

DRIVERS OF OPERATIONAL PERFORMANCE AND CUSTOMER RETENTION IN THE CHEMICALS INDUSTRY

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ABSTRACT

South Africa has a vibrant chemical industry that contributes significantly to the socio-economic well-being of the country. However, due to ease of entry, there is a proliferation of businesses operating in this industry, which has increased the level of competition within the industry. Most businesses operating in this industry, therefore, face the challenge of retaining their customers in the wake of the increased competition. This study aimed to investigate the drivers of operational performance and customer retention in the chemicals industry in South Africa. To achieve this aim, the study tested the relationships between supply chain relationship quality, workplace safety and health, operational performance and customer retention within firms operating in the chemicals industry in Gauteng Province.

Using a quantitative approach, a survey questionnaire was distributed to a convenient sample of 184 professional employees drawn from selected businesses in the chemicals industry. Hypotheses were then tested through the structural

equation modelling approach using SMART PLS 3 statistical software. The results of the study show that supply chain relationship quality positively influenced the adherence to safety regulations. Both relationship quality and safety regulations positively influenced operational performance and customer relationships. However, there was no relationship between operational performance and customer retention. Practitioners in the chemicals industry can apply the results of the study in improving the retention of customers by implementing strategies for improving the adherence to safety and health standards and the quality of relationships with all stakeholders.

Keywords: Chemicals industry, relationship quality, safety regulations, operational performance, customer relationships

JEL Classification: M31

1. INTRODUCTION AND BACKGROUND

Chemicals are used to make virtually every human-made product and play an essential role in the daily life of people around the world (Bhusnure, Dongare, Gholve & Giram, 2018). The chemical industry is the third largest industrial sector in the world and employs more than 10 million people and generates a lot of money in shareholder value and tax revenue for governments (Bhusnure *et al.*, 2018). Since the late nineties, the global chemical industry has sunk into economic challenges due to a series of unfavourable events that unfolded over the last few years that have had crippling effects on the industry (Oh, Karimi & Srinivasan, 2008).

In South Africa, the situation is different, with the chemical industry in that country being cited as one of the key and vibrant industries that have contributed immensely to the economic growth of the nation. According to Majozi and Veldhuizen (2015), the South African chemical industry was founded in the later part of the 19th

Century to fill the demands for explosives and chemicals needed by the mining industry. The chemical industry is of the utmost importance to the South African economy as it is one of the largest manufacturing industry in the country and is a significant contributor towards job creation and leads towards international competitiveness and growth (Fakude, 2014). According to Majozi and Veldhuizen (2015) the chemical industry in South Africa is the largest of its peculiar kind in Africa and it is highly diversified and can be divided into 11 subsectors namely plastic products, consumer chemicals, inorganic chemicals, primary polymers and rubbers, pharmaceuticals, rubber products, bulk formulated organic chemicals, speciality chemicals, and fine chemicals and liquid fuels. However, as put forward by Oliveira (2014), despite South Africa having the largest and most sophisticated chemicals industry estimated at USD30 –billion it only contributes about 1% to global growth. It also adds about 5% to the country's gross domestic product (GDP) while the local petrochemicals industry is the most significant sector in the South African chemical industry, with a contribution of 55% of total production, and the entire industry also employs about 200 000 people (Department of Mineral Resources, 2017).

Although the chemical industry in South Africa plays an imperative role in the socio-economic development of the country, it has faced several challenges that prevent it from performing as expected. Such problems include market size, skills shortage, unreliable supply of electricity and energy supply, cost of doing business, labour issues infested with industrial actions, access to feedstock, and regulatory stringency and high tax burdens (Chemical & Allied Industries Association, 2017). Other challenges cited by the Small Enterprise Development Agency (2012) include obsolete technology, counterfeit parts, customer retention and operational performance

This study aims to investigate the relationships between supply chain relationship quality, workplace safety and health, operational performance and customer retention within firms operating in the chemicals industry in Gauteng Province. The research suggests that better supply chain relationship quality (SCRQ) and health and safety are critical elements to improved operational performance and customer retention. Specifically, the objectives of the article are to establish the influence of

SCRQ on safety and health, operational performance and customer retention. The study also seeks to explore the influence of safety and health on operational performance and customer retention as well as establishing the influence of operational performance on customer retention.

Most previous studies conducted on supply chain management (SCM) within South Africa (e.g. Vermeulen, Niemann, 2016; Botes, Niemann & Kotze, 2017; Nguegan Nguegan & Mafini, 2017) disregarded the chemicals industry. Previous studies on the South African chemicals industry (Majozi & Veldhuizen, 2015; Kotzee, 2016) also overlooked the relationship dimensions under consideration in this study. In addition, there is a lack of literature on studies that investigated both operational performance and customer retention in the South African chemical industry. Hence, these existant research gaps prompted the necessity to conduct the present study in order to discuss the driving factors of both operational performance and customer retention.

2. LITERATURE REVIEW AND HYPOTHESES

This section of the study provides a theoretical discussion of the chemicals industry in South Africa. The section also provides an overview of the literature on supply chain relationship quality (SCRQ), safety and health, operational performance and customer retention.

