# “Barriers to effective value chain management in developing countries: new insights from the cotton industrial value chain”


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| **AUTHORS** | Arthur Mapanga http://orcid.org/0000-0001-9115-7000<br>ResearcherID: C-2809-2018<br>Collins Ogutu Miruka<br>Nehemiah Mavetera |



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Arthur Mapanga, Ph.D. Candidate, School of Economic Sciences, North-West University, South Africa.

Collins Ogutu Miruka, Professor, School of Business and Governance, North-West University, South Africa.

Nehemiah Mavetera, Professor, School of Economic Sciences, North-West University, South Africa.

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**Arthur Mapanga** (South Africa), **Collins Ogutu Miruka** (South Africa), **Nehemiah Mavetera** (South Africa)

# BARRIERS TO EFFECTIVE VALUE CHAIN MANAGEMENT IN DEVELOPING COUNTRIES: NEW INSIGHTS FROM THE COTTON INDUSTRIAL VALUE CHAIN

## Abstract

A rigorous and extensive application of the value chain management (VCM) has become the vogue in modern day business practices and processes. However, due to the complex and multidimensional nature of value chains, achieving efficient and effective value chain management in real value chains remains a major conundrum for practitioners. Many unknown barriers continue to impede effective and efficient value chain management in developing countries' industrial value chains. The purpose of this study was to find out the common barriers to effective value chain management in a developing country's industrial value chains using evidence from the cotton industry in Zimbabwe. The analysis was based on survey data sets obtained from 157 purposively sampled experts from the cotton industry value chain in Zimbabwe. Exploratory factor analysis was used to find the barriers to effective value chain management. The results revealed both architectural and governance barriers to effective value chain management. The findings also presented major policy implications for industrial value chains in the developing countries and also indicated areas for further robust research founded on a broader data set from other developing countries' industrial chains as a way of validating the findings of this study.

**Keywords** value chain management, barriers, industrial value chains, developing countries, exploratory factor analysis

**JEL Classification** L22, M10, M11

## INTRODUCTION

The concept of value chain management (VCM) is widely acknowledged in contemporary literature as giving businesses both operational and strategic advantages. Value chain management entails handling the sequences of activities for developing, producing and delivering a good or service according to target market prerequisites (Gereffi & Fernandez-Stark, 2016; Dunne, 2001). Its importance lies in the eradication of inefficiencies in organizational operations. Also, value chain management initiates consistency, as well as the necessary flexibility in the delivery products and services to customers (Simchi-Levi, 2010; Singh, 2012; Ross, 2013). Implied here is the achievement of smooth economically driven operations that ensure maximum customer service. Therefore, in response to the globalized, efficient and hypercompetitive markets, a number of studies (see, for instance, Whelan & Meaden, 2012; Kulkarni, 2015) continue to promote rigorous and extensive use of the value chain management (VCM) in modern day business practices and processes. Through the application of VCM, managers start to develop an appreciation of the criticality of focusing

their energy and effort to constructing properly integrated relationships with suppliers, customers, as well as other stakeholders. This is what has made VCM the vogue in attempts to improve and sustain competitiveness in industries. VCM as such acknowledges the primacy of coopetition over competition in the management of business in the efficient global markets.

This line of thinking reflects the idea that business success is contingent upon firms' ability to manage and enhance the total performance of the value chain so that it can deliver improved value to customers. As indicated above, only through closer and long-term working relationships and partnerships with suppliers and customers at all levels in the chain can performance of the entire value chain be guaranteed. Indeed, Hayes and Watts (2016) situate VCM as a business philosophy for creating a shared vision and strategy, mutual respect, leadership, compatible culture, collaboration, commitment, win-win orientation, and mind-sets among numerous and often diverse business operations along the product or service chain.

As the foregoing shows, the necessity of value chain management can never be in doubt. However, as value chains are typically complex, multidimensional problem sets consisting of an infinite number of unknown variables that need to be optimized (Yeung & Coe, 2015; Gereffi, 2014; Ponte & Sturgeon, 2014), achieving efficient and effective value chain management in real value chains remains a major conundrum for practitioners. As reflected by the cotton industry value chain in Zimbabwe which unceasingly continues to underperform in spite of the spirited efforts in employing the value chain management principles, the effects of many unknown barriers impeding the effective and efficient value chain management approach in industrial value chains is a reality that must be tackled by management practitioners and researchers alike. Unless the barriers are identified and attended to, it seems industrial value chains would continue to experience underperformance. Implied here is the obvious need for managers working along industrial value chains such as the cotton industry value chain in Zimbabwe to have a full grasp of a common framework of barriers to effective value chain management before they can successfully improve performance in industrial value chains. Unfortunately, no cogent understanding of such barriers is as yet available to managers (Bratianu, 2016; Gerschberger, Engelhardt-Nowitzki, Kummer, & Staberhofer, 2012; Mathur, Mathur, & Kenyon, 2012). In addition, even a close framework of such barriers does not exist in literature (Sadraoui & Mchirgui, 2014; Ross, 2013). This study, thus, is in response to the quest for answers to the question regarding the barriers to effective industrial value chain management. The paper begins with a review of the available literature on barriers to effective value chain management. Links to the value chain literature are made in particular with reference to the issues of architecture, coordination and governance. The research design and methodology is then explained, including the rationale behind the selection of methods. Next, the paper presents findings from one case study based on primary data collected on the cotton industry value chain in Zimbabwe supplemented by secondary sources. Lastly the key findings are discussed, thus unlocking the way for implications and conclusions for managers and policy makers.

