Abstract—Supply Chain Management (SCM) has been known as a simultaneous integration of customer requirements, internal processes, and upstream supplier performance. The term of supplier refers to small medium enterprises (SMEs). The investigation of SCM implementation in SMEs are generated from internal and external aspects including environment uncertainty, institutional theory, and internal resource. This research would test some hypotheses of variables linkage developed by some theoretical and empirical studies. Some of rigorous statistical methods had been used to assess the correlation between variables. Overall, the result of this research would be about the most significant correlation both of external and internal variables to SCM practices and how does SCM practices affecting organizational performance. The research suggests a unique solution of population by attaching some recommendations to improve SCM practices in SMEs.

Keyword—SCM, SMEs, environment uncertainty, institutional theory, internal resource, organizational performance.

I. INTRODUCTION

Today’s competition is getting tighter from time to time [1]. Achieving efficiency within organization is no longer enough. A whole supply chain needs to be efficient as the competition is no longer only between firms, but also among supply chains [2]. Furthermore, Small Medium Enterprise (SME) is identified as a counterpart of a bigger supply chain. SMEs play various roles in a supply chain both in upstream and downstream level. Therefore, SMEs also need to be efficient in managing their supply chain activities. Implementing supply chain management (SCM) in SMEs may offer potential benefits as their large firm counterparts benefit from SCM implementation [3]. Literature has reported that SCM contribute significantly to an organization’s performance and competitive advantage. Li [2] has explored that organization with high level of SCM has high level of competitive advantage and performance. Therefore, SCM can be regarded as one alternative strategy to improve the organizational performance. Forward-thinking firms have emerged as the star in competitions because of their intensive management in supply chain. Williamson [4] found some factors which are affecting the integration of supply chains. Internal resource, or recently known for its IT context, tend to drive these firms to be unique, rare, more valuable, and more competitive [5]. Environmental uncertainty is one identified factor which is founded in several economic, manufacturing, and supply chain literatures. As explained by the Transaction Cost Theory, high levels of business uncertainty tend to drive the firm towards a vertical integration strategy. Another factor which even less researched is institutional theory. Institutional theory refers to the expectations of behavior practice from other institutions [6]. SMEs are industries which are giving a high contribution to economic transactions. SMEs are known as those who save the Indonesian economy after the crisis situation. Their role as the trigger of economic growth and employment was an early step for Indonesian government to empower the production sector in many different fields [7]. SMEs contribute 60% of Indonesia Gross Domestic Product (GDP) and absorb 97% employment in Indonesia (BPS, 2011). On the contrary, there were only 0.24% Indonesians become entrepreneurs with US$ 4,567 per capita compare to 7% of Singaporean entrepreneurs that earn US$43,67 per capita [8]. In many large firms, the implementation of SCM has been established [9] but not in SMEs. A literature review revealed that there is a limited research of SCM in SMEs [10].

II. LITERATURE REVIEW

A. Supply Chain Management and Supply Chain Practices

Supply Chain is a system which is distributing firm’s products and services to the customers. These chains are also a network of many organizations which are connected to each other. They have the same purpose to establish the logistic procurement and distribution of their goods. [11].

In manufacturers, there are some aspects covered by SCM, such as: (1) the flow of materials, (2) the flow of information, (3) and the flow of money.
The concept of supply chain has been considered from various points of view, such as: (1) purchasing and supply management, (2) operation management, (3) organizational theory, (4) information system, (4) and marketing. From those various theories, there are some specific aspects for each perspective [2]. Based on his research, there are some dimensions of supply chain practices, such as: (1) strategic supplier partnership, (2) customer relationship, (3) level of information sharing, (4) quality of information sharing, (5) and postponement.

### B. Factors Affecting Supplier Integration

Supply chain can be seen from resource based point of view (RBV). The RBV is a theoretical perspective that attempts to describe, explain, and predict, how firms can achieve a sustainable competitive advantage through acquisition and control over resources. According to the RBV, there are two dimensions of assets: tangible asset (e.g. equipments) and intangible asset (e.g. process knowledge and IT) [12]. Besides RBV, there were also environment uncertainty and institutional theory as externalities. Uncertainty is the situation where the probability of the outcome of an event is unknown, as opposed to a risk situation where each outcome is calculated as probability [13]. Institutions are part of a network of socio-economic relationships and they shape the institutional theory in their environments. In business environment, firms tend to put some normative pressures to influence the structure and practices in that environment. Institutional theory also increases the firm’s survival capabilities [6].

### C. Structural Equation Modeling (SEM)

Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA) are statistical techniques that can be used to reduce the number of observed variables into a smaller number of latent variables by examining the co-variation among the observed variables [14]. The measurement model of SEM is actually a CFA, while the pattern of observed variables for those latent constructs is described in hypothesized model. In addition to the new terms, measurement and structural, two other terms associated with SEM are exogenous and endogenous variables.