2.1.The Chemicals Industry

The chemicals industry is one of the top-ranked and most significant sectors in the world. According to Clements *et al.* (2010), the chemicals industry uses a wide range of raw materials to create a wide variety of products purchased by consumers directly and used to make products for other industries. The same authors further note that the industry is divided into three categories namely basic chemicals which include petrochemicals, polymers and basic inorganics, speciality chemicals which include chemical acids and catalysts used in industries, and consumer chemicals which are sold directly to the public, such as cleaning material. In South Africa, the chemicals industry remains an important feeder industry to other economic sectors

such as manufacturing and mining industries (Small Enterprises Development Agency, 2012). The country's chemical industry has primarily developed around the gasification of coal because of the absence of significant upstream oil reserves and little natural gas. This saw the establishment of a petrochemicals industry in the 1950s and two synthetic oil-from-coal plants in the 1980s (Chemical and Allied Industries Association [CAIA], 2010). Its products are of great significance to socio-economic prosperity, but several substances also lead to significant adverse effects on health and the environment (KEMI Report, 2010).

2.2. Supply Chain Relationship Quality

Supply Chain Relationship Quality (SCRQ) has increasingly become a dominant factor in determining the success or failure of firms (Lotfi et al., 2013). It has been defined as the overall assessment of the strength of a relationship and the degree to which the needs and desires of the supply chain members are satisfied as well as the depth and atmosphere of an exchange relationship (Naudé & Buttle, 2000; Woo & Ennew, 2004; Huntley 2006; Srinivasan *et al.*, 2011). In other words, SCRQ is concerned with the degree to which parties in a supply chain are engaged in an active, long-term working relationship. Some scholars (Ghaseni, 2011; Razavi, Abdi, Amirnequiee & Ghasemi, 2016) have indicated that several determinants or indicators determine the degree of engagement between supply chain partners. Such indicators/determinants include communication, corporation interdependence atmosphere, adaptation, trust, commitment, information sharing, coercive and non-coercive power, dependency and conflict to mention a few (Ghaseni, 2011; Odongo, Dora, Molnár, Ongeng & Gellynck, 2016; Razavi *et al.*, 2016).

Effective SCRQ is closely associated with many benefits such as customer satisfaction, product quality improvement, product or service availability, market coverage and enhanced business performance among others (Razavi *et al.*, 2016; Odongo et al., 2016). Several studies (Field & Meile, 2008; Athanasopoulou, 2009; Grewal *et al.*, 2009; Singh & Power, 2009; Segarr & Moliner *et al.*, 2013) have demonstrated the importance of relationship partners in determining success in services and manufacturing and retail industries. However, most researchers have mixed views regarding how relationships between supply chain partners influence

a firms' operational performance (Fynes & Burca, 2007; Liu Ke, Wei & Hua, 2013). Hence, the following hypotheses are formulated:

H1=Better quality SCR leads to improved workplace safety and health

H2= Better quality SCR leads to enhanced operational performance

H3= Better quality SCR leads to enhanced customer retention.

2.3. Safety and Health

Safety and health is a discipline dealing with the prevention of work-related injuries and diseases and the protection and promotion of healthy workers (Foromo, Chabeli & Satekg, 2016). Taderera (2012) highlights that safety and health entail the promotion and maintenance of the highest degree of physical, mental health and social well-being of workers in all occupations. The same author further notes that safety and health are composed of two parallel but related extremes namely occupational health and occupational safety. Occupational health according to Armstrong (2012) deals with ill-health arising from working conditions/environment that slowly accumulates and leads to the deterioration of all health of employees. Occupational safety concerns the prevention of accidents and minimising the aspect of the work environment that has the potential of causing immediate harm to the employee (Armstrong, 2012). Gadzirayi, Taruwona, and Mupararano (2010) proposed that it is imperative for every organisation to have a safety and health program to reduce unsafe conditions in the workplace. Safety and health are greatly linked to employee performance which can impact operational and organisational performance positively or negatively (Skipa, 2011; Jelimo, 2013; Syombua, 2014). Amponsah-Tawiah and Mensah (2016) also posit that when employees perceive that their organisation does not care for their health and safety, they will reciprocate by exhibiting work behaviours such as absenteeism, intention to leave the organisation, and inadequate commitment. This leads to the following hypotheses:

H4=Better workplace safety and health leads to customer retention

H5= Better workplace safety and health leads to enhanced operational performance.

2.4. Operational Performance

Operational performance relates to a manufacturing plant's capabilities to more efficiently produce and deliver products to customers (Zhu *et al.*, 2008). Turkulainen and Ketokivi (2013) argue that operational performance is considered to be a feasible option when one intends to inspect the direct effects of organisational activities such as workforce development by scrutinising operational outcomes. Operational performance enables firms to improve the effectiveness of production activities and to create high-quality products leading to increased revenue and profit and customer satisfaction which in turn lead to customer retention (Kaynak, 2003; Troung *et al.*, 2017). Typical measures of operational performance can be productivity, production quality, service quality, sales and innovation (Tomic *et al.*, 2018). These measures can be obtained both through subjective estimates and objective measures. However, more often than not, the operational measures are of an objective nature (Byremo, 2015). Many of these types of performance are easy to break down in numbers, e.g. the quality of products produced, the number of customer complaints or the number of new products developed (Byremo, 2015). Several studies (Olyaei, 2006; Van Doorn & Verhoef, 2008; Alrubaiee, 2010) have revealed that operational performance impacts profoundly on customer retention. This leads to the following hypothesis;

H6: Greater operational performance leads to enhanced customer retention

2.5. Customer retention

Retention refers to a commitment to continue to do business or exchange with a particular company on an ongoing basis. Stauss *et al.* (2001) defined retention as the customers' liking, identification, commitment, trust, willingness to recommend and repurchase intentions, with the first four being emotional-cognitive retention constructs and the last two being the behavioural intention. Han and Hyun (2013) define customer retention the propensity of the customer to stay with the service provider. Oliver (1997) posits that customer retention involves a deep commitment to rebuy or re-patronise a preferred product or service consistently in the future,

despite situational influences and marketing efforts having the potential to cause switching behaviour. It is influenced by factors such as trust, perceived customer service, customer satisfaction, perceived price reasonableness, dependability, corporate and brand image as well as relationship quality and the safety and health of the the organisation (Crozier & Baylis, 2010; Kumar, Batista & Maull, 2011; Han & Hyun, 2013; Jani & Han, 2013; Han & Hyun 2015; Kim, 2017).

