

Supply Chain Integration for Improving Performance on Manufacturing Industries

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Abstract

Rising global competition and the increasing costs of natural resources today as well as customers demands for higher manufactured goods quality, better product selection, and improved customer service have created new challenges for manufacturing industries. Even though research has suggested that supply chain management and supply chain integration are distinct potential, little is known about their performance effects and about the contextual conditions under which they are effective. Based on a literature survey and expert analysis of manufacturing firms, we empirically investigate the effects of supply chain integration on quality performance using Analytical hierarchical Open Decision maker analysis. We argue our study in the dynamic capabilities view and contingency theory. We investigate that supply chain integration positively affect quality performance. our result indicates that knowledge, technology, production design and resource integration directly related and impact on quality performance for manufacturing companies.

Index terms— quality performance; supply chain integration; supply chain variables, manufacturing industry; ethiopia.

1 Introduction

ising global competition and the increasing costs of natural resources today as well as customers demands for higher product quality, greater product selection, and better customer service have created new challenges for manufacturing industries. Companies today are increasingly dealing with supplier and customer local and from all corners of the globe. In the recent competitive market, producing value-added, high quality and innovative products have come out as the fundamental tactic for manufacturing companies to stay alive. Manufacturing industries in different nations have take on numerous performance improvement programs and developed new operating viewpoint to enhance the way they operate to stay competitive Agus ??2015). However, among those improvement programs, supply chain integration has become an integral part of corporate strategy and its adoption in manufacturing companies has steadily accelerated since the 1980s. Although, effective supply chain management and supply chain (SC) integration are becoming increasingly critical factors for business success ??ang & Cassivi (2006), Georgise et al ??2014). Moreover, Supply chain integration can be defined as the degree to which a firm can strategically work together with its supply chain partners and cooperatively manage intra-and inter-organizational processes to achieve effective and efficient flows of products, services, information, money, and decisions to provide the maximum value to the final customer with low costs and high speed Huo(2012). Science, supply chain integration provided evidence of their potential joint positive impact on competitiveness and firm performance DeWitt ??2006). Supply chain Scholars shows the importance of Supply Chain practice to firms' their competitive strategies and advantage as well as can improve organization performance ??ambert and Cooper (2000), Birhanu (2014), Pathak (2015) Rao ??2015). According to Bekele (2008), Gebreeyesus & Sonob (2011), Sarmiento & Nagi (2012), Georgise et al ??2014) states that, the performance of an organization is influenced to a greater or lesser degree by the actions of the organizations that integrate the inputs and the

44 supply chain at large extents. Even though, the impact of supply chain integration practices vary, depending on
45 the type of firm trick and there are no commonly accepted concepts the impact of supply chain integration on
46 performance. In addition, there is very little empirical evidence as how different supply chain integration influence
47 various types of company performance. For example, Koufteros et al (2007), studies elaborate the sole roles of
48 supplier integration or customer integration in improving performance. Some recent studies also consider both
49 internal and external integration impact to performance, Swink et al (2007), Flynn et al (2010). Moreover,
50 Huo (2012) supply chain research supply chain integration can be viewed as internal and external integrative
51 capabilities that lead directly or indirectly to company performance. Even though, most of the previous studies
52 that address the relationship between supply chain integration and performance but no researches are conducted
53 which components of supply chain integration highly impact on performance. There is a pay little attention
54 to scholarly work focusing on explicitly the impact of various dimensions of supply chain relationships (such
55 as knowledge, production & design, technology and resource) on performance, rather the general supply chain
56 integrations(internal and external integrations) impacts. A key question is whether the implementation of supply
57 chain integration (such as knowledge, production & design, technology and resource) can make an impact on
58 company quality performance? This paper intends to filling this gap by using data collects from literature review
59 on significant value in supply chain integration and practices is apply.

