Supply Chain Operation Reference in the Indonesian Non-Formal Education: An Analysis of Supply Chain Management Performance

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Abstract— The focus of the current study is non-formal education and supply chain companies in Indonesia. The ultimate objective is to investigate how non-formal education contribute towards supply chain management performance. Two major elements of non-formal education, namely; non-formal learning and non-formal training was considered. Additionally, supply chain company’s recruitment from non-formal educational sector was also considered. Four hypotheses were proposed concerning the relationship between learning, training, supply chain company’s recruitment, supply chain operations and supply chain management performance to approach the ultimate objective of the study. The cross-sectional research design was selected, and data were collected from the human resources (HR) employees of the supply chain companies in Indonesia. Three hundred (300) questionnaires were distributed through random sampling technique. After data collection, PLS (SEM) was used to test the hypothesis. It was found that, learning and training has significant positive relationship with supply chain company’s recruitment which has positive effect on supply chain operations. Finally, the better supply chain operations have positive contribution to enhance the supply chain management performance. This study has major contribution in the body of literature, as this is the first study which examined the relationship of non-formal education and supply chain management performance. This study will provide better grounds for supply chain companies to recruit their required staff from non-formal educational sectors.

Keywords--- Non-formal education, learning, training, supply chain recruitment, supply chain operations, supply chain management performance.

1. Introduction

The founding father of Indonesian education, Ki Hajar Dewantara basically expressed that education is responsible for building up the inner quality, and physic of a young generation in order to keep up with their condition and society. In a similar spirit, Indonesia through its National Instruction Framework strategy (Sistem Pendidikan Nasional) no. 20, 2003 formally expressed instruction as a cognizant and consider push to make learning process sufficient capable that empower students to effectively create values, quality, identity, respectable character, and abilities that they require, likewise for society, and country. The definition of education according to Ki Hajar Dewantara contains feeling of improvement that is coordinated for identity working of the students in order to pick up capacity to blend with the extent of nature and individuals [1-5].

While the formal definition of education by state is an educational body running by state or people with projects to prepare students, so they have capacity to work in society [1]. Generally, education has three forms, namely, formal education, informal education and non-formal education [6]. As it is shown in Figure 1.
However, the focus of current study is non-formal education. Non-formal education takes numerous structures: 'additional opportunity education' for those unfit to profit by standard classes; youth clubs with significant educational purposes; grown-up and proceeding with education; network education; self-awareness projects, for example, cultural, language, fitness and games programmes; professional projects for the jobless and updating workforces [7-11]. According to [12, 13], non-formal education comprised: literacy, basic education for adults, out of school youth and school dropouts. It also includes youth group as well as social development and community mobilisation. This non-formal sector generally includes learning and training which is most significant for supply chain performance. Learning and training is most important because it enhances the staff services quality through better services [14, 15]. Non-formal education generally provided outside the formal institutions and different study chain companies contacted and recruit the staff from Non-formal education places. As the non-formal education is generally based on voluntary activities which is not compulsory, therefore, people choose their most liked activities in which they have interest. Thus, when people choose with their own choice, they learn more as compared to the formal education.

Therefore, from various clubs and societies where the non-formal educational activities are performed, supply chain companies recruit various people which has significant impact on supply chain operations and finally a good supply chain operation enhances the supply chain management performance, as it is shown in Figure 2. As the supply chain performance is most crucial to enhance the overall performance of company [16, 44].

Thus, the ultimate objective of the current study is to investigate that how non-formal education contribute towards supply chain management performance. To achieve the major objective, the study is following sub-objectives;

1. To examine the relationship between learning, training and supply chain company’s recruitment.
2. To examine the relationship between supply chain company’s recruitment and supply chain operations.
3. To examine the relationship between supply chain operations and supply chain management performance.