3. CONCEPTUAL FRAMEWORK

Based on the review of the literature, the conceptual framework in Figure 1 was developed, which shows the proposed relationships between SCRQ, safety and health, operational performance and customer retention.

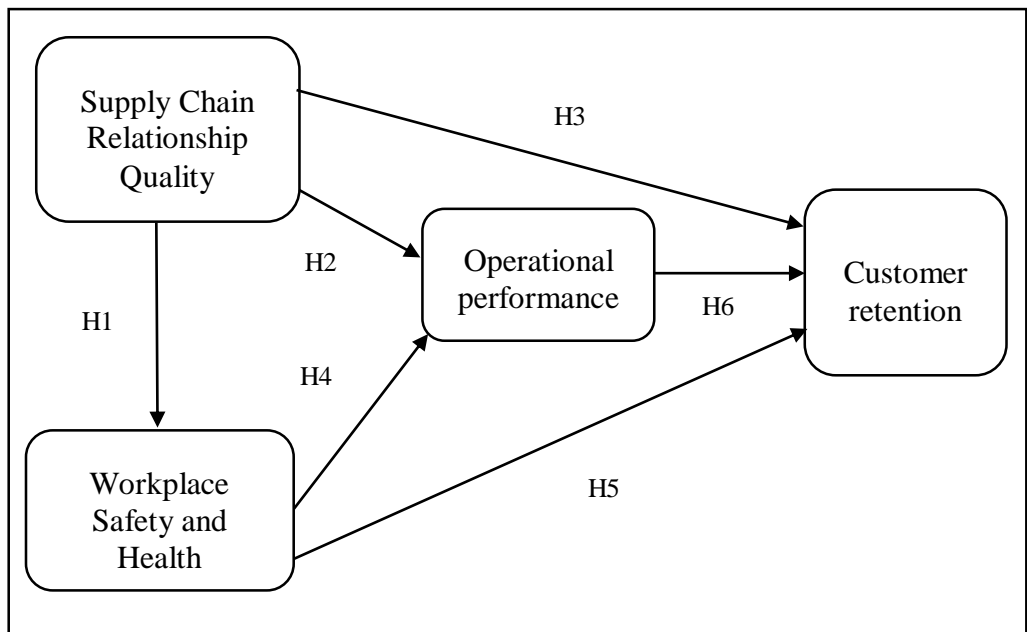


Figure 1: Conceptual framework

4. RESEARCH METHODOLOGY

The research methodology section provides an overview of the sampling design, procedures for data collection, instrumentation and data analysis.

4.1.Sampling Design

The unit of concern in this study was the South African chemicals sector, incorporating the petrochemicals, plastics and pharmaceutical industries. The research was conducted in 12 firms consisting of three firms in the petrochemicals industry, four firms in the plastics industry and five firms in the pharmaceuticals industry. All participating firms were based in Gauteng Province. Participating firms were conveniently selected, given the inaccessibility of a single sample frame from which a list of these firms could be obtained. A selective sampling technique, in which the researcher uses his/her judgement to select only those respondents who serve the objectives of the study (Saunders, Lewis & Thornhill, 2012), was used to draw the actual respondents who were relevant to the research. These respondents were either managers or professional employees who had some knowledge regarding the area of study and had been employed in that industry for at least one year. Respondents were typically chosen from the Operations, Supply Chain Management and Marketing departments of each firm since the research area was somewhat relevant to the activities of these departments.

4.2.Procedures for Data Collection

The study was conducted using a quantitative survey design since it involved the testing of six *apriori* hypotheses suggesting the existence of relationships between four different variables. Data were collected over a period of seven months (March to September) in 2017, using two trained research assistants who were students at a South African university of technology. The drop and collect method was used in the distribution of questionnaires. A total of 350 questionnaires were initially distributed to respondents, and 207 were returned. A total of 23 unusable questionnaires were discarded in the screening process, culminating in 184 questionnaires that were used in the data analysis. This resulted in a response rate

of 52%, which according to Baruch and Holtom (2008), lies within the acceptable norms of academic research. Also, the actual sample of 184 was deemed as acceptable, using the suggestion by Hair, Hult, Ringle and Sarstedt (2013) that the minimum sample size when using Structural Equation Modelling should be ten times the largest number of structural paths directed at a particular construct in the structural model. This suggestion was satisfied in this study, which tested a total of six structural paths.

4.3. Instrumentation

Measurement scales used in this study were adapted from previously validated research instruments. The SCRQ construct was measured using items adapted from previous study studies conducted by Fynes, de Bu´rca, Marshall (2004) and Young (2000). The safety and health construct was measured using items adapted from Lingard, Wakefield and Cashin (2011). The operational construct was measured using items adapted from Chan and Qi, (2003) and Prajogo, Oke and Olhager (2016). The customer retention construct was measured using items adapted from a previous study by Jing-Bo, Zhe and Xuan-Xuan (2008). Response options were presented in five-point Likert-scales anchored by 1=strongly disagree and 5=strongly agree.