## 1. LITERATURE REVIEW

The chain metaphor is ubiquitous in business management literature with various studies (Gereffi et al., 2014; Kaplinsky & Morris, 2001) conceptualizing value chains as subsets of more complex and fluid structures whose nature, according to Rimmer (2014), comprises networks, webs and grids. For Costanza et al. (2014), such a lens allows value chains to be perceived as providing a fundamental understanding of business activity that cuts across the larger global and national economies. In addition, Sturgeon, Van Biesebroeck, and Gereffi (2008) identify entities such as workers, clusters, firms, and distinct industries as clear attributes of value chain. Thus, according to Kaplinsky and Morris (2001), the analysis of a given value chain situates the understanding of the "full range of activities which are required to bring a product or service from conception, through the different phases of production to delivery to the final consumers and final disposal after use".

Clearly, this framework shifts the point of focus away from an individual firm to a value chain stream (Porter, 1985). This premise rests on the assumption that only when activities are performed in a fashion that enables the generation of a sufficient margin between the overall costs of doing the activities and the price the consumer would be willing to pay, would the firm become profitable. The value added in each activity thus determines the competitiveness and sustainability of the business (Porter & Kramer, 2011).

Organizations are thus profitable when functions are so managed to operate effectively in adding value to the products and services offered to customers. In the context of this study, after noting tangible and intangible value-adding activities enshrined in the value chains, value chains are understood as a whole array of actors, policies, frames of references, power imbalances, interests, mind-sets, aspirations, frictions, positions, economic and social blind spots, priorities, technologies, practices and support systems which in unison work to add value to a product or service along its way from the primary producers to the end customers and disposal after use. Managing these elements thus become the only way to reducing uncertainty and enhancing customer service along the value chain.

Therefore, noting the above and according to extant literature (Soosay, Fearne, & Dent, 2012; Christ, 2014; Quarshie, Salmi, & Leuschner, 2016), value chain management (VCM) should aim to achieve competitiveness through the efficient and effective addition of consumer-recognized value at every stage along the production pipeline. This way VCM becomes a business strategic response for increased competitiveness (Bonney et al., 2007; Gooch, 2005; Dunne, 2001; Ackah & Agboyi, 2014). A related literature (Zott, Amit, & Massa, 2011; Prajogo & Olhager, 2012; Ross, 2013; Christopher, 2016) sees VCM as focusing on achieving strategic relationships among complementary businesses and stakeholders. This implies the primacy of effective coordination (Bigsten & Tengstam, 2015) in building strong relationships (Prajogo & Olhager, 2012; Ponte & Sturgeon, 2014) and creating value for consumers (Amit & Zott, 2012; Pearson, 2016). Yet, as discussed earlier, there are many unknown barriers to the effective and efficient value chain management to allow the manifestation of increased competitiveness in industrial value chains, especially so in the developing world. The following sections are in order to discover the likely barriers to effective and efficient VCM in industrial value chains.

Added to the fact that VCM is a new approach for most product businesses are many reasons for failure in value chains. A conceptual framework arising from five complementary theories in the form of National Competitiveness Diamond (Porter, 1990), New Economic Geography (Krugman, 1995), Systems Theory (Checkland, 2010), New Institutional Economics (Commons, 1930; Coase, 1937; Williamson, 2001) and Social Network Theory (Scott, 2000) points to both architectural and governance barriers to the effective and efficient VCM in industrial value chains. Firstly, a value chain may lack an effective supporting architecture due to various deficiencies in related to value chain activities such as scale, capacity utilization, linkages, interrelationships, vertical integration, location, timing, learning, policy decisions, and government regulations (Porter, 1985). Secondly, the value chain may lack an effective governance such as effective collective action regimes (Ostrom, 2014), regulatory systems (Elms & Low, 2013), lack of trust (Pietrobelli & Rabellotti, 2010), weak intermediaries (Lee, Gereffi, & Beauvais, 2012) and institutions (Kramer & Porter, 2011) leading to high transaction costs. Thirdly, the value chain may lack the capabilities required to sustain competitiveness (Kaplinsky & Morris, 2001), usually a result of players' inability to learn how to deal with the changing environment. Fourthly, the lack of commensurate cultures (Balcik, Beamon, Krejci, Muramatsu, & Ramirez, 2010; Cao & Zhang, 2011) among value chain players may lead to failures in value chain management initiatives. Furthermore, the pursuance of impractical and non-aligned strategies by partners in the value chain in most cases is a panacea for disaster. Lastly, the inability or unwillingness to share information; incorrect, or lack of or too much technology; incorrect or insufficient training; and also incentives that are misaligned to participants' goals can impede the application of the VCM in industrial value chains.