### III. RESEARCH METHODOLOGY

#### A. Theoretical Framework and Hypothesis

According to some former literatures, the research framework from Baihaqi and Sandhu [3] was being adopted.

- **H1**: The environmental uncertainty will be positively associated with their SCM practices.
- **H2**: The institutional theory will moderate the relationship between environmental uncertainties and their SCM practices. Lai [16] found that institutional theory emphasizes the institutional isomorphic processes that exist in groups of firms. There are three types of isomorphism: (1) coercive, (2) mimetic, and (3) normative.
- **H3**: The internal resource will be positively associated with their SCM practices. Resource based point of view (RBV) somehow described as IT links inside the firm is one of key successes in supply chain integration. Wu et al. [16] found that to understand how IT can affect the supply chain is described from two perspectives: IT advancement and IT alignment.
- **H4**: The SCM practices will be positively associated with organizational performance. There will be three dimensions of SCM practices that will be identified in this research, they are: (1) strategic supplier partnership, (2) customer relationship, (3) and level of information sharing [2].

#### B. Research Design

The research design helped the author to make several sequential actions based on theory foundation. Based on research questions and hypotheses, a questionnaire survey was considered as the most appropriate method of collecting data. Reasons behind the decision in making survey as the measurement technique was derived from three theoretical backbones: (1) the survey involves collection of information by asking respondents in structured format, (2) the survey requires a standardized information in order to define or describe factors and relationship between factors, (3) and the
collected survey will be able to generalize findings from the population of the sample [3].

IV. DATA COLLECTION AND ANALYSIS

A. Classification of SME

In this data collecting stage, the author had been working with Mitra Bersama Organization. Some of our respondents (50%) were the member of Mitra Bersama Organization and the rest were established independently. There were 130 SMEs gathered in data collection stage. The SMEs classified into: metal, food and beverage, chemical, plastic, glass, furniture, handicraft, garment, fashion, etc. The investigated firms’ sizes start from 1-20 headcounts, 20-50 headcounts, 50-100 headcounts, and more than 100 headcounts. From 130 respondents, all of them achieved such a formal pedegree; junior high school graduates, senior high school graduates, vocational school graduates, diploma graduates, bachelor graduates, and master graduates.

B. Profile of Respondents’ Answer

There were 50 statements about: supplier uncertainty (EU1), customer uncertainty (EU2), technology uncertainty (EU3), coercive (IT1), normative (IT2), mimetic (IT3), IT advancement (IR1), IT alignment (IR2), strategic supplier partnership (SC1), customer relationship (SC2), and level of information sharing (SC3), and organizational performance approved by respondents. The value of data represents Statistical description to their answered displayed in table below:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Mean</th>
<th>St. Dev</th>
<th>Variance</th>
<th>Composite Reliability</th>
<th>Loading Factor Composite</th>
<th>Error Variance Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU1</td>
<td>5.064</td>
<td>0.710</td>
<td>0.503</td>
<td>0.648</td>
<td>0.805</td>
<td>0.177</td>
</tr>
<tr>
<td>EU2</td>
<td>3.977</td>
<td>0.844</td>
<td>0.712</td>
<td>0.441</td>
<td>0.664</td>
<td>0.398</td>
</tr>
<tr>
<td>EU3</td>
<td>3.696</td>
<td>0.868</td>
<td>0.753</td>
<td>0.800</td>
<td>0.894</td>
<td>0.151</td>
</tr>
<tr>
<td>IT1</td>
<td>4.242</td>
<td>0.744</td>
<td>0.554</td>
<td>0.788</td>
<td>0.888</td>
<td>0.117</td>
</tr>
<tr>
<td>IT2</td>
<td>4.297</td>
<td>0.665</td>
<td>0.442</td>
<td>0.690</td>
<td>0.831</td>
<td>0.137</td>
</tr>
<tr>
<td>IT3</td>
<td>3.456</td>
<td>0.631</td>
<td>0.398</td>
<td>0.897</td>
<td>0.947</td>
<td>0.041</td>
</tr>
<tr>
<td>IR1</td>
<td>3.140</td>
<td>0.968</td>
<td>0.937</td>
<td>0.848</td>
<td>0.921</td>
<td>0.142</td>
</tr>
<tr>
<td>IR2</td>
<td>2.939</td>
<td>1.022</td>
<td>1.045</td>
<td>0.948</td>
<td>0.974</td>
<td>0.054</td>
</tr>
<tr>
<td>OP1</td>
<td>3.827</td>
<td>0.674</td>
<td>0.454</td>
<td>0.781</td>
<td>0.884</td>
<td>0.099</td>
</tr>
<tr>
<td>OP2</td>
<td>3.537</td>
<td>0.789</td>
<td>0.622</td>
<td>0.919</td>
<td>0.959</td>
<td>0.050</td>
</tr>
</tbody>
</table>