60 In addition, the previous research work on supply chain shows that, the significance role of manufacturing
61 industries to improve their efficiency and Competitive advantage Fabbe-Costes et al (2008), Wang (2010),
62 Alfalla-Luque et al (2013), Otchere et al (2013).The strategic supply chain integrating with suppliers to
63 customer implies to improved operations and overall performances of the firms Kim (2009), Flynn et al (2009).
64 Despite these efforts, in the East Africa basic metal industries has not yet made their share of markets and their
65 contribution still low. Meanwhile, the basic metal industries of developing countries doesn't get enough attention
66 and are not studied well and seems to be isolated from global literature Georgise et al (2014), Msimangira &
67 Tesha (2014). Few studies describe and show that the Ethiopian manufacturing industries including basic metal
68 industries have various challenges and obstacles hamper their productivity, performance and competitiveness
69 Dagne Birhanu (2009), Tolossa et al (2013), Georgise et al (2014). But up to now there is no effort to
70 investigate the effect of supply chain integration on basic metal industry to impact quality performance of basic
71 metal industries in the country. Consequently, this study addresses impact of quality performance improvements
72 through supply chain integration in manufacturing industries. This factors that influence quality performance
73 include knowledge, technology, resource utilization, production and design integration are considered. However,
74 the study analyzes those significant achievement factors of quality performance related to supply chain integration
75 (SCI). In the next section, we will review related literature and develop hypotheses by proposing a conceptual
76 model, ahead of describing the methodology and presenting the results of analysis. We provide a discussion of
77 the findings and managerial implications. Finally, we present the conclusions, limitations, and suggestions for
78 future research.

79 2 II. Research Material and Methods

80 To test these hypotheses empirically we apply AHN (Open Decision maker). The Open Decision Makes enables
81 you to find the best alternative for a defined goal with the AHP (Analytic Hierarchy Process) method. following
82 the methodology successfully used in previous papers Alfalla-Luque et al(2012), Maleki et al (2013), we adopt a
83 literature survey as the strategy for collecting data, and to identify valid measures, and then adapted existing
84 scales to measure supply chain integration and company performance is analyze. In order to achieve the objective,
85 we use online databases and library services such as Taylor & Francis (www.tandfonline.com), Emerald (www.
86 emeraldinsight.com), ELSEVIER (www.elsevier.co), www. sciencedirect.com and other related sources, journal
87 articles, reports, policies, standards and manuals were obtained from these selected databases. A search of
88 articles published between 2000 and 2016 identify with the key words including Supply chain, integration, Quality,
89 Performance, Global Supply chain, Basic metal, performance measurement and logistics are used for searching
90 and screening. Depending on the significance of the material, through abstract and keyword screening operation
91 are make and the collected data are further reduce. The screening and reducing materials also again brought
92 down to the most important data considering recent publications, reading methodology and result of the papers.
93 From total of 125 write up. It is difficult to include all documents that made contribution to the field. At last,
94 13 articles were collected as the samples area. The objective is to focus on how supply chain integration impact
95 on performance of manufacturing industries, to see current state of the art of the researches peak and to identify
96 the gaps from previously conducted researches. The gaps that exist can be filled by the overall research works
97 considering further research areas.

98 3 III.

99 4 Literature Review a) Supply chain integration

100 A enormous deal of research has been done on the importance of integrating suppliers, manufacturers, distributors,
101 retailers, and customers Huo (2012), Rehme, (2012), Hatani et al(2013), Rakhman et al (2016). Even though,
102 the supply chain integration is relatively new as an area of research, although there is an extensive body of
103 research on uni-dimensional supply chain relationships, examining collaborative articles 13 articles are selected