4.4. Data Analysis

Two statistical software, namely the Statistical Packages for the Social Sciences (SPSS version 24.0) and the Smart PLS 3 were used in the data analysis. Simple descriptive statistics were used to analyse the demographic details of respondents while structural equation modelling was used for testing the scale accuracy as well as to test the hypotheses.

5. RESULTS OF THE STUDY

The results section discusses the demographic details of respondents, the measures for scale accuracy and the results of the hypotheses tests.

5.1. Demographic Details of Respondents

The demographic details of the 184 respondents who participated in this study are provided in Table 1.

Table 1: Demographic Details of Respondents

Demographic Variable	Categories	n	%
Gender	Male	103	55.4
	Female	81	44.0
Age groups	18-35 years	89	48.4
	36-50 years	67	36.4
	51 years+	28	15.2
Educational Qualifications	Certificate	23	12.5
	Diploma	70	38.0
	Degree	44	23.9
	Postgraduate	37	20.1
	Other (e.g. professional)	10	5.4
Years of Experience	<10years	91	49.5
	11-20 years	56	30.4
	21 years +	37	20.1
Occupational Field	Supply Chain Management/Logistics	79	42.9

	Marketing	38	20.7
	Operations	45	24.5
	Other	22	12.0

An analysis of Table 1 shows that a majority 55% (n=103) of the respondents were male. In terms of age groups, nearly 49% (n= 89) of the respondents were aged between 18 and 35 years, followed by the 36% (n=67) who were aged between 36 and 50 years. With respect to educational qualifications, 38% (n=70) of the respondents were holders of diplomas, nearly 24%(n=44) were holders of degrees, and 20% (n=37) were holders of postgraduate qualifications. Regarding their years of experience in the chemicals industry, a majority 50% (n=91) had less than 10 years of experience, followed by 30% (n=56) who had between 11 and 20 years of experience, and 20% (n=37) who had over 21 years of experience. With regards to occupational field, close to 43% (n=79) were supply chain management/ logistics professionals, 21% (n=38) were marketers, 25% (n=45) were in operations, while the remaining 12%(n=22) were in other ancillary but relevant areas. In terms of industry type, 39% (n=73) were drawn from the petrochemical industry, 33% (n=61) from the plastics industry and 27% (n=50) were drawn from the pharmaceuticals industry.

5.2. Measurement Scale Accuracy

In research, it is always important to determine whether measurement scales are accurate in terms of reliability and validity. In this study, measurement scale accuracy was determined through the confirmatory factor analysis (CFA) procedure, in which the researcher tests whether the measures of a construct are consistent with his/her understanding of the nature of that construct (Kline, 2010). The results of the CFA analysis are presented in Table 2.

Table 2: Accuracy Analysis Statistics

Research Constructs		Cronbach's Test		C.R. Value	AVE Value	Factor Loading
		Item-total	α Value			
Safety and health (SR)	SR1	0.765	0.909	0.909	0.888	0.887
	SR2	0.797				0.915
Relationship Quality (RQ)	RQ1	0.768	0.893	0.893	0.600	0.890
	RQ2	0.732				0.859
	RQ3	0.679				0.729
	RQ4	0.508				0.599
Operational Performance (OP)	OP1	0.811	0.911	0.911	0.738	0.858
	OP2	0.824				0.883
	OP3	0.793				0.841
Customer Retention (CR)	CR1	0.912	0.723	0.723	0.692	0.982
	CR2	0.459				0.464

Note: Safety Regulation (SR); Relationship Quality (RQ); Operational Performance (OP); Customer Retention (CR); Composite Reliability C.R.; AVE: Average Variance Extracted

During scale purification, item-to-total correlations were computed and were expected to be above the recommended minimum threshold of 0.3 (Churchill,

1979). Using this criterion, two items (SR3 and SR4) were discarded from the safety and health scale because they had item-to-total correlations less than 0.3 and were hence specified as ‘garbage’ items that were not measuring the safety and health construct. In checking for reliability, the Cronbach alpha test and the Composite reliability tests were computed. The recommended minimum values for the two tests is 0.7, for a measurement scale to be classified as reliable (Fornell & Larcker 1981; DeVellis, 2012). Consistently, Table 1 indicates that all measurement scales had Cronbach alpha and composite reliability values above 0.7, and were therefore reliable.

In testing for content validity, a pilot test was conducted using 40 conveniently selected respondents, who were excluded from the final study. Feedback from the pilot study was used to improve the questionnaire in terms of its wording, length, response options and other technical aspects. The study then went on to test for the two variants of construct validity, namely convergent and discriminant validity. To check for convergent validity, factor loadings for the individual scale items were computed. The suggestion by Comrey and Lee (1992) which uses cut-off values starting from 0.32 (*poor*), 0.45 (*fair*), 0.55 (*good*), 0.63 (*very good*) or 0.71 (*excellent*) was used in assessing the factor loadings. Using this recommendation, one item (RQ5) and two items (CR3 & CR4) were discarded from the scales, since they had factor loadings below 0.3. The resulting items in each scale were above 0.4 and were therefore deemed as adequate in ensuring convergent validity. Convergent validity was further assessed using the Average Variance Extracted (AVE). The Fornell and Larcker (1981) criterion was used, which recommends that AVE values should be greater than 0.4 in the determination of convergent validity. Since all AVE values satisfied this criterion, all items were deemed to be converging well on their respective constructs.

To check for discriminant validity, inter-factor correlations were used. The study followed Clark and Watson’s (1995) recommendation that correlation coefficients less than 1.0 are an indicator of adequate discriminant validity. The results are indicated in Table 3.