C. Construct Validity and Construct Reliability

To analyze the validity of the constructs, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) are needed. However, the number of manifest indicator and the number of respondents do matter in the processing stage. The insufficient data will lead to inappropriate construct conclusions. To make the data more reliable, there were two steps approaches in SEM; to build composite value for each indicator and then validate the sub dimension with CFA. The description of composite indicators as follow:

D. Structural Equation Modeling (SEM)

Before the data assessed with SEM, they should have normal distribution, outlier free (z-score ±3), and no multicollinearity. After the assumptions had met, the sub dimensions from EFA are validated by using CFA. CFA treats each variable as independent variable, so that the correlation among them would be presented. After the correlation was significant, the model should transform to full assessment model. The model could be revised if it had unsatisfied results. The modification could be: (1) find the unprompted indicator based on its cr and p-value, (2) find the reasonable covariance in modification idicies, (3) correlate the exogenous variables with co-variance arrow, (4) and replace the negative variance with a small positive value (0,05) [17]. In the end, the moderation model should be assessed in order to validate the hyphoteses.
The regression weight of each estimated parameter had achieved the acceptable values. Based on the table above, it shown that the moderating variable was marginally affected SCM practices (Estimate= 0.03 ; CR= 0.52). All of variance had positive estimate and cr value. There was only variable error of IT2 (e5) had least positive value. However, the value (Estimate= 0.12 ; CR= 0.27 P=0.78) can be still accepted. It had better goodness of fit withins estimation. The probability of it was increased a lot (0.05) and become very fitted. Ratio between chi-square and df was getting smaller (CMIN/DF= 1.34). This condition indicates significant improvement of model by adding the interaction indicator (EUxIT).

<table>
<thead>
<tr>
<th>Model Fitness</th>
<th>Value</th>
<th>Goodness of Fit</th>
<th>Critical Value</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>77.36</td>
<td>minimum is expected</td>
<td>358.44</td>
<td>Good</td>
</tr>
<tr>
<td>DF</td>
<td>58</td>
<td>≥ 1</td>
<td>78</td>
<td>Good</td>
</tr>
<tr>
<td>Probability</td>
<td>0.05</td>
<td>≥ 0.05</td>
<td>0</td>
<td>Good</td>
</tr>
<tr>
<td>CFI</td>
<td>0.90</td>
<td>≥ 0.95</td>
<td>0</td>
<td>Good</td>
</tr>
<tr>
<td>GFI</td>
<td>0.91</td>
<td>≥ 0.90</td>
<td>0.648</td>
<td>Good</td>
</tr>
<tr>
<td>AGFI</td>
<td>0.86</td>
<td>≥ 0.90</td>
<td>0.584</td>
<td>Good</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.05</td>
<td>≤ 0.08</td>
<td>0.172</td>
<td>Good</td>
</tr>
</tbody>
</table>

V. RESULTS AND DISCUSSION

Most of investigated SMEs experienced some uncertainties in their environment, both from suppliers and customers. However, some of them agreed that customer contributed a significant impact to their SCM practices. This dependence condition led the firms worked together with their partners in order to have more sustained performance. Environment uncertainty had a significant regression to SCM Practices (Estimate= 0.09; CR=2.90; P=0.04).

The institutional theory had two roles within this model. Firstly, institutional theory had direct affect to SCM practices. Secondly, institutional theory had not affected the SCM practices directly, but moderated another manifest variable, environment uncertainty, and SCM practices. When institutional theory had been tested directly, the result was less significant (Estimate=0.09; CR=1.99; P=0.04). There should be another explanation about another role of institutional theory in this model; as a moderator variable.

Aligned with two previous hypotheses, internal resource particularly information technology (IT) was positively correlated with SCM practices. An organization should have IT support in order to keep them updated with information, knowledge, the development of technology, and issues. The IT supports should be valuable, rare, and hard to substitute [5]. In SMEs, the contribution of IT was significant as their role to attain better SCM practices (Estimate= 0.16; CR=4.96; P=0).

There were some dimensions which were the most affected SCM practices; strategic supplier partnership, customer relationship, and level of information sharing. In SMEs, these dimensions would rather be elaborated with another, than affecting in single point indicator. In the end, SCM practices would lead the organization attaining better performance (Estimate=1.61; CR=5.98; P=0).

