Identification of Quality within the Warehousing Function - A Study within Protea Chemicals

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Abstract

The process of warehousing is an integral component of every logistics system as it is the primary link between production, suppliers and customers. Warehousing should play a pivotal role by providing a desired level of customer service at the lowest possible total cost. If a logistics system functions effectively, warehouse facilities are able to reduce stock outs whilst simultaneously reducing inventory levels which leads to improved customer service levels. One of the most complex challenges that an organisation encounters is determining what customers (internal or external) truly values. Once an organisation has determined what factors customers value, only then can the organisation begin to attempt to put in place measures and systems to ensure that customer satisfaction is achieved. This research study aims at investigating the efficiency of warehousing within Protea Chemicals, with specific reference to the quality of its service. It investigates operational staff, line management and internal customers' perceptions of Protea Chemical's warehouse quality.

Keywords: warehousing, service quality, efficiency, customer perception

Introduction

Protea Chemical provides warehousing to many of its internal and external customers. The emphasis in warehousing should be on planning of warehousing activities, which include goods receiving and its proper storage. Assembling, packaging, picking and distributing of customer's orders for delivery are also included. The reason for an existence of a warehouse is to

provide storage and delivery of goods to customers. In this context, it can be regarded as a complex system. This article is investigating new insights of operation staff, line management and internal customer perceptions of the Protea Chemical's warehouses. The researchers use the SERVQUAL instrument to identify quality variables such as tangibles, reliability, responsiveness, empathy and assurance that can impact on warehouse quality within Protea Chemicals. The quality gaps are identified and explained and recommendations are made with which Protea Chemical can close such gaps.

Assumed Problems Investigated

- The challenge facing each of the Protea Chemicals warehouse facilities is to improve the variance between the company's current service quality and the expected service quality within the warehousing function.
- Protea Chemicals warehouse facilities fail to have accurate stock levels and thus face the risk of losing customers to competitors.
- Warehouse staff needs to respond promptly to customer requests in order to retain existing customers and attract new customers.

Background of the Study

Protea Chemicals is a member of the Omnia Group family of companies located in South Africa. The Omnia Group consists of Omnia fertilizer, Bulk Mining Explosives, Protea Polymers, Protea Food Ingredients, Protea Bulk Resources and Protea Chemicals. For the purpose of the research study, the researcher will focus on the Protea Chemicals division only. Protea Chemicals is a diversified and specialist chemical services company. Protea Chemicals manufacture and distribute chemicals, and polymers throughout the African continent. Protea Chemicals operates in every sector of the chemical distribution industry, with widespread satellite facilities throughout Africa Omnia Group's business framework is underpinned by its vast resources namely intellectual capacity and innovative technology, and this provides the organisation with a competitive advantage over its competitors (Omnia, 2010a:2).

State of the art plant and warehouse facilities combined with widespread rail car and tank truck handling capacity permit superior efficiency,

guaranteed quality control and reduced overheads in the transportation of inbound and outbound distribution of raw materials, work in progress and finished goods within South Africa, (Omnia, 2010b:5).

Literature Review

In the literature review various books, journal articles and company documents and articles were studied to examine the debates on warehouse quality. The literature will first look at the warehousing function and thereafter the SERVQUAL model and service quality will be discussed.

Warehousing

Warehousing is about storing materials/goods and making timely delivery so that goods are manufactured on time. According to Murphy and Wood (2008:242) warehousing has been defined as "that part of a firm's logistics system that stores products (raw material, parts, goods-in-process, finished goods) at and between points of origin and point of consumption".

According to Waters (2009:399) warehousing is the general term for any place where materials are stored on their journey through a supply chain. Warehouses are needed for a variety of reasons, primarily reducing the overall costs of maintaining a supply chain while improving customer service. Emmet (2005:4-5) adds that warehousing is about having the right product in the right place at the right cost and at the right time. The emphasis in warehousing should be on planning and managing of warehousing activities, which include receiving, storing, assembling, packing, picking and distribution of customer's orders.

Another view put forward by Bowersox, Closs and Cooper (2010:267) is that warehousing has traditionally existed to stock inventory. Contemporary warehousing provides a broader value proposition in terms of economic and service benefits. Economic benefits include consolidation and break-bulk, sorting, seasonal storage, and reverse logistics. Service benefits include spot-stocking, full line stocking, and value-added services.

Emmet (2005:214) suggests that to obtain customer satisfaction the warehouse company has to improve warehouse efficiencies and have quality within the warehouse function.

To improve warehouse efficiency requires the following:

- Identifying Location in Warehouse Management

- Process Improvements in the Warehousing Function

Identifying Location in Warehouse Management

Emmet (2005:214) found that choosing a warehouse location is a critical decision in the strategy of an organisation. When taking location into consideration, an organisation should consider the location of raw materials, location of production site, location of customers and location of skilled labour.

Process Improvements in the Warehousing Function

It is necessary that the logistics managers to develop their own respective frameworks for the evaluation of their own performances and according to which their own procedures can be designed and implemented. Once the framework is ascertained, the logistics manager can create a detailed audit format based on history, projections, and reasonable goals (Ackerman, 2004:2-3).