Table 3: Correlations between Constructs

Research Construct	Construct correlations			
	SR	RQ	OP	CR
Safety Regulation (SR)	1.000			
Relationship Quality (RQ)	0.555**	1.000		
Operational Performance (OP)	0.398**	0.294**	1.000	
Customer Retention (CR)	0.444***	0.567**	0.591**	1.000
** Correlation is significant at the 0.01 level (2-tailed)				

An analysis of Table 3 reveals significant inter-factor correlations ranging between $r=0.294$ and $r=0.591$, which all fell within the recommended threshold values. Hence discriminant validity was considered to be satisfactory in this study since measures (constructs) that were expected to be unrelated were indeed unrelated, as indicated by the correlations.

5.3.Results for Hypotheses Tests

The six hypotheses were tested using the path analysis technique, with the aid of the Smart PLS 3 software. The results are presented in Table 4.

Table 4: Results for hypotheses tests

Proposed relationship	hypothesis	Hypothesis	Path coefficient estimates	Decision
Supply Chain Relationship Quality → Safety Regulations		H1	0.366***	Accepted
Supply Chain Relationship Quality → Operational Performance		H2	0.115***	Accepted
Supply Chain Relationship Quality → Customer Retention		H3	0.319***	Accepted
Safety Regulations → Operational Performance		H4	0.707***	Accepted
Safety Regulations → Customer Retention		H5	0.277***	Accepted
Operational Performance → Customer Retention		H6	-0.062	Rejected

As presented in Table 4, the levels of the coefficients of five of the six hypotheses are significant at a level of $p < 0.01$, since all of them present three stars (***). This indicates that significant positive relationships existed between these research

constructs. Hence, it can be concluded that the hypotheses H1 to H5 in this study are positive, significant and supported. The results are further illustrated in the path model presented in Figure 2.

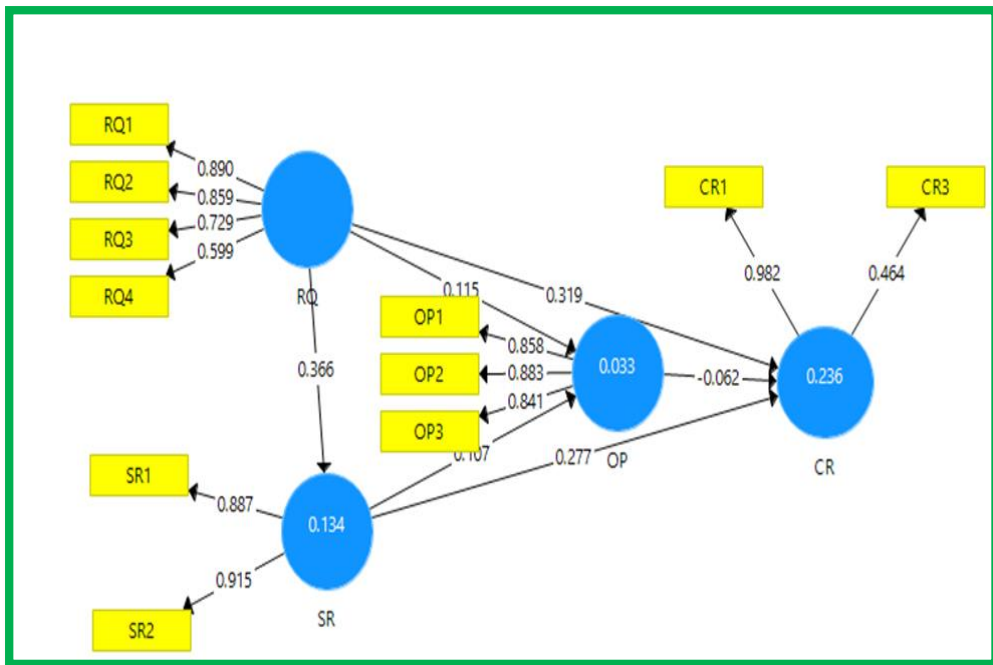


Figure 2: Path Model for Supply Chain Relationship Quality, Safety and Health, Operational Performance and Customer Relationships

6. DISCUSSION OF THE RESULTS

This study aimed to test the relationship between SCRQ, safety and health, operational performance and customer retention in the chemicals industry in South Africa. Six hypotheses were put forward representing the suggested relationships between these constructs. The first hypothesis indicated that better SCRQ leads to improved workplace safety and health this hypothesis was accepted since there was a significant positive relationship ($\beta=0.366$; $p<0.01$) between the two constructs. This result demonstrates that higher quality relationships between supply chain

partners lead to improved adherence to health and safety standards in the chemicals industry. This result coincides with studies by Du Toit (2012) and Sambe and Auo (2017)) which state that better SCRQ lead to improved workplace relationships. The second hypothesis suggested that better quality SCRQ leads to enhanced operational performance. This hypothesis was accepted because a positive and significant relationship ($\beta=0.115$; $p<0.01$) was observed between these two constructs. This result illustrates that firms within the chemicals industry that have better quality relationships with their supply chain partners are likely to have superior operational performance as well. This is in sync with a study by Razavi, Abdi, Amirnequiee and Ghasemi (2016) which suggests that developing a close relationship between suppliers and customers is widely encouraged as it enhances operational performance.