## 2. METHODOLOGY

To understand the barriers to effective VCM in the 'cotton industry value chain in Zimbabwe, a positivist paradigm was adopted since the units of analysis were the value chain actors and the allied stakeholders who were are "out there", existed and could be quantified. In this light, adopting this approach in this study was consistent with the ontological and epistemological assumption that reality is external and objective (Creswell, 2011; Chia, 2002). To answer the main question of this study, a cross-sectional survey research was utilized. Specifically, a descriptive survey design was employed to guide the study. This design was necessary as it could describe the events as they currently occurred, as well as how they related to other factors (Bryman, 2015; Creswell, 2014; Leedy & Ormrod, 2013). In the view of Neuman (2003), a descriptive survey study collects data (facts and opinions) concerning the present conditions and condition of phenomena.

This study then adopted a value chain approach, which, according to Badir (2015), corresponds to value chain analysis (VCA) to collect and analyze data used to isolate those variables with the capacity to influence value chain management in industrial value chains. The analysis of value chains is important in a business environment characterized by the interconnectedness of the business activities. Applying the value chain approach on the cotton industry in Zimbabwe was important as the chain was experiencing challenges which were beyond the control of individual managers. In line with the philosophical assumptions guiding this study, namely, a positivistic ontology with an objective epistemology, the methodological stance in the extant study rested on the need to collect primary data through quantitative methods, mainly through the use of standardized questionnaires.

### 2.1. Selection of respondents

Selection criteria were employed to determine the respondents included in the study, ensuring adequate representation of all segments and levels of the cotton value chain in Zimbabwe. To select a sample of respondents where an assessment of a framework of barriers to effective and efficient VCM would be meaningful, the research team did put in perspective the importance of experience and participation in the governance of the cotton industry value chain. Respondents with little experience (below 5 years) in cotton industry were less likely to be well versed with the intricacies of the industry. In the same vein, those who participated in the governance of the value chain were more likely to understand the barriers encountered in the industry value chain. This process produced respondents from the following groups: cotton farmer organizations, cotton ginning companies, textiles manufacturers, clothing manufacturers, academia, input suppliers, civil society, financial institutions, government ministries and agencies. It was imperative to involve these diverse groups of experts in order to balance the possible biases of different stakeholder groups. This ensured data accuracy. Also, reaching out to both the private and public sectors was meant to see the variances in perspectives between the parties. The sampling method was thus a purposive variant called snowballing based on the work experience and the respondent's involvement with the governance and knowledge of the cotton value chain. This nonprobability sampling technique resulted in the recruitment of 350 respondents.

### 2.2. Data collection

The field work was conducted from the beginning of April 2016 to the end of September 2016. This study relied on primary data collected through standardized questionnaires completed by the cross section survey respondents. In designing the questionnaire used in this study, the questionnaire development process suggested by Neelankavil (2015) was used. This process consists of ten steps, namely, clarifying objectives and research questions, translating them into specific needs, developing questions to address each information need, re-evaluating the wording of the questions, reworking the questions to elicit interest of respondents, arranging the questions to produce a logical sequence, improving style and presentation and finally pretesting the questionnaire. In order to safeguard the relevance and accuracy (of research

objectives and research questions), a statistician was consulted to check on the questionnaire items' efficacy in gathering the intended statistical data. Also, to avoid misinterpretations due incorrect grammar, the services of an English language editor were utilized to certify that the language used to frame the questionnaire items was able to solicit the requisite data.

During the study, the internal consistency method as estimated by the Cronbach's alpha (Aloini, Pellegrini, Lazzarotti, & Manzini, 2015; Aloini et al., 2013; Haladyna, 2012) was used to measure reliability. Spry (2015) asserts that the internal consistency of a measure reveals the similarity of the items in the instrument that is used to tap the constructs. One assumption of factor analysis is that items should at least be 70% reliable (Charry et al., 2016). Follow-ups were conducted to address and iron out any discrepancies in the answers provided by the respondents. However, redundant variables often reduce the reliability of the items. It is then advisable to detect and remove such items from the analysis. Negative total correlations and Cronbach's alpha if item deleted were used in this study to assist in detecting the redundant variables. In addition, the study used insignificant pairwise correlations $(r < 0.3)$ to further detect the redundant variables. And in order to improve the validity, the research team also conducted a desk research using extant literature in journals, government, industry reports and other relevant material available online to review the collected data.

350 questionnaires were distributed to the respondents. To realize a high response rate, the researchers motivated the respondents by affixing a post: "This questionnaire only takes a maximum of 10 minutes to complete. Enclosed for your convenience is a pen to use and keep as a token of appreciation for your effort". While acknowledging the conflict nature of respondent incentive, this decision was taken out of pure appreciation than to motivate the respondents. After a week, a friendly reminder was sent to each respondent. The strategy worked as 172 questionnaires were returned. Finally, upon receiving the questionnaires back from the respondents, the researchers checked whether the questionnaires were fully completed, numbered them for easy identification in case there was a need to relook at particular questionnaires in future. The data were loaded into an Excel software package after which it was transferred into the IBM SPSS version 23 software package for subsequent analysis.