104 and use for the analysis. Finally, it has been filter out to for this literature purpose relationships between a
105 manufacturer and either its customers or suppliers Flynn et al ??2009). supply chain integration continues
106 to be a key theme amongst those seeking to understand how to harness the potential of the supply chain to
107 create sustainable value. Kannan & Tan(2010) supply chain integration is the strategic integration of both intra-
108 and inter-organizational processes and gauges the extent to which supply chain partners work collaboratively
109 together to gain reciprocally beneficial outcomes. Supply chain integration means the co-operation between
110 various functions in the supply chain. The degree to which an organization strategically collaborates with its
111 partners and manages intra and inter-organizational processes in order to achieve efficient and effective flows
112 of products, services, information, money and decisions Halme (2010). An effective and efficient supply chain
113 integration achieves the well defined flows of products and services, information, money and decisions, to provide
114 maximum value to the customer at low cost and high speed Flynn et al ??2009). Integration can be characterized
115 by cooperation, collaboration, information sharing, trust, partnerships, shared technology, and a fundamental
116 shift away from managing individual functional processes, to managing integrated chains of processes Power (2005,
117 Krishnaapriya (2014). Supply chain member organizations integrate in to three dimensions customer, supplier
118 and internal integration. This dimensions are considered as independent variables of supply chain integrations on
119 manufacturing industries Flynn.et.al (2009), Otchere.et.al ??2013). Furthermore, Study describes as, Successful
120 coordination and integration of supply chains for all the activities associated with moving goods from the raw
121 materials stage through to the end user for sustainable competitive advantage ??ambert and Cooper (2000).
122 World-class organizations now realize that nonintegrated manufacturing processes, non-integrated distribution
123 processes and poor relationships with suppliers and customers are inadequate for their success. the success
124 coordination, integration management of key business across the member of supply chain will determine the
125 ultimate success of the single industry Vorst ??2000). Different supply chain integration level and various
126 dimension of supply chain integrations are essential to ensure enhanced significance in supply chains. In most
127 modern systems, the wisdom is it's better to do what you do best and own a very limited asset. Nearly everything
128 is outsourced but the brand and distribution process integration with supply chain partners Ray (2013). However,
129 in the developing Country manufacturing industry, supply integration still infant. According to Getahun (2012)
130 investigates that, lack of supply integration and customer integration within the garment industry, have the
131 potential to affect the quality and competitive advantage of the sector. Negussie (2014) supply chain evaluation
132 study shows that developing nation leather industries are suffering from the shortage of raw material (hides
133 and skins) as well as its quality problem. Companies in developing countries need to integrate their operations,
134 especially the sourcing processes into the global supply chain Georgise (2014), Msimangira (2014) and some
135 sectors are fragmental and infant integration including basic metal industries Xiong & Helo (2008). Hence it is
136 an important issue, to study and implement supply chain strategy for developing nation manufacturing industries.
137 However, we intended to study and implement integrated supply chains systems for basic metal industries, order
138 to bring the improvement of basic metal industry performance. the study investigate the relation between supply
139 chain integration and quality performance with associated resource, knowledge, technology , production & design
140 is address.

141 5 b) Quality

142 Although there are several definitions of quality, simply put, quality can be defined as meeting or exceeding
143 customer expectations Evans & Lindsay (2002). When we buy something we know almost without thinking
144 about it whether it has a high quality or not. Producing items of the highest possible quality has become more
145 and more important over recent years due to ever increasing competition between the companies who manufacture
146 the items and the ever increasing demands of the consumer for better quality items that perform better and last
147 longer. Therefore the pursuit of quality has developed into a science among manufacturing companies and much
148 time and effort is spent in this area. Quality can be a confusing concept as it has different meanings to different
149 people depending on whether they are the producers of a product or the users of it. Various definitions are
150 available by quality gurus such as Deming, Crosby, Juran, Feigenbaum and Ishikawa. dictionary definitions of
151 quality have their core terms like "degree of excellence", "relative nature", or "kind or character", and usually
152 go on to equate quality with high rank or greater standing Patel (1994). Currently, an increasing number of
153 product recalls are occurring. Such product recall incidents have resulted in serious customer dissatisfaction
154 and significant company losses in both image and business. Because of this, quality is a critical requirement for
155 customers, especially in the case of expensive and complex products. According to Lee (2013) states that, to
156 ensure product quality collaboratively becomes a vital task for the companies along the supply chain. However,
157 in its most general connotation, therefore, quality is seen as being value oriented. Quality is not absolute, it is
158 always expressed as a relative term, take as example A is of better quality than B. Quality means different things
159 to different people but a broad definition in relation to local government social services reads: Quality is the
160 totality of features or characteristics of a service that bear on its ability to satisfy a given need.