Figure 1. Types of Education
Non-Formal Education

![Theoretical Model of study showing that how the non-formal education contributes towards supply chain management performance.](image)

This study has major contribution in the body of literature. As this is the first study which examined the relationship of non-formal education on supply chain company’s recruitment process. This is the first study which revealed that how non-formal education in Indonesia effect the supply chain management performance. The literature on non-formal education was missing that how the non-formal education effects the supply chain operations, however, the current study filled this literature gap. Most importantly, the literature was missing with studies on non-formal education, especially in Indonesian prospective. This study will provide a better ground for supply chain companies to recruit their required staff from non-formal educational places. From these place/events, the supply chain companies can recruit better skilled workers which will affect positively on their supply chain operation and ultimately enhances the overall supply chain management performance. All these elements will contribute positively on company performance. Hence, this study is contributed in the body of knowledge through multiple ways.

2. **Hypothesis Development**

The concept of non-formal education emerged amid the dynamic history of education in Indonesia. The conceptual source of formal as well as non-formal education can be traced back to social class through the traditional period. During Colonial period, actually the formal education was not intended for the native. Educations for all were then naturally non-formal [1].

For all intents and purposes, non-formal education framework is started from a drift of collaboration in the public eye with a typical enthusiasm by which the individuals investigate their potential and figure out how to create themselves. Further, the collaboration created with an intend to build ability and to prepare the individuals to trade ideas among themselves and with the supervisors. Thus, a non-formal education has a particular reason and framework that suits the need of the individuals and students. The reason for non-formal education alludes to the concept of strengthening that is coordinated to empower long lasting learning not deep-rooted education [17].

The concept underlines the significance of human flexibility for constant learning and to encourage the human culture framework with a very much prepared esteem framework, learning, ethic, feelings, implications and trust in the network [18]. In case of Indonesia, non-formal education started from child and then includes the play group, non-formal primary group, lower secondary, secondary school and then courses. All these steps of formal and non-formal education in Indonesia is given in Figure 3.
2.1 Non-Formal Learning and Training

Learning and training has vital role in supply chain management performance. In Indonesia, Mr. Harry Roesli along with his friends took the initiative to begin an art studio, called ‘Depot Kreasi Seni Bandung’ (DKSB). DKSB was at first started with no presence of the outsider’s partners. Reacting to the absence of workmanship scenes in Bandung, he later chose to open his home as a social gathering place, for sharing learning and imagination for everybody [1]. After that it caused to establish many learning non-formal institutions.

Non-formal education program was built up by the late Mr. Harry Roesli in 1998. He was principally worried about the destiny of people who were misled by neediness due to the monetary emergency in 1998. The non-formal education procedure has following stages of learning including the training activities;

1. **Rumah Belajar** (House of Learning), in this level, people are trained with fundamental education such as reading, math, and writing. Additionally, people are also introduced with good values including good manners as well as good behaviour.

2. **Rumah Kreatif** (House of Creativity), in this level, people were prepared with skills suitable to learner interests. In this stage training for life skills are also provided.

3. **Rumah Kreasi** (House of Creation), the group members make small groups that have parallel interests to yield something. For instance, various students who are concerned in the art of music creation collective with other students who have similar interests, then make musical instruments as well as sound system themselves or make a song.

4. **Rumah Berkarya** (House to create), in this type of program, students generally considered independent sufficient to work in the industrial world.

In house of learning individuals generally trained with different skills related to every field which they have interest. These skills are more important in operations of supply chain process. In house of learning development, a good behaviour always effects positively on the work environment in supply chain companies. Good behaviours as well as manners have impact on customers [16, 19]. As distribution channels has key role in supply chain [20] where the supply chain agent or delivery agent has most important role. Thus, learning and training from non-formal education has significant

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**Figure 3.** Formal and Non-Formal Education Structure in Indonesia.
contribution in supply chain operations and supply chain operations has significant effect on supply chain management performance.