VI. CONCLUSION AND RECOMMENDATION

There are some recommendations to enhance SMEs performance, especially in marketing and financial purposes. After the critical path had been found within the model, the improvement should be based on the highest regression of indicators. Customer was a priority aspect within business
environment and SCM practice. Customer satisfaction will lead to loyalty and profit for the firm. Standard response to competition was indirectly accelerating the implementation of SCM practices in SMEs. Mimetic tends to make the environment less predicted by flocking the market with enormous product variety. The endeavor of SMEs was a good sign of SCM practice which have to be stimulated with workshop, training, and some success story. The third recommendation would be about internal sector of organization. IT alignment would help the organization become more valuable. To be aligned with their business partners especially customers, they have to be more advance in technology. In part-supply industries (B2B), IT can be used as an online catalogue to generate its brick-and-mortar channels. In grocery industries (B2C), IT can be used to build their own market by making people as member, giving special service level, etc [18] With information technology the organization could develop relationships among their suppliers, customers, and business partners. Overall, SMEs should be equipped with technology both hardware and software, or in the other word, computer and internet for each business.

However, before the idea would be implemented, the advance development should be focused on the man behind the business. IT requires a man with innovation. To develop this kind of innovation in SMEs, it takes courage and passion to learn new things. Furthermore, a good recruitment would be necessary. The person in SMEs should be adaptive, creative, innovative, flexible, and efficient in order to capture any movement in global business. There were four criteria of ideal human resource in SMEs, including: (1) problem solving skills, (2) leadership skills, (3) team building skills, (4) job skills [19]. In the end, workshops and trainings related those criteria would potentially help SMEs to build a better culture within the organization.

ENCLOSURE

A. Questionnaire
1. We consider quality as our number one criterion in selecting suppliers.
2. We regularly solve problems jointly with our suppliers.
3. We have helped our suppliers to improve their product quality.
4. We have continuous improvement programs that include our key-suppliers.
5. We include our key suppliers in our planning and goal-setting activities.
6. We actively involve our key suppliers in new product development processes.
7. We frequently interact with customers to set reliability, responsiveness, and other standards for us.
8. We frequently measure and evaluate customer satisfaction.
9. We frequently determine future customer expectations.
10. We facilitate customers’ ability to seek assistance from us.
11. We periodically evaluate the importance of our relationship with our customers.
12. We inform trading partners in advance of changing needs.
13. Our trading partners share proprietary information with us.
14. Our trading partners keep us fully informed about issues that affect our business.
15. Our trading partners share business knowledge of core business processes with us.
16. We and our trading partners exchange information that helps establishment of business planning.
17. We and our trading partners keep each other informed about events or changes that may affect the other partners.
18. There were unreliable quality in supply that affects our SCM.
19. There were unreliable lead time from the suppliers that affects our SCM policy.
20. We consider there were unreliable quantity in supply that affects our SCM responsiveness.
21. There were fluctuation in demand volume and product specification that affect our SCM effectiveness.
22. There were changes in lead-time requirements for shipping that affects our SCM policy.
23. There were inaccurate demand forecast provided by the customers that affects our SCM efficiency.
24. There were changes in product and process technology that affects our SCM fitness.
25. There were complexity in the product and the process technology that affects our SCM fitness.
26. Our business unit uses the most advanced supply chain communication system.
27. Our supply chain communication system is always state-of-art technology.
28. Relative to our competitors, our supply chain communication system are more advanced.
29. Our business unit is always first to use new supply chain communication system in our industry.
30. Our business unit is regarded as the leader in our industry for supply chain communication system.
31. Our business unit’s supply chain communication system is well aligned with our partner.
32. Our business unit invests in IT to align our technology with our partner.
33. Our partner invests in IT to align their technology with us.
34. Both my business unit and our partner always work together for the best IT alignment.
35. IT advances for supply chain communication system, between my business unit and our partner, are well aligned for best supply chain performance.
36. Our main customers that matter to us believe that we should use SCM.
37. We may not retain our important customers without SCM.
38. Our main suppliers that matter to us believe that we should use SCM.
39. Our suppliers that are crucial to us hotly wish us to use SCM.
40. SCM has been widely adopted by our suppliers currently.
41. SCM has been widely adopted by our customers currently.
42. SCM has been widely adopted by our competitors currently.
43. Our main competitors that have adopted SCM benefited
greatly.
44. Our main competitors that have adopted SCM are perceived favorably by customers.
45. Our main competitors that have adopted SCM are more competitive.
46. There was correlation between SCM strategies with our market share achievement.
47. There was correlation between SCM strategies with our return on investment achievement.
48. Our SCM implementation tends to contribute the growth in return on investment.
49. Our SCM implementation tends to contribute in the profit margin on sales.
50. Our SCM implementation tends to contribute in the overall competitive position.

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BIBLIOGRAPHY