161 This clearly indicates that quality is also judged on the customer's perception of how a service met their needs.
162 However, there are a number of definitions that are generally accepted and used. Hence quality can be variously
163 thought of as: .it is the capacity and process ability of the objects produces within the given specifications to full
164 fill given the expectations. 2) Product Performance-Performance quality is the primary product characteristics.
165 Performance quality refers to the levels at which the products primary characteristics operate. Buyers will pay

166 more for better performance as long as the higher price does not exceed the higher perceived value. David A.
167 Garvain categorized as Product Performance involves the various operating characteristics of the product. For
168 a television set, for example, these characteristics will be the quality of the picture, sound and longevity of
169 the picture tube and for an automobile, performance would include traits like acceleration handling, cruising
170 speed, and comfort. In service businesses say, fast food and airlines performance often means prompt service
171 Harvard Business Review (1987), No. 87603, Levine & Toffel (2010). Hence we argue that, quality performance
172 is, the measurement of product on its capability operate within the intended requirements to meet the primary
173 expectations and purposes. 3) Product Reliability (RELIAB)-Reliability is a measure of the probability that
174 a product will not malfunction or will operate properly within a specified time period or the consistency of
175 performance over time during which it is subjected to a given set of environment and or mechanical reliability.
176 According to Joseph Juran has two definitions for quality, freedom from deficiencies and fitness for use, which is
177 a utility value concept, which varies from one customer to another. His concept of fitness for use reflects meeting
178 customer needs and is based on the following quality characteristics like, Technological (strength), Psychological
179 (beauty), Timeoriented (reliability), Contractual (guarantee Ethical (sales staff courtesy). He emphasized that
180 the improvement of product or services and processes applies to all customers, internal and external. U.S.A.
181 Department of Defense also define quality as, it is doing the right thing right the first time, always striving for
182 improvement, and always satisfying the customers. In several case, the meaning of quality in fact, remains a
183 term that is easily misunderstood. Some used the term to refer luxury and merit and some others to mean
184 excellence and value. The term is also being used to qualify a quality product as superior in all aspects to
185 others in its class. Hence, quality is based up on customer actual experience with the product or service,
186 measured against his requirements. Quality is meeting customer requirements and this has been expressed in
187 many ways by the quality experts in the field, Deming says that, quality should be aimed at the needs of
188 customer, present and future". A comprehensive definition of quality is that product or service which fulfils
189 an aggregate requirement of customers, in all aspects, at present and in the future and which customers can
190 buy it. consequently the closer this conformation indicates the higher the degree of quality. ??2013) to study
191 the effect by using internal integration, process integration as indirect variables and in their study they use.
192 when we say internal integration there are numerous components of internal integration, which one is likely
193 related to financial performance? we should exactly tackle and show the exact effect integration components
194 but their study is general. it needs for further investigations by using different indirect variables of Supply
195 chain integration like knowledge, production and design, technology, so as to decide where finance or operational
196 performances us as key performance measures?.on the other hand the previous studies have locate the limitations
197 in relying using on financial performance measures in supply chain studies Johnson and Kaplan (1987). For
198 example, numerical performance measures used as simple qualitative evaluations may not sufficiently illustrate
199 firm performance. As a result, in this study, we take on quality performance to measure the benefits of supply
200 chain integration. Supply chain integration can help companies to understand the requirements of customers,
201 to work with customers in joint product design, manufacturing process, information exchange, and strategic
202 accomplishment. For example, Tan (2001), Flynn et al (2010) found that internal integration could create a close
203 link between manufacturing and distribution processes to deliver products and services in a timely and effective
204 manner. Research and development integration has a positive impact both on business performance and social
205 performance, and that business performance serves as a mediator in the relationship between the integration of
206 R&D-marketing and social performance Xu et al ??2014).Hence without the cooperation of various functions,
207 it is difficult for companies to collaborate with and meet the requirements of customers in a dynamic business
208 environment. Thus, we propose our first set of hypotheses:

209 Few previous studies have investigated the impact of supply chain integration on the dimension of supply
210 chains. We argue that the integration and cooperation between production process, knowledge, technology
211 between internal& external firm, can facilitate the overall performance of the organizations. as a result, we
212 propose: Supply chain integration plays an important role in the enhancement of quality performance. However,
213 Supply chain integration enhances suppliers' understanding of the needs of the company, especially regarding the
214 quality standards of raw materials, production and components. In addition, supply chain integration can improve
215 information shearing, partnerships, joint planning, and product design with suppliers. Even though, According
216 to Aishah et al (2013) supply chain integration directly impacted by different factors towards the performance
217 of supply chain integration on the long term competitiveness and sustainable economic growth. However, very
218 limited studies had been conducted on the effects of supply chain integration components in order to achieve
219 longterm and sustainable economic growth. we propose the following hypothesis Production integration with
220 other functional areas and suppliers is a key aspect for achieving sustainable competitive advantage. Paiva et
221 al ??2011) analyze and found that the impact of manufacturing integration on performance. They found that
222 production integration aspects are positively related to sales growth, but only manufacturing-R & D integration
223 is positively related to profitability. Lin et al (2012) characterize the effect of vertical integration on profitability,
224 product price, and quality in a competitive setting. Thus is no clear findings that shows the significant association
225 between manufacturing integration and quality performance improvement. The diverse findings in the above
226 studies the need for further investigation of the relationship between production integration with impact of on
227 quality performance. as a result we propose In knowledge-based environments, necessity to develop a systematic
228 approach to integrating knowledge resources throughout the industry in order to improve quality. The firm

229 which is enhance the quality performance is comprises of accomplishing quality objectives in a convenient way
230 and fortifying connections both inside and outside the boundaries of the firm Gardner et al (2011). integrating
231 the firm into the knowledge features will abbreviate the correspondence chains between different departments.

232 The implementation of knowledge integration is an important factor for the firms in order to compete in
233 the quality performance. Overall improvement in knowledge integration across the supply chain directly impact
234 performance of supply chain. for establishing system-wide Knowles integration among supply chains will improve
235 resource utilization, productivity growth, quality, delivery and flexibility of the supply chain. However, the tasks
236 of knowledge integration is might differ from firm to firm and industry to industry. our hypotheses capture these
237 relationships by proposing that knowledge integration in a supply chain is a function of the extent of knowledge
238 integration with impacts on quality performance within a firm. thus we propose We believe that a higher level of
239 technological exchange and sharing is increase communication between manufacturer, suppliers and Customers,
240 improve production capability and improves performance of supply chain. A higher level of untreated linkage
241 between internal and external supply chain firms through an recognized technology improves the company, trust
242 and relationship, thus improving the overall performance of supply chain. though we propose, this hypothesis
243 H1a: The level of Supply chain integration is positively impact with quality performance.

244 H1b: Supply chain integration has an positively related on Production ,knowledge, Technology and Resource
245 integration in the supply chain on quality performance.

246 H1c: Supply chain integration, through knowledge, Production, Technology and Resource integration, has an
247 impact on quality performance of manufacturing industry.