House of Creation focused on to create something new. The people are divided into various groups and ask them to introduce something new which add value to the concerned project. Or generally assign them to come up with the solution of any problem related to concerned project. These activities increase the problem-solving ability of people. These problem-solving abilities are most significant in supply chain operations and causes to innovate something new [21, 39, 43]. Thus, the creativity learning among people has significant impact on supply chain management performance.

House of creation involved various groups of people. In this process, people having good abilities in field attached to those people who have interest in that field but not having good abilities. In this group people having low abilities learn from the people having high abilities. This is generally based on the concept learn from each other’s [22-26, 38, 41] which has significant importance in non-formal education.

In forth step, house to create, students are generally assigned with independent tasks. Students generally considered independent sufficient to work in the industrial world. In this process, individuals are not allowed to work in group. They generally work independently and show creativity. All these steps of non-formal education are important in supply chain operations and company’s performance, however, risk management should be manage properly [16] to avoid any distortion.

According to [27, 40], in supply chain competency, learning is most important. Learning has important link with knowledge sharing in supply chain process [28]. Here the non-formal education is important to accelerate the effect of learning through knowledge sharing. Because within informal activities, people are allowed to share knowledge and create something new. Learning also has the ability to enhance innovativeness among supply chain companies [29, 36, 37, 42].

One of the most significant things that can be done to guarantee that the supply chain is working at its top, is to train companies staff in all parts of the supply chain such as operations, management, delivery and production. Staff who are well trained will feel more valued and will bring greater value to their organization. Non-formal training can offer supply chain team a great learning experience that is much away from traditional classroom training and that helps them to become more effective as well as productive in their daily activities [30]. Generally, the non-formal training and learning includes various steps. Non-formal learning is shown in Figure 4. This process of non-formal learning based on learning needs and expectations, curriculum criteria, delivery, assessment and certifications. It is associated with non-formal training.

Moreover, supply chain is a combined set of business operations, encompassing all actions from raw material acquisition to final customer delivery. Delivering to the customers a right product at the right time with reasonable price are vital objectives of efficient as well as effective supply chain [31, 32]. Therefore, in this comprehensive process, employee learning as well as training is most
important in which non-formal training has crucial role. Non-formal education enhances the ability of individuals to make supply chain operation in smooth way. Recruitment by supply chain companies from various non-formal education places is most significant because these people always has the ability to handle supply chain operations in smooth ways which has direct impact on supply chain management performance.

From above discussion, it is revealed that non-formal education has significant link with supply chain recruitment process through non-formal learning and non-formal training activities in various clubs, institutes and societies. This recruitment from non-formal institutions has significant link with supply chain operations. Employees recruited from these institutions has positive effect on supply chain operations. Better supply chain operations always have positive association with supply chain management performance in various companies. Thus, from the above discussion, below hypothesis are proposed.

H-1: Non-formal learning has significant relationship with supply chain company’s recruitment.  
H-2: Non-formal training has significant relationship with supply chain company’s recruitment.  
H-3: Supply chain company’s recruitment has significant relationship with supply chain operations.
H-4: Supply chain operations has significant relationship with supply chain management performance.

3. Research Methodology

This study is based on non-formal educational sector and supply chain companies of Indonesia. It examined the effect of non-formal educational activities such as non-formal learning and training on supply chain operations and supply chain management performance. Therefore, by examining the objective and nature of the study, cross-sectional research design was selected, as the selection of research method is most crucial and nature of study should be considered [33, 34].

3.1 Sample Size

Sample size was selected based on Comrey and Lee (1992) inferential statistics. “Sample having less than 50 participants will observed to be a weaker sample; sample of 100 size will be weak; 200 will be adequate; sample of 300 will be considered as good; 500 very good whereas 1000 will be excellent.” Thus, three hundred (300) sample size was selected for this study.

3.2 Sampling Technique and Data collection procedure

Data were collected through simple random sampling technique. Human resource staff of supply chain companies was the respondents of this study. First of all, the list of all the supply chain employees were collected and then respondents were selected randomly. However, the employees having no involvement in recruitment activities were not included in the survey to get the accurate information.