The third hypothesis suggested that greater SCRQ leads to improved customer retention. This hypothesis was accepted since there was a positive and significant relationship ($\beta=0.319$; $p<0.01$) between SCRQ and customer retention. This result implies that firms within the chemicals industry that enjoy stronger relationships with their supply chain partners are likely to retain their customers in the long term. This result is consistent with several studies (Wirtz & Lihotzky, 2003; Roberts-Lombard & Nyadzayo, 2014; Nischal, 2015) in which it is indicated that strong relationships with customers enable organisations to retain their customers. The current study is further analogous to the results of a previous study by Terblanche and Boshoff (2010) which found out that customer retention is triggered by factors such as perceived products value, quality and satisfaction with relationships. The fourth hypothesis suggested that better quality workplace safety and health leads to enhanced operational performance. This hypothesis was also accepted after a significant positive relationship ($\beta=0.707$; $p<0.01$) emerged between safety and health and operational performance. This result implies that greater operational performance in the chemicals industry is linked to the more effective adherence to workplace health and safety standards.

The fifth hypothesis stated that greater adherence to safety and health leads to enhanced customer retention. This hypothesis was accepted, based on the positive and significant relationship ($\beta=0.277$; $p<0.01$) existing between safety and health

and customer retention. This result validates that customer retention is likely to be higher where there is a more effective adherence to health and safety standards within the chemicals industry. The sixth hypothesis stated that greater operational performance leads to improved customer retention. This hypothesis was rejected as there was an insignificant relationship ($\beta=-0.062$; $p>0.01$) between operational performance and customer retention. The beta value is almost zero, indicating that there is virtually no relationship. This result suggests that in the chemicals industry, customer retention is not based on operational performance.

On the one hand, a firm might be experiencing greater operational performance but still be unable to retain its customers. On the other hand, a firm with below standard operational performance may still be able to maintain its customers. The results of the study show that it should be expected that improved customer retention in the chemicals industry is most likely to accrue from factors such as SCRQ and safety and health, rather than due to operational performance. It is necessary then to direct attention more significant attention to the development of SCRQ and workplace safety and health within that industry

7. CONCLUSIONS AND MANAGERIAL IMPLICATIONS

The study tested relationships between SCRQ, safety and health, operational performance and customer retention in the chemicals industry in South Africa. The results of the study show that for the chemicals industry, greater operational performance hinges on both the development and sustaining of stronger relationships between supply chain partners as well as the effective adherence to health and safety standards. Likewise, higher customer retention is dependent upon the existence of stronger relationships between supply chain partners as well as the uplifting of health and safety standards. Still, it is more likely that health and safety standards will be followed more effectively when enabling relationships exist between supply chain partners. However, operational performance is not linked to customer retention, which depicts that it does not mediate the relationship between customer retention and the other two predictor variables; SCRQ and safety and health. Thus, only direct connections exist between SCRQ, safety and health and customer retention.

Several managerial implications can be put forward for firms operating in the chemicals industry. The broader view is that both operational performance and customer retention may be improved through strengthening the relationships between supply chain partners and uplifting the health and safety standards within that industry. To improve SCRQ, it is critical that firms recognise supply chain relationship management as a strategic activity that should have its own allocation of resources. Communication and risk sharing with all stakeholders should be strengthened by integrating the systems, procedures and processes in the different stakeholder organisations in the chemicals supply chain. The use of technology to manage supply chain relationships could further improve the monitoring of relationships that affect the different stakeholders within the supply chain. To improve safety and health, regular inspections directed by qualified inspectors should be conducted to ensure that facilities and equipment are safe for use by all stakeholders. Regular training for both managers and employees should be conducted to ensure that they are well informed and skilled to uphold safety standards. Accident investigations should be conducted and the findings communicated well enough to create further awareness of the prevailing hazards within the workplace.

8. LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

The sample size used in this study was drawn from firms that were based in Gauteng Province only. This makes it necessary to exercise restraint when generalising the results of the present study to chemical industries in other provinces of South Africa and different regions of the world. Future studies may consider extending this study to other economic sectors such as mining, construction, electronics and automotive industries, among others.

References

- Abuga, G. (2012). A Case study on the effects of occupational health and safety programs on organizational effectiveness. Unpublished Masters' Dissertation. Kenyatta University. <http://ir-library.ku.ac.ke/handle/123456789/7407>. Accessed 2018/06/28.
- Amponsah-Tawiah, K. & Mensah, J. (2016). Occupational health and safety and organizational commitment: evidence from the Ghanaian Mining Industry. *Safety and Health at Work*, 7, 225-230.
- Armstrong, M. (2012). *Strategic human resource management practice*. Kogan Page, London
- Baruch, Y. & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human Relations*, 61(8), 1139-1160.
- Bhusnure, O.G., Dongare, R.B., Gholve, S.B. & Giram, P.S. (2018). Chemical hazards and safety management in pharmaceutical industry. *Journal of Pharmacy Research* | 12(3), 357-369.
- Chemical and Allied Industries Association (CAIA). (2017). Chemical industry viewpoint: The Chemical and Allied Industries Association (CAIA) Summit. CSIR International Convention Centre in Pretoria 5-7 October 2017.
- Byremo, C. (2015). Human Resource Management and Organisational Performance Does HRM lead to improved organizational performance? <https://www.duo.uio.no/bitstream/handle/10852/49030/Cathrine-Byremo-2015---HRM-and-Organisational-Performance--Does-HRM-lead-to-improved-organisational-performance-.pdf?sequence=1>. Accessed 2018/06/29.
- Chan, F.T.S. & Qi, H.J. (2003). An innovative performance measurement method for supply chain management. *Supply Chain Management. An International Journal*, 8, 209–223.
- Chemical and Allied Industries Association (CAIA). (2010). History of SA Chemical Industry, 1896 to 2010. <https://www.google.co.za/search?q=chemical+and+allied+industries+association>

<http://www.chemicalindustryeducation.com/chemical-industry-education-centre/chemical-industry-education-centre-2018-06-28>. 2018/06/28.