### 2.3. Data analysis

In this study, the questionnaire items were measured using the "seven-point Likert scale from 1 to 7" rating, with choices from "very strong" to "very weak" or " strongly disagree" to "strongly agree". Firstly, in order to identify statistical facts and patterns on the characteristics of the sample, statistical analysis was done on the collected data from the cotton value chain experts. This was then followed by factor analysis. The statistical analyses were done with SPSS software (version 23.0). Firstly, a data sheet was developed in Microsoft Excel, and then transferred into the IBM SPSS 23 statistical package. Before analysis could take place, the researcher took some time to clean the data for possible errors and omissions in the feeding process. Data were then analyzed using multivariate statistics, precisely exploratory Factor analysis (EFA).

## 3. RESULTS

This study was designed to produce a common framework of the underlying barriers that can explain the practical failure of value chain management in industrial value chains. The cotton value chain in Zimbabwe was used as an illustrative case. The identification of such barriers in this study was pertinent in assisting the managers and policy makers working along the cotton value chain in Zimbabwe in formulating and executing those strategies that can at last transform the performance in industrial value chains.

### 3.1. Questionnaire response rate

A total of 172 out of 350 experts completed and returned the questionnaires. Fifteen (15) of the returned questionnaires were unusable, because either they were not completed fully or the respondent did not complete the consent form as had been requested. The useable questionnaires

totalled one hundred and fifty-seven (157). This means the usable response rate was 45% of the total sample of the identified cotton value chain experts. This sample was adequate as indicated by the KMO test as shown in subsequent analysis.

## 3.2. Statistical analysis

Cronbach's alpha was employed to check the reliability of the questionnaire items used in the study. Cronbach's alpha enables the estimation of consistency in the questionnaire items (Tavakol & Dennick, 2011). Cronbach's alpha ranges from 0 to 1 with those alpha coefficients closest to 1.0 revealing highest internal consistency on the items. Nonetheless, any value above 0.6 can be accepted as posing satisfactory item reliability (Yücel, 2012; Malhotra, 2010). Table 1 shows the Cronbach's alphas for the items used in this study.

**Table 1.** Reliability testing on the items measuring the barriers to effective VCM

| Reliability statistics | |
|---|---|
| **Cronbach's alpha** | **N of items** |
| .791 | 26 |

### *3.2.1. Exploratory factor analysis*

An exploratory factor analysis (EFA) was conducted on the instrument items. An exploratory factor analysis is utilized to reduce the number of variables and to categorize the variables (Sass & Schmitt, 2010; McDonald, 2014; Kline, 2013). Before getting on with exploratory factor analysis, it was necessary to assess whether the items on the instrument were factorable or not. Therefore, in this study, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were used to decide on the factorability of the research data. According to Pallant (2010), values equal or better than 0.6 for the KMO test and a significant Bartlett's test of sphericity would suggest that the data set is factorable. Presented in Table 2 are the results KMO and Bartlett's tests on the dataset from the cotton value chain in Zimbabwe.

**Table 2.** Results of KMO and Bartlett's test of sphericity on barriers to effective VCM

| KMO and Bartlett's test | | |
|---|---|---|
| Kaiser-Meyer-Olkin measure of sampling adequacy | | .767 |
| Bartlett's test of sphericity | Approx. Chi-Square | 1995.041 |
| | df | 666 |
| | Sig. | .000 |

The results portrayed in the Table 2 show that the KMO value for the data (KMO = 0.767) was greater than the benchmark of 0.6 (Dimitrov, 2014) thus making factor analysis possible. In addition, the Bartlett's test result (Chi-square Bartlett test = 1992.041 (df = 667), $p = .000 < 0.05$) was significant (Leech, Barrett, & Morgan, 2014) implying that there was sufficient correlation among the variables to allow factor analysis. Accordingly, the two tests were satisfactory for factor analysis to be used in the study.

### *3.2.2. Barriers in the cotton value chain in Zimbabwe*

**Table 3.** Eigenvalues of the barriers in the cotton industry value chain in Zimbabwe

| Component | Initial eigenvalues | | Cumulative, % |
|---|---|---|---|
| | Total | % of variance | |
| 1 | 6.371 | 15.514 | 15.514 |
| 2 | 4.988 | 10.649 | 26.163 |
| 3 | 3.159 | 8.483 | 41.677 |
| 4 | 2.182 | 5.627 | 47.304 |
| 5 | 1.811 | 4.895 | 52.199 |
| 6 | 1.547 | 3.811 | 56.010 |

The six (6) barriers to effective VCM in the cotton industry value chain in Zimbabwe were identified as barrier 1.1 to barrier 1.6 and as can be seen in Table 3, barrier 1.1 contributed much of the total variance explained, contributing to about 15.514%. The least contributor was barrier 1.6, contributing to about 3.811% of the total variance explained. The results of the initial factor solution after the factor analysis are presented in Table 4.