248 H2a. Production & Design integration is positively related quality performance on a supply chain.

249 H2b: The knowledge integration positively impact and will improve quality performance. Resources is
250 viewed as the major organization driver in the global competitiveness. the quality and availability of resource
251 an organization determines the success potential. integration and linkages facilitates product development,
252 manufacturing, utilization and delivery efforts, which in turn has implications for quality, increased responsiveness
253 to market changes, and the reduction of defects from the supply chain. This in turn will have implications
254 for broader measures of quality and overall performance. we explore to hypotheses: customer, supplier and
255 internal operational and business the contingency approach, hierarchical regression was the results indicated that
256 internal and customer integration were more integration performance. used to determine the impact and In the
257 configuration approach, cluster analysis was used to develop patterns. This study generates important findings
258 of the significant and positive relationships between IGSCM (internal, with customers and with suppliers) and
259 operational performance in terms of flexibility, delivery, quality and cost.

260 **6 Global Journal of Researches in Engineering**

261 **7 Gimenez et al(2012)**

262 **8 Supply chain integration**

263 Cost performance survey-based research design is developed shows that supply chain integration increases
264 performance if supply complexity is high, while a very limited or no influence of supply chain integration can be
265 detected in case of low supply complexity. Also show that in high supply complexity environment integration has
266 a negative effect on cost performance. Yim& Leem (2013) social capital i.e (structural, relational, and cognitive)
267 integration Firm performance survey instrument is developed, authors validated their model and tested the
268 hypotheses using the partial least squares (PLS) structural equation model (SEM).

269 Empirical results reveal that the three dimensions of supply chain social capital -structural, relational, and
270 cognitive -had significant effects, directly or indirectly, on supply chain integration and performance, and supply
271 chain integration played a mediating role in the relationships between structural capital and firm performance,
272 between relational capital and firm performance, and between cognitive capital and firm performance. Danese
273 & Romano (2011) customer and supplier integration Efficiency performance Survey method and hierarchical
274 regression analysis apply.

275 **9 Supplier**

276 integration positively moderates the relationship between customer integration and efficiency, whereas the
277 analyses do not support the hypothesis that in general customer integration positively impacts on efficiency.
278 Also supplier integration is at a low level, customer integration can even produce a reduction in efficiency. Lee
279 et al (2007) Internal, supplier and customer integration cost-control and reliability performance

280 **10 Multivariate regression models and survey instrument are 281 used**

282 Internal integration is the most important contributor to costcontainment while integration with the supplier
283 is the best strategy to achieve supply chain reliable performance. ??ckstein The interaction between supplier
284 coordination and size was directly and positively related to quality performance (large size effect). However, the
285 is employed interaction between customer coordination and size was directly and negatively related to flexibility

13 V. CONCLUSION AND LIMITATIONS

286 performance (small size effect).Also shows interaction between supplier coordination and clock speed was directly
287 and positively related to only flexibility performance IV.

288 11 Result and Discussion

289 This study investigates the impact of supply chain integration on quality performance, by openly focusing on the
290 effect of knowledge, technology, production & design and resource integration in the supply chain context. We
291 found that most of our hypotheses are supported or partially supported, broadly indicating that supply chain
292 integration is related to quality performance. The independent variables are selected and then tested to know
293 their effect on quality performances. From figure1observe that supply chain technology and resource are entered
294 as independent variables. Whereas quality performance is selected as the dependent variable. The analysis
295 and testing is particularly we apply Hierarchical open decision analysis is used to test our hypotheses(H1a-H2c)
296 to (H2a-H2d). We investigated that production& design, knowledge, technology and resource integration is
297 directly related to quality performance. Although supply chain integration affect quality performance through
298 the interaction and integration of knowledge, production & design, technology and resource utilization.