Churchill, G.A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16(1), 64-73.

Clements, A., Dunn, M., Firth, V., Hubbard, L., Lazonby, J. & Waddington, D. (2010). *The essential chemical industry*. York: Chemical Industry Education Centre.

Comrey, A.L. & Lee, H.B. (1992). *A first course in factor analysis* (2nd edition). Hillsdale, NJ: Lawrence Erlbaum Associates.

Crozier, G.K.D. & Baylis, F. (2010). The ethical physician encounters international medical travel. *Journal of Medical Ethics*, 36, 297-301.

DeVellis, R.F. (2012). *Scale development: Theory and application*. Los Angeles: Sage.

Du Toit, W.J. (2012). *The relationship between health and safety and human risk taking behaviour in the South African Electrical Construction industry*. Theses Nelson Mandela Metropolitan University. [Online]. Available: http://www.masterbuilders.co.za/resources/docs/News-Articles:2012.PDFs/100512_Relationship.between.H.S.Human.Risk.taking.Behaviour.in.South.African.Electrical.Construction.Ind.pdf [Accessed: 21 August 2018].

Fornell, C. & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.

Foromo, M.R., Chabeli, M. & Satekge, M.M. (2016). Survey on the implementation of the Occupational Health and Safety Act at an academic hospital in Johannesburg. *Curationis*, 39(1), 1-10.

Fynes, B., de Bu' rca, S. & Marshall, D. (2004). Environmental uncertainty, supply chain relationship quality and performance. *Journal of Purchasing & Supply Management*, 10, 179-190.

- Han, H. & Hyun, S.S. (2015). Customer retention in the medical tourism industry: Impact of quality, satisfaction, trust, and price reasonableness. *Tourism Management*, 46, 20-29.
- Hair, J.F., Hult, G.T.M., Ringle, C. & Sarstedt, M. (2013). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SE)*. Sage Publications, Inc.
- Han, H., & Hyun, S. (2013). Image congruence and relationship quality in predicting switching intention: conspicuousness of product use as a moderator variable. *Journal of Hospitality and Tourism Research*, 37(3), 303-329.
- Liu, H., Ke, W., Wei, K.K. & Hua, Z. (2013). Effects of Supply Chain Integration and Market Orientation on Firm Performance: Evidence from China. *International Journal of Operational & Production Management*, 33(3), 322-346.
- Truong, H.Q., Sameiro, M., Fernandes, A.C., Sampaio, P., Duong, B.T., Duong, H.H., & Vilhenac, E. (2017). Supply chain management practices and firms' operational performance. *International Journal of Quality & Reliability Management*, 34(2), 176-193.
- Jani, D., & Han, H. (2013). Personality, social comparison, consumption emotions, satisfaction, and behavioral intentions: how do these and other factors relate in a hotel setting? *International Journal of Contemporary Hospitality Management*, 25(7), 970-993.
- Jelimo, M.S. (2007). *The Effects of Occupational Health and Safety on Employee Productivity (Descriptive Study)*. Unpublished, Moi University, Kenya. http://erepository.uonbi.ac.ke/bitstream/handle/11295/93944/Oluoch_Effect%20Of%20Occupational%20Safety%20And%20Health%20Programmes%20On%20Employee%20Performance%20At%20Kenya%20Power%20Company%20Limited.pdf?sequence=3. Accessed 2018/06/25.
- Jing-Bo, S., Zhe, W. & Xuan-Xuan, L. (2008). The driving factor of customer retention: Empirical study on bank card. *Proceedings of the Management Science and Engineering*, 15, 558-564.

Katsuro, P., Gadzirayi, C.T., Taruwona, M. & Mupararano, S. (2010). Impact of occupational health and safety on worker productivity: A case of Zimbabwe food industry. *African Journal of Business Management*, 4(13), 2644-2651.

Kaynak, H. & Hartley, J.L. (2008). A replication and extension of quality management into the supply chain. *Journal of Operational Management*, 26(4), 468-489.

KEMI Report. (2010). Chemical industry from an economic perspective of development trends in the world, the EU, and Sweden in 2010. <https://www.kemi.se/global/rappporter/2010/rapport-5-10-chemical-industry-from-an-economic-perspective.pdf>. Accessed 2018/06/29.

Kim, J. (2017). The impact of different price promotions on customer retention. *Journal of Retailing and Consumer Services*, 30(40),1-8.

Kline, R. B. (2010). *Principles and practice of structural equation modeling*. (3rd ed.). New York, New York: Guilford Press.

Kotzee, E. (2014). Evaluating the awareness of environmental management accounting in the South African chemical industry. http://dspace.nwu.ac.za/bitstream/handle/10394/14292/Kotzee_E.pdf?sequence=1&isAllowed=y. Accessed 2018/06/28.

Kumar, V., Batista, L. & Maull, R. (2011). The impact of operational performance on customer loyalty. *Institute for Operational Research and the Management Sciences*, 3(2), 158-171.

Lingard, H., Wakefield, R. & Cashin, P. (2011). The development and testing of a hierarchical measure of project OHS performance. *Engineering and Construction Architect Management*, 18(1), 30-49.

Majozi, T. & Veldhuizen, P. (2015). The chemical industry in South Africa. *American Institute of Chemical Engineers (AIChE)*, 46-51.

