of all covariances between the components, respectively.

### 4 Empirical Results

Before using the research instrument as a medium for data collection, we conducted a trial (try out) using the instrument by collecting data from 30 respondents (beyond the planned sample). This step is done in handicraft industry, in Malang, East Java. Result of this analysis will be used for validity and reliability tests for the research instrument.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Question codes</th>
<th>$r$</th>
<th>$p$-value</th>
<th>Variable</th>
<th>Question codes</th>
<th>$r$</th>
<th>$p$-value</th>
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<td>0.000</td>
<td>$y_1$</td>
<td>$y_{1,1}$</td>
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<td></td>
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</table>

From the table we can see that even though each question produces different value of Pearson product–moment correlation but its corresponding $p$-value is less...
than 0.05. It means that the research instruments for each variable corresponds to each component is valid.

Meanwhile, results for reliability test are presented in Table 2 in which the Cronbach alpha value for each variable is greater than 0.600. This suggests that the questions used in the questionnaire are reliable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Items</th>
<th>Cronbach's Alpha</th>
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<tr>
<td>Internal environment</td>
<td>5</td>
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<td>Managerial characteristics</td>
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<td>Differentiation strategy</td>
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<tr>
<td>Financial performance</td>
<td>3</td>
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<tr>
<td>Non-financial performance</td>
<td>3</td>
<td>0.697</td>
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</table>

References


Validity and reliability test


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