**Table 4.** Initial solution on the barriers

| Item | Factor 1.1 | Factor 1.2 | Factor 1.3 | Factor 1.4 | Factor 1.5 | Factor 1.6 |
|---|---|---|---|---|---|---|
| Q26 | 0.275 | 0.185 | –0.383 | 0.268 | 0.217 | 0.293 |
| Q27 | 0.229 | 0.234 | 0.051 | 0.153 | 0.431 | 0.041 |
| Q29 | –0.083 | 0.618 | 0.187 | 0.022 | –0.242 | 0.018 |
| Q30 | 0.227 | 0.029 | 0.616 | –0.223 | –0.118 | –0.247 |
| Q32 | 0.256 | –0.216 | 0.304 | –0.316 | –0.292 | 0.116 |
| Q33 | 0.455 | –0.138 | 0.271 | 0.002 | 0.352 | –0.174 |
| Q34 | 0.102 | 0.378 | 0.393 | 0.029 | –0.414 | 0.171 |
| Q35 | 0.209 | 0.193 | 0.223 | –0.066 | –0.191 | –0.249 |
| Q37 | 0.377 | 0.41 | 0.314 | –0.166 | 0.034 | –0.105 |
| Q38 | 0.32 | 0.004 | 0.325 | –0.053 | 0.361 | –0.396 |
| Q40 | 0.087 | 0.272 | 0.365 | 0.174 | –0.21 | –0.413 |
| Q49 | 0.151 | 0.454 | 0.028 | 0.348 | –0.082 | 0.15 |
| Q52 | 0.299 | –0.038 | 0.366 | 0.308 | 0.15 | –0.262 |
| Q55 | 0.31 | 0.315 | –0.169 | 0.384 | 0.032 | –0.237 |
| Q67 | 0.05 | 0.535 | –0.309 | –0.156 | 0.24 | –0.07 |
| Q68 | 0.256 | –0.261 | –0.509 | –0.035 | –0.116 | 0.206 |
| Q69 | 0.621 | –0.088 | –0.226 | –0.122 | 0.053 | 0.049 |
| Q74 | 0.234 | 0.455 | –0.41 | –0.034 | 0.109 | 0.197 |
| Q77 | 0.368 | –0.275 | 0.007 | 0.092 | –0.206 | 0.148 |
| Q83 | 0.418 | –0.115 | 0.071 | –0.378 | 0.009 | 0.081 |
| Q84 | 0.566 | 0.163 | –0.272 | 0.022 | –0.044 | –0.267 |
| Q86 | 0.592 | 0.043 | –0.399 | –0.135 | –0.038 | –0.09 |
| Q89 | 0.311 | 0.422 | –0.171 | 0.387 | –0.105 | –0.02 |
| Q91 | 0.646 | 0.325 | –0.204 | –0.167 | –0.146 | 0.082 |
| Q93 | –0.088 | 0.373 | 0.275 | 0.221 | –0.317 | 0.286 |
| Q98 | 0.114 | 0.188 | –0.262 | –0.353 | 0.107 | –0.061 |
| Q119 | 0.57 | –0.03 | 0.146 | –0.014 | –0.209 | 0.155 |
| Q121 | 0.298 | –0.11 | 0.153 | –0.144 | 0.009 | –0.014 |
| Q125 | 0.25 | –0.177 | 0.157 | 0.101 | –0.316 | 0.18 |
| Q128 | 0.448 | –0.228 | 0.029 | 0.133 | –0.136 | 0.326 |
| Q129 | 0.254 | –0.237 | 0.393 | –0.273 | 0.163 | 0.414 |
| Q131 | 0.368 | –0.128 | 0.295 | –0.189 | 0.371 | 0.18 |
| Q132 | –0.02 | 0.169 | 0.297 | 0.128 | 0.118 | 0.227 |
| Q138 | –0.091 | 0.184 | 0.386 | 0.286 | 0.443 | 0.293 |
| Q140 | 0.009 | 0.192 | 0.357 | 0.161 | 0.259 | 0.404 |
| Q194 | 0.285 | –0.594 | –0.02 | 0.533 | –0.038 | –0.109 |
| Q197 | 0.294 | –0.593 | –0.004 | 0.527 | –0.042 | –0.095 |

It was difficult to determine which items defined which barriers from the initial solution above. Therefore, factor rotation was carried out to improve interpretability. The results of equamax factor rotation are presented next in Table 5.

As can be seen in Table 5, it was easier to interpret the barriers, since the distribution of items was spread across all the six barriers extracted from the dataset from the cotton industry value chain in Zimbabwe.