3.3 Response Rate

Three hundred (300) questionnaires were distributed among the human resource employees of supply chain companies. Only one hundred and eighty (180) questionnaires were returned. However, six (06) questionnaires were not complete, therefore, not included in the study. The response rate is given in below Table 1.

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency/Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total questionnaires distributed</td>
<td>300</td>
</tr>
<tr>
<td>Total questionnaires returned</td>
<td>180</td>
</tr>
<tr>
<td>Total Useable questionnaires</td>
<td>174</td>
</tr>
<tr>
<td>Total questionnaires excluded</td>
<td>06</td>
</tr>
<tr>
<td>Total response rate</td>
<td>60%</td>
</tr>
<tr>
<td>Total response rate after data entry</td>
<td>58%</td>
</tr>
</tbody>
</table>
4. Analysis and Results

4.1 Respondents Profile

From the profile of respondents, it is revealed that a higher number of male are working in supply chain companies as compared to the female. Almost 78% male are working in HR departments of supply chain companies. However, female is 22% only. In case of age, the employees having age 41 to 50 are more. The people having age 41 to 50 are 34.44%. On the other hand, employees having age 31 to 40 are at second position with 31.6%. In case of education, the employees having master’s degrees are more as compared to others. The employees having master’s degrees are 45.4% and bachelor are 40.22%. Therefore, in Indonesian supply chain companies, most of the employees are master and bachelor holders. A higher percentage of employees are receiving salary in between 31,000 IDR to 40,000 IDR with 40.22%. However, the people receiving higher salaries above 60,000 IDR are only 8%. The people receiving salary between 51,000 IDR to 60,000 IDR are 27.58%.

Table 3. Profile of the Respondents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>135</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>39</td>
<td>22</td>
</tr>
<tr>
<td>Age</td>
<td>21-30 Years</td>
<td>35</td>
<td>20.11</td>
</tr>
<tr>
<td></td>
<td>31-40 Years</td>
<td>55</td>
<td>31.6</td>
</tr>
<tr>
<td></td>
<td>41-50 Years</td>
<td>60</td>
<td>34.44</td>
</tr>
<tr>
<td></td>
<td>Above 50 Years</td>
<td>24</td>
<td>13.7</td>
</tr>
<tr>
<td>Education</td>
<td>Intermediate</td>
<td>20</td>
<td>11.4</td>
</tr>
<tr>
<td></td>
<td>Bachelor</td>
<td>70</td>
<td>40.22</td>
</tr>
<tr>
<td></td>
<td>Master</td>
<td>79</td>
<td>45.4</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>05</td>
<td>2.8</td>
</tr>
<tr>
<td>Income (in IDR)</td>
<td>21,000-30,000</td>
<td>42</td>
<td>24.13</td>
</tr>
<tr>
<td></td>
<td>31,000-40,000</td>
<td>70</td>
<td>40.22</td>
</tr>
<tr>
<td></td>
<td>51,000-60,000</td>
<td>48</td>
<td>27.58</td>
</tr>
<tr>
<td></td>
<td>Above-60,000</td>
<td>14</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Author’s own calculations based on collected data.

4.2 Reliability and Validity

Smart PLS 3 was used to check the reliability and validity. In case of reliability, both Cronbach alpha and composite reliability was examined. In case of validity, both convergent validity and discriminate validity was examined.

According to the previous studies, the minimum level of Cronbach alpha and composite reliability should be 0.7. In the current study, all the values of Cronbach alpha and composite reliability are more than acceptable range. Moreover, the convergent validity was attained through factor loading and average variance extracted (AVE). According to [35], the factor loading should be more than 0.4 and average variance extracted (AVE) should be more than 0.5 to attain convergent validity. However, in the current study, the factor loading is more than 0.6 for all items and average variance extracted (AVE) is more than 0.5. Thus, it confirms the convergent validity. All the results of reliability and validity are shown in Table 2.