Majozi, T. & Veldhuizen, P. (2015). The Chemicals Industry in South Africa. *American Institute of Engineers (AIChE)*, 1, 46-51.

- Naudé, P. & Buttle, F. (2000). Assessing relationship quality. *Industrial Marketing Management*, 29(4), 351-361.
- Nischal, C.K. (2015). Customer relationship management and customer retention in the Amica Restaurant at Valmet Oy Ltd. Thesis, JAMK University. [Online]. Available:<
https://www.theseus.fi/bitstream/handle/10024/103213/Nischal_final.pdf?sequence=1> [Accessed: 21 August 2018].
- Nguegan Nguegan, C.A. & Mafini, C. (2017). Supply chain management problems in the food processing industry: Implications for business performance. *Acta Commercii*, 17(1), 1-15.
- Oh H.C., Karimi I.A. & Srinivasan R. (2008). Supply chain management in the chemical industry: trends, issues, and research interests. In: Tang C.S., Teo CP., Wei KK. (eds) *Supply Chain Analysis*. International Series In Operational Research & Mana, Inc, 119
- Oliveira, D. (2014). South African chemicals industry has growth potential. <http://www.engineeringnews.co.za/article/south-african-chemicals-industry-has-growth-potential-2014-03-21>. Accessed, 2018/06/20.
- Prajogo, D., Oke, A., Olhager, J. (2016). Supply chain processes. *International Journal of Operational and Production Management*, 36, 220–238.
- Razavi, S.M., Abdi, M., Amirnequiee, S. & Ghasem, R. (2016). The impact of supply chain relationship quality and cooperative strategy on strategic Purchasing. *Journal of Logistics Management* 2016, 5(1), 6-15.
- Roberts-Lombard, M. & Nyadzayo, M.W. (2014). Supplier-customer relationship management and customer retention: A perspective on motor dealerships in an emerging Economy. *Mediterranean Journal of Social Sciences*, 5(20), 792-801.
- Saunders, M., Lewis, P. & Thornhill, A. (2012). *Research methods for business students*. 6th edition, Pearson Education Limited.
- Sembe, F. & Ayuo, A. (2017). Effect of selected occupational health and safety management practices on job satisfaction of employees in university campuses in Nakuru Town, Kenya. *Journal of Human Resource Management*; 5(5): 70-77.

Sikpa F.C. (2011). An assessment of occupational health and safety practices on job performance at the Tetteh Quashie Memorial Hospital, Akuapan. Kwame Nkrumah University Publishers, Ghana. <http://ir.knust.edu.gh/bitstream/123456789/4225/1/Sikpa%20Francis%20thesis.pdf>. Accessed 2018/06/22.

Srinivasan, M., Mukherjee, D. & Gaur, A.S. (2011). Buyer-supplier partnership quality and supply chain performance: moderating role of risks, and environmental uncertainty. *European Management Journal*, 29(4), 260-271.

Taderera, H. (2012). Occupational health and safety management systems: Institutional and regulatory frameworks in Zimbabwe. *International Journal of Human Resource Studies*, 2(4), 99-117.

Department of Mineral Resources. (2017). The contribution of industrial minerals to South Africa's Economic Growth: The quest to increase food security, accelerate infrastructural development and chemical expansion. <http://www.dmr.gov.za/LinkClick.aspx?fileticket=j01VskVV2o8%3D&portalid=0>. Accessed 2018/ 06/20.

Terblanche, N.S. & Boshoff, C. (2010). Quality, value, satisfaction and loyalty amongst race groups: A study of customers in the South African fast food industry. *South African Journal of Business Management*, 41(1), 1-9.

Tomic, I., Tesic, Z., Kuzmanovic, B. & Tomic M. (2018). An empirical study of employee loyalty, service quality, cost reduction and company performance. *Economic Research-Ekonomska Istraživanja*, 31(1), 827-847.

Tremblay, A. & Badri, A. (2018). A novel tool for evaluating occupational health and safety performance in small and medium-sized enterprises: The case of the Quebec forestry/pulp and paper industry. *Safety Science*, 101, 282-294.

Turkulainen, V. & Ketokivi, M. (2013). The contingent value of organizational integration. *Journal of Organization Design*, 2(2), 31-43.

Vermeulen, Y., Niemann, W. & Kotzé, T. (2016). Supply chain integration: A qualitative exploration of perspectives from plastic manufacturers in Gauteng, *Journal of Transport and Supply Chain Management* 10(1), 1-23.

- Odongo, W., Dora, M., Molnár, A., Ongeng, D. & Gellynck, X. (2016). Performance perceptions among food supply chain members: A triadic assessment of the influence of supply chain relationship quality on supply chain performance. *British Food Journal*, 118(7), 1783-1799.
- Wirtz, B. W. & Lihotzky, N. (2003). Customer retention management in the B2C Electronic Business. *Long Range Planning: International Journal of Strategic Management*, 36(6), 517-532.
- Woo, K.S. & Ennew, C.T. (2004). Business-to-business relationship quality: an IMP interaction-based conceptualization and measurement. *European Journal of Marketing*, 38(9), 1252-1271.
- Young, J.A. (2000). Strategic alliances: are they relational by definition. Working Paper, Indiana State University. <http://www.sbaer.uca.edu/research/sma/1995/pdf/73.pdf>. Accessed 2018/06/29.
- Zhu, Q., Sarkis, J. & Lai, K. (2008). Confirmation of a measurement model for green supply chain management production and environmental performance. *Production and Operational Management*, 10(3): 244-256.