**Table 5.** Equamax factor rotation on the barriers to effective VCM

| Item | Factor 1.1 | Factor 1.2 | Factor 1.3 | Factor 1.4 | Factor 1.5 | Factor 1.6 |
|---|---|---|---|---|---|---|
| Q26 | 0.187 | –0.001 | –0.072 | 0.138 | 0.285 | 0.01 |
| Q27 | –0.067 | –0.086 | 0.057 | –0.02 | 0.075 | 0.565 |
| Q29 | 0.082 | –0.288 | 0.565 | –0.14 | 0.204 | –0.112 |
| Q30 | 0.059 | –0.099 | 0.188 | 0.235 | –0.178 | 0.33 |
| Q32 | 0.077 | 0.106 | 0.244 | 0.25 | –0.538 | 0.07 |
| Q33 | 0.285 | 0.246 | –0.098 | 0.002 | –0.135 | 0.479 |
| Q34 | –0.03 | –0.066 | 0.72 | 0.128 | –0.086 | 0.002 |
| Q35 | 0.322 | 0.11 | 0.386 | –0.168 | –0.056 | 0.104 |
| Q37 | 0.318 | –0.152 | 0.432 | –0.049 | –0.112 | 0.395 |
| Q38 | 0.01 | –0.011 | –0.05 | 0.012 | –0.073 | 0.797 |
| Q40 | 0.013 | 0.055 | 0.419 | –0.054 | 0.221 | 0.296 |
| Q49 | 0.089 | –0.052 | 0.364 | 0.103 | 0.4 | –0.021 |
| Q52 | –0.078 | 0.172 | –0.004 | 0.259 | 0.23 | 0.522 |
| Q55 | 0.224 | 0.046 | 0.107 | 0.088 | 0.545 | 0.247 |
| Q67 | 0.313 | –0.512 | –0.065 | –0.152 | 0.309 | 0.039 |
| Q68 | 0.259 | 0.257 | –0.099 | 0.09 | –0.185 | –0.174 |
| Q69 | 0.495 | 0.097 | –0.098 | 0.293 | –0.117 | 0.195 |
| Q74 | 0.244 | –0.313 | 0.149 | 0.011 | 0.145 | 0.102 |
| Q77 | 0.107 | 0.272 | 0.005 | 0.44 | –0.097 | 0.002 |
| Q83 | 0.295 | –0.005 | 0.054 | 0.159 | –0.47 | 0.232 |
| Q84 | 0.629 | 0.041 | –0.017 | 0.158 | 0.272 | 0.15 |
| Q86 | 0.701 | 0.056 | –0.084 | 0.155 | 0.05 | 0.026 |
| Q89 | 0.268 | 0.03 | 0.293 | 0.118 | 0.507 | 0.049 |
| Q91 | 0.728 | –0.075 | 0.265 | 0.186 | 0.001 | 0.014 |
| Q93 | –0.261 | –0.048 | 0.648 | 0.073 | 0.045 | –0.053 |
| Q98 | 0.366 | –0.282 | –0.088 | –0.15 | –0.085 | –0.012 |
| Q119 | 0.208 | 0.005 | 0.114 | 0.662 | –0.045 | 0.177 |
| Q121 | 0.233 | –0.15 | –0.302 | 0.488 | 0.08 | –0.019 |
| Q125 | –0.163 | 0.035 | 0.05 | 0.687 | 0.001 | 0.041 |
| Q128 | 0.127 | 0.213 | –0.031 | 0.587 | –0.049 | –0.033 |
| Q129 | 0.077 | 0.078 | –0.006 | 0.196 | –0.561 | 0.055 |
| Q131 | 0.255 | 0.09 | –0.104 | 0.049 | –0.355 | 0.25 |
| Q132 | 0.077 | 0.042 | 0.141 | –0.092 | 0.066 | –0.175 |
| Q138 | –0.25 | –0.003 | 0.062 | –0.102 | 0.103 | 0.163 |
| Q140 | –0.239 | –0.113 | 0.139 | 0.135 | 0 | 0.129 |
| Q194 | 0.067 | 0.899 | –0.115 | 0.061 | 0.054 | 0.05 |
| Q197 | 0.069 | 0.897 | –0.106 | 0.073 | 0.042 | 0.049 |

**Table 6.** Summary of barriers to effective and efficient VCM in the Zimbabwe cotton value chain

| | |
|---|---|
| | **Factor 1.1 (unaffordable transport and logistics services)** |
| Q69 | Absence/presence of chain related information and knowledge |
| Q84 | Infrastructure and technology should be improved |
| Q86 | Lack of product diversification |
| Q91 | Unaffordable transport and logistics services |
| Q98 | Unskilled labor |
| | **Factor 1.2 (stringent industrial regulations)** |
| Q67 | Firm policy decisions |
| Q194 | Stringent industrial regulations |
| Q197 | High transaction costs along the cotton industry's value chain |
| | **Factor 1.3 (market volatility)** |
| Q29 | Weak linkages with quality control agents |
| Q34 | Volatility of MF markets |
| Q35 | Weak market regulation |
| Q37 | Linkages of international textiles trading to other agents |
| Q40 | Linkages to traders |
| Q93 | "Stock prices" along the cotton industry's value chain |
| | **Factor 1.4 (collective action problems)** |
| Q77 | Internal versus external cooperation in performance |
| Q119 | Collection of action problems in the export trade |
| Q121 | Collection of action problems in the transport and logistics infrastructure |
| Q125 | Collection of action problems in the textiles manufacturing industry |
| Q128 | Collection of action problems in industrial financing |
| | **Factor 1.5 (limited competition)** |
| Q32 | Intermediation along the value chain |
| Q49 | Weak intensity competition in cotton ginning industry |
| Q55 | Weak intensity competition among farming inputs suppliers |
| Q83 | Diversity in knowledge and skills along the value chain |
| Q89 | Amount and effects of entry barriers along the cotton value chain |
| Q129 | Weak intensity competition among farming inputs suppliers |
| | **Factor 1.6 (access to financing)** |
| Q27 | Availability of third party financial providers |
| Q33 | Availability of credit information |
| Q38 | Weak linkages with financial institutions |
| Q52 | Cotton lint export links |