299 12 Tables 2a-2c

300 Result Summary of AHP -Analysis results. ?? performance improvement supply chain integration paths indicates
301 that supply chain integration is positively and significantly associated with the four independent variables, that
302 impact on the of quality performance on firms. We found that most of our hypotheses are supported that
303 supply chain integration is related to quality performance. this implies that, the results indicated that internal
304 integration is highly impact positively associated with quality performance, supporting H2b.The relationship
305 between supply chain integration and knowledge, Production& design, Technology and Resource integration, has
306 an impact on quality performance of manufacturing industries, supporting H1c. Production & design, technology
307 and resource integration are positively related to quality performance supporting H2a, H2c and H2d. However,
308 the level and interaction of supply chain variables have different effects on quality performance and supply chain
309 practices. though, within constant Critical consistency ratio: (0.1), the Consistency ratio of each independent
310 variables is different.

311 The this difference are highly related to interaction terms between supply chain practices and competitive
312 strategies have different effects on quality performance. Knowledge and supply chain integration higher and
313 positive effect on the improvement and success of quality performance in supply chain. we compare our results
314 with those from previous research on supply chain integration, our finding that supply chain integration is
315 extensively associated to supply chain performance. .20 significant association between supplier and customer
316 integration impact effects on quality performance. Huo et al(2014) also shows that, the relation of Internal
317 integration, process integration, product integration, with financial performance. This is an vital finding, since to
318 a large extent of the existing literature on supply chain integration does not include multi-dimensional variables
319 integration as a dimension of supply chain integrations. This is not exactly show the effect of this variables
320 on supply chain performances. consequently multi dimension supply chain integrations should considered and
321 the relationship between supply chain integration and multiple quality performance dimensions needs further
322 investigation. Thus our study clearly shows that supply chain internal (such as knowledge, technology, production
323 & design and resource) highly related and impact for supply chain integration improvement, and positively
324 associated with quality performance on a supply chain. The pervious findings, as illustrated in Table 1, offer
325 to support for our hypotheses and results. The results also indicate that the strongest relationship subsist
326 between supply chain integration, knowledge, technology, production & design and resource integration with
327 quality performance. However, the findings provide guidelines for managers adopting supply chain integration
328 perform under different competitive strategies. primary, knowledge, technology, production& design and
329 resource integration directly improve firms' quality performance. Subsequently Supply chain integration through
330 knowledge, technology, production& design and resource are extensively enhance for quality performance. While
331 former research typically investigated a positive relationship between supply chain integration and supply chain
332 performance, our findings as well confirms a significance function of supply chain integration in enhancing supply
333 chain performance. This result implies that executive should look for to tactically facilitate multidimensional
334 integration by collaboratively working together with a strong emphasis on supply chain practices to improve
335 supply chain quality performance.

336 13 V. Conclusion and Limitations

337 To meet the increasing demand of high-quality and technological goods from sophisticated local and overseas
338 markets, manufacturing companies must continuously improve their efforts in technology and quality operations
339 of SCM. Supply chain integration provides to focuses competitive advantage and improve quality performance.
340 The effect of supply chain variables and quality performance is asses and investigated using literature review and
341 AHP analysis. The results of this study shows in the understandings of how supply chain variables (knowledge,
342 technology, production & design and resource) influence supply chain integration and quality performance. The
343 result indicates that knowledge, technology, production & design and resource integration directly related and
344 impact on quality performance for manufacturing companies. Supply chain integration has also positively linkage

345 on Production, knowledge, Technology and Resource integration so as to improve quality performance in a
346 supply chain. Although previous research usually investigated a positive relationship between supply chain
347 integration and supply chain performance, our findings also confirmed a vital role of supply chain integration
348 in enhancing supply chain performance on firms. Even though our findings have important implications for
349 researchers and managers, we recognize that the present study has certain limitations. We study the effects
350 of knowledge, technology, production & design and resource integration as the independent variables to impact
351 quality performance, but other variables such as integrated topology, information system might help to explain
352 causal variation in supply chain quality performance. Future research should investigate in addition to the effects
353 of above the variables on, supply chain integration and firm performance, but also include the relation between
354 information system, topology with on quality and financial performance. ¹