Table 2. Reliability and Validity

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Cronbach Alpha</th>
<th>Composite Reliability</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning (L)</td>
<td>0.852</td>
<td>0.765</td>
<td>0.562</td>
</tr>
<tr>
<td>Training (T)</td>
<td>0.780</td>
<td>0.800</td>
<td>0.581</td>
</tr>
<tr>
<td>Supply Chain Companies Requirement (SCCR)</td>
<td>0.812</td>
<td>0.812</td>
<td>0.522</td>
</tr>
<tr>
<td>Supply Chain Operation (SCO)</td>
<td>0.785</td>
<td>0.826</td>
<td>0.613</td>
</tr>
</tbody>
</table>
Moreover, the discriminant validity was examined through square root of average variance extracted (AVE). The Table 3 shows the discriminant validity which is achieved by the current study.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>0.848</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>0.731</td>
<td>0.818</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCR</td>
<td>0.578</td>
<td>0.730</td>
<td>0.701</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCO</td>
<td>0.507</td>
<td>0.788</td>
<td>0.615</td>
<td>0.898</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCMP</td>
<td>0.711</td>
<td>0.794</td>
<td>0.650</td>
<td>0.784</td>
<td>0.808</td>
<td></td>
</tr>
</tbody>
</table>

### 4.3 Hypothesis testing

Hypothesis testing results are shown in Table 4. In hypothesis testing, the t-value 1.96 and p-value 0.05 was considered. According to the results of the study, it is revealed that non-formal learning and non-formal training has significant positive relationship with supply chain companies recruitment with t-value 8.330 and 6.662, respectively. Positive beta value shows positive relationship. Moreover, it is found that supply chain companies recruitment has significant relationship with supply chain operations with t-value 2.10. Furthermore, it is found that supply chain operations have significant relationship with supply chain management performance with t-value 2.859 and positive beta value. Therefore, supply chain operations have significant positive relationship with supply chain management performance.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Relationship</th>
<th>(β)</th>
<th>SD</th>
<th>T-value</th>
<th>P-Values</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1</td>
<td>T -&gt; SCCR</td>
<td>0.117</td>
<td>0.014</td>
<td>8.330</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H-2</td>
<td>L -&gt; SCCR</td>
<td>0.207</td>
<td>0.031</td>
<td>6.662</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H-3</td>
<td>SCCR -&gt; SCO</td>
<td>0.201</td>
<td>0.100</td>
<td>2.100</td>
<td>0.037</td>
<td>Supported</td>
</tr>
<tr>
<td>H-4</td>
<td>SCO -&gt; SCMP</td>
<td>0.309</td>
<td>0.108</td>
<td>2.859</td>
<td>0.021</td>
<td>Supported</td>
</tr>
</tbody>
</table>

These hypotheses results show that non-formal educations have positive contribution towards supply chain recruitment. Both have direct relationship with each other’s. Moreover, it is found that supply chain companies recruitment from non-formal educational institutions has positive effect on the operations of supply chain companies. Increase the recruitment from non-formal education students has positive effect on supply chain operations. Furthermore, supply chain operations have positive role to enhance supply chain management performance.

### 5. Conclusion

The current study was carried out to examine the effect of non-formal education on supply chain management performance. Data were collected from human resource employees of supply chain companies. Structural equation modelling was used to analyse the data and test the concerned hypotheses.

From the results, it is revealed that non-formal education has positive contribution towards supply chain management performance through non-formal learning and non-formal training activities in Indonesia. Supply chain companies recruit employees from various societies, clubs and other non-formal educational places. These recruited employees have positive contribution in the supply chain operations. This positive effect on supply chain operations contributes majorly in overall supply chain management performance. Hence, non-formal education (learning and training) has key role to enhance supply chain management performance.
performance through recruitment from non-formal educational places. Therefore, companies should recruit their staff from non-formal educational activities. Future research is required to compare the performance of recruited employees from formal and non-formal educational system.

References