# 4. DISCUSSION

In order to decide what the extracted barriers symbolized in terms of the concrete actions necessary to improve value chain management in the cotton value chain in Zimbabwe, factor loadings were employed. In Table 5, the estimated standard loadings were from 0.35 to 0.90 for the identified themes. This guaranteed the unidimensionality of the items of each barrier (Chen & Cheng, 2012; Gerbing & Anderson, 1998). In general, the higher the absolute factor loadings that the inherent item adds the more it symbolises the underlying factor (Stewart, Ivy, & Anslyn, 2014; Gorsuch, 2010; Field, 2009). On this basis, the item with the highest factor loading was taken to represent the barrier. In addition, the researchers relied on prior established theoretical constructs to describe the barriers. In a way this reduced remarkably the threat to validity.

Major outcomes that arose from the research data offered important insights and also were a significant step towards the discovery of the barriers impeding effective VCM in the cotton industry value chain in Zimbabwe.

### 4.1. Unaffordable transport and logistics services

VCM aims to speed up the flow of goods and services through efficient logistics and transportation systems. Logistics optimizes the production and distribution processes (Stadtler, 2015). A good logistics and transport system provides better business efficiency, reduce operation cost, and promote service quality. It is argued that around one third to two thirds of the expenses of enterprises are spent on logistical and transportation activities in the value chain. On this basis, it is evident that exorbitant logistics and transportation activities present a restriction on the objectives of VCM in industrial value chains.

### 4.2. Stringent industrial regulations

For Lauridsen (2010), robust, effective and efficient regulatory systems are essential components of well-functioning industrial value chains. Certainly, government policies and regulations shape the business environment due to their impacts on costs, risks and barriers to competition for players in value chains. Thus, wrong institutional and regulatory frameworks are detrimental to the competitiveness of firms along value chains. This undermines the ability of firms to integrate into global value chains (Humphrey & Memedovic, 2003; Morrison, Pietrobelli, & Rabellotti, 2008; Gereffi, 2014). In addition, excessive regulation imposes high transaction costs on firms (Ghosh, 2010; Matheson, 2011; Chen & Imam, 2013). These observations tally with the findings of this study that stringent industrial regulations are detrimental to effective VCM in developing countries

### 4.3. Market volatility

According to Randers (2013), changes in supply and demand, new emerging markets and customer groups, rapidly changing demographics and skyrocketing commodity prices, shortening of product life cycles, natural disasters, industrial disputes, terrorism and war lead to scarcity in raw materials, funding gaps which bring complications to the VCM. For Anning (2013), such complexity in the operating environment places new demands and uncertainty to the practice of VCM. Beyond the effect on value chain strategies, market volatility also affects business performance. For example, more inventory may be needed to increase total safety stock in the value chain thereby causing cost escalation (see, for example, Speier, Whipple, Closs, & Voss, 2011; Ogbo & Ukpere, 2014). Certainly, therefore, the foregoing alerts management practitioners, as well as researchers, that market volatility is detrimental to VCM in industrial value chains.

### 4.4. Collective action problems

The dataset from the cotton industry value chain suggests that collective action problems (factor loadings is –0.687) present some notable challenge to effective and efficient VCM. For Datta and Christopher (2011), a value chain is indeed a solution to the coordination problem. Collective action is key for reducing high transaction costs (Markelova, Meinzen-Dick, Hellin, & Dohrn, 2009; Valentinov, 2007) along the value chain. As well, collective action is instrumental to accessing inputs and outputs, market information, new technologies, and market opportunities. Similarly, collective action may reduce barriers of entry to markets by improving the bargaining power with other supply chain actors, and may offset the lack of basic infrastructure and services, (Markelova et al., 2009). However, there is always a lack of spontaneity in the development of cooperation in value chains to achieve common goals. This is in light of the fact that individual actors may freely ride on the efforts of other firms thereby limiting collective action. As the foregoing refers, by implication, the presence of collective action problems along the value chain negatively affects value chain management in industrial value chains.