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Author(s) (Ref.no)	Integration types	Performance measures	Methodology	Major findings
Beheshti et al (2014)	Internal and external (Supplier, Customer)integration	Financial performance	survey instrument and Data analysis by SPSS software.	The findings supply chain integration a is beneficial t
Huo (2012)	Internal integration, supplier integration Customer integration	operational and financial performance	Using data collected from 617 companies in China and the structural equation modeling method	internal integ proves extern integration a ternal and ex integration d indirectly
Huo et al (2014)	Internal integration ,process integration, product integration,	Financial performance	Survey methodology was used to collect data and Hierarchical linear regression used	internal integ nificantly affe the financial ance of cost leaders, whi integration the
Seo et al (2014)	innovativeness Integration	supply chain integration (SCI) and supply chain performance	A questionnaire survey and structural equation modeling were used	performance entiators. Innovativeness supply chain a positive i both supply and internal and chain whereas
			moderating effects. integration performance. integration fully mediated innovative- ness-supply relationships, integration	

2

a: Alternatives Ranking

Name	Value
1 knowledge integration	38.85%
2 Supply chain Integration	17.75%
3 Technology	15.27%
4 production & Design integration	14.83%
5 Resource integration	13.30%

Figure 2: Table 2

2b

integration, knowledge, production & design,
 Figure 2 : performance improvement supply chain integration paths
 Tables 2a-2c Result Summary of AHP-Analysis
 results and figure

	Resource integration	Supply chain Integration	Technology
Resource integration	17.65%	9.54%	9.26%
Supply chain Integration	21.06%	24.22%	12.22%
Technology	16.03%	18.31%	21.73%
knowledge integration	34.77%	34.09%	39.27%
Production & Design integration	10.50%	13.84%	17.52%

Consistency ratio: 0.07, (Critical consisten

Table 2c : Main Criteria Weighting

1	knowledge integration	41.12%
2	Resource integration	19.14%
3	production & Design integration	16.32%
4	Technology	12.43%
5	Supply chain Integration	10.99%

Figure 3: Table 2b :

- 355 [Distribution Logistics Management] , *Distribution & Logistics Management* 38 p. .
- 356 [Burt et al. ()] , D N Burt , Petcavage , R Pinkerton . 2010. Boston: Irwin McGraw-Hill. (Supply management.
357 8 th edition)
- 358 [Peter and O'brien ()] , L Peter , O'brien . 2011. Russell Reynolds Associates, Inc. Russell Reynolds is a
359 trademark of Russell Reynolds Associates, Inc.
- 360 [Technovation (2005)] , 10.1016/j.technovation.2003.09.012. *Technovation* May 2005. 25 (5) p. .
- 361 [Carter Dale and Rogers ()] 'A framework of sustainable supply chain management: moving toward new theory'.
362 Craig R Carter Dale , S Rogers . *International Journal of Physical* 2008.
- 363 [Li et al. ()] 'A strategic analysis of inter organizational information sharing'. Jingquan Li , Riyaz Sikorab ,
364 Michael J Shawa . www.elsevier.com/locate/dsw *Decision Support Systems* 2005. 2006. 42 p. . (Gek
365 Woo Tan)
- 366 [Li A and Lin ()] 'Accessing information sharing and information quality in supply chain management'. Suhong
367 Li A , Binshan Lin . www.elsevier.com/locate/dss51 *International Journal of Operations & Production*
368 *Management* Stephan Vachon Robert D. Klassen (ed.) 2006. 2006. 2006. 42 p. . (Decision Support Systems)
- 369 [Braithwaite ()] *Achieving world class supply chain and logistics in the chemical industry*, Alan Braithwaite .
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13 V. CONCLUSION AND LIMITATIONS

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