### 4.5. Limited competition

While five variables loaded onto this theme, the largest factor loading (–561) (Gorsuch, 2010) indicated the primacy of limited competition as a barrier to effective VCM in industrial value chains. Neo-classical economists (for example, Keynes, 1924; Marshall, 1924; Beckert, 2009) attribute competition as the single most important precondition in successful markets. Competition promotes both allocative and productive efficiency (Motta, 2004; Arnold,

Nicoletti, & Scarpetta, 2008). Furthermore, competition within value chains emboldens members to become innovative. For Porter (1990, p. 117), there is "a strong association between vigorous domestic rivalry and persistence in an industry". The findings of this study thus suggest that the prevalence of limited competition along the segments of industrial value chains militates against the proper functioning of the markets and the production of goods and services through the misallocation resources.

### 4.6. Inability to access to finance

Empirical evidence (see, for instance, Nichter & Goldmark, 2009; de la Torre et al., 2010; Baas & Schrooten, 2005) indicates that without access to diverse financial options, firms in industrial value chains cannot achieve the requisite levels of competitiveness and profitability. This is much more acute in developing countries' value chains which mostly comprise of small to medium enterprises with no adequate support to access finance during their formative years (de la Torre et al., 2010). Similarly, the lack of credit facilities in developing in developing countries to finance start-ups and subsequent upgrading investments negatively affect the development of industrial value chains (Kaplinsky & Morris, 2001; Beck & Demirgüç-Kunt, 2008). Capital is a prerequisite element for entrepreneurial success within value chains as it fuels start-ups, business expansion and smooth operations. Small businesses in industrial value chains are able to improve their productive capacities, acquire the essential technologies and thus improve their return on investment (Beck & Demirgüç-Kunt, 2008). Given the foregoing, access to credit is therefore imperative for those firms at the lower end of the value chain in order for them to upgrade into higher value adding activities. Therefore, to the extent that none of the firms can adequately access finance, effective VCM cannot be achieved in the developing countries

## CONCLUSION

This study investigated the barriers to effective VCM in industrial value chains using the case of the cotton industry in Zimbabwe. A multi-theoretical approach was employed to provide a conceptual framework for identifying the barriers to effective VCM in industrial value chains. This framework managed to provide answers to the problem faced in this study. In addition, this study provided empirical evidence on the barriers to effective VCM in industrial value chains. The empirical results revealed both architectural and governance barriers to VCM in industrial value chains. In the cotton industry value chain in Zimbabwe, high transport and logistics services, stringent industrial regulations, market volatility, collective action problems, limited competition and the inability to access to finance were major barriers to effective VCM. This study contributed to the body of knowledge in the business management field through the identification of unique barriers to VCM in industrial value chains. Managers and policy makers in industrial value chains can now manipulate such barriers to improve VCM.

## RECOMMENDATIONS

Reducing value chain barriers would improve the VCM effectiveness in developing countries. The following measures could help deal with the most potent barriers as revealed in the study:

### Transportation and logistics services

Integration into value chains depends to a large extent on the ease and costs of international flows of goods, services, capital, knowledge and people (Baldwin, 2012; Lorenzen & Mudambi, 2012; Taglioni & Winkler, 2016). In the developing world, therefore, there is a need for clear policy framework for reducing the high costs of logistics transportation services. Investments in logistics services infrastructure is necessary to reduce costs for logistics services.

### Access to value chain finance

To achieve effective VCM in developing countries' industrial value chains, there is a need to ensure that suitable and fit for purpose financing options are made available to the incumbent firms. Cooperative financing and investment by value chain actors may be an important means to avert lack of finance in the developing countries' industrial value chains. Governments must strive to provide enabling policy frameworks that secure finance service providers in the value chains. In so doing, governments would encourage the financial schemes to open up to the demands for finance from the actors in the value chains. Also, it is important for the financial service providers in developing countries' industrial value chains to provide appropriate financial products that meet the needs of the participants in the industrial value chains.

### Stringent regulations

While industrial regulations are pertinent to smooth running of value chains, excessive regulation can become detrimental to effective VCM in industrial value chains promoting holistic, coordinated and balanced approach to policy and regulation by the authorities in developing countries. There is really a need for governments to seek to better understand how their policy actions may impact the functioning of markets and value chains. Continuity is essential for developing consistent and predictable policies that are critical to enhancing investor confidence and delivering the strong, sustainable, inclusive growth that the world needs.

### Collective action problems

Improving the incentive structures facing the industrial value chain members is one way to reduce the occurrence of collective action problems. Certainly, value chain participants would do well by acting in their collective best interest rather than sectorial or self-interests. Furthermore, a value chain governance system that creates a social structure underpinned by trust would remove most of the collective action problems found in value chains.

## LIMITATION OF THE STUDY

While the methodological approach in this study had obvious benefits, there were also some inherent limitations. The use of structured questionnaires, simply generalized the insights with the possibility of disregarding some pertinent context-specific insights. To address such limitations, the data presented in this study and any recommendations thereof must be augmented with other essential datasets from further research as well as country relevant information coming from a number of sources such sectorial bulletins and government publications. There is a further need for refining the barriers through an internal review supported by further collection of feedback from more stakeholders from within the cotton industry value chain in Zimbabwe.

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