In warehouse management the audits should focus on the following (Ackerman, 2004:3):

- Monitoring customer relationships
- Auditing for process and cost control
- Auditing to maintain quality
- Auditing the performance of staff in the warehouse
- Monitoring physical assets
- Using audit data to justify warehouse improvements

An important consideration to improve customer satisfaction within the warehousing function is to have quality in the warehousing function. According to Evans and Lindsay (2005:18) quality in warehousing function can be identified in:

- Quality as a Management Framework

- Customer and Stakeholder Focus
- Participation And Teamwork
- Process Focus and Continuous Improvement

Quality as a Management Framework

Quality as a management framework will include: customer and stakeholder focus, participation and teamwork and process focus and continuous improvements.

Customer and Stakeholder Focus

According to Evans and Lindsay (2005:18) the customer is the primary decision maker when it comes to quality. Perceptions of value and satisfaction are influenced by numerous factors of customers overall purchase, ownership and service experiences. To meet or exceed customer expectations, organisations have to fully understand all product and service attributes that contribute to customer value and lead to satisfaction and loyalty. An organisation must understand that internal customers are as important in assuring quality as are external customers who buy the product. Employees who understand that they are customers of and suppliers to other employees understand how their work links to the final product. In essence, the responsibility of any supplier is to understand and meet customer requirements in the most effective and efficient way possible. An organisations success depends on the knowledge, skills, motivation and creativity of employees and partners. A total quality organisation has to demonstrate commitment to employees and partners by providing opportunities for growth and development, provide recognition beyond normal compensation systems, share knowledge and promote risk taking (Evans & Lindsay 2005:18).

Participation and Teamwork

When management provide staff with the tools in order to arrive at sound business decisions and the liberty and support to make contributions, they assure enhanced quality goods and sound operations procedures as a consequence. By allowing employees to contribute to decision-making which impacts on their work functions and the client, may lead to significant quality improvements (Evans & Lindsay (2005:18).

Process Focus and Continuous Improvement

A process perspective links together all relevant activities and increases understanding of the entire system. Continuous improvements refer to both incremental changes that are gradual, and breakthrough or rapid improvements. These improvements enhance customer value, reduce defects and the associated costs, drives productivity and usefulness of resources and advances receptiveness and cycle time performance to resolve client non-conformances or introduce new products. The key enhancement in response time may necessitate simplification of work processes and often foster immediate development in quality and efficiency (Evans & Lindsay (2005:18). The next part of the theory that the study is based on is the SERVQUAL and GAPS model.

The Conceptual Model of Service Quality

This study uses the SERVQUAL instrument to test quality within the warehousing function. The Gaps model will also be adapted as it is an extension of the SERQUAL model.

The SERVQUAL Instrument to Measure Service Quality

According to Parasuraman (2004:46), the first and second components of the SERVQUAL instrument determine client expectations versus their perceptions respectively alongside a selection of service characteristics assembled into the five dimensions which follow:

- Reliability: ability to perform the promised service dependably and accurately.
- Responsiveness: willingness to help customers and provide prompt service.
- Assurance: knowledge and courtesy of employees and their ability to inspire trust and confidence.
- Empathy: caring, individualized attention the firm provides its customers.
- Tangibles: appearance of physical facilities, equipment, personnel, and communication materials.

Gaps Model

According to Bhattacharjee (2006:488), the Gap model for service quality can assist an organisation seeking to improve service quality to better focus on its strategies and service processes. Quality in service is as perceived by the customer. As service is intangible, the only way to measure quality in service is to measure the customer expectation and before the receipt of the service and measure the perception after the experience or service encounter. The gap between the two is the measure of service quality. The larger the gap, the worse is the service quality. The inverse also applies, where the narrower the gap, the better the service quality.

According to Cravens, Crittenden and Lamb (2002:458), business functions such as marketing, accounting and operations form a continuous chain of customer service that extends to the end user (buyer) of the product.

Evans and Lindsay (2005:4) confirmed that internal customer requirements need to be understood. Historically, organisations failed to comprehend client requirements, and significantly less to internal customer requirements. Management and specialists directed operations and workers were told how and what to do. Teamwork was non- existent.

For the purpose of the research study, the supplier is the warehouse and warehouse staff and the customers are sales representatives, telesales representatives and line management of Protea Chemicals. According to Parasuraman (2004::47), the organization needs to find ways and ask questions to close each of the gaps:

- Gap 1: For closing the market information gap. Does the company have mechanisms in place for channeling feedback from front line staff (sales or telesales staff) to warehouse and operations staff?
- Gap 2: For closing the service standard gap. Is warehouse staff swift to discard customer expectations as impractical and irrational?
- Gap 3: For closing the service performance gap. Does the company support warehouse staff with appropriate information systems and adequate training?
- Gap 4: For closing the internal communication gap. Does the company have tools in place for encouraging cross- functional interaction?

Methodology

A survey was conducted on warehouse Operations staff, Line Managers and Internal Customers (telesales and sales representatives) at Protea Chemicals. The survey was designed to collect information from staff on their perceptions on service quality wards warehouse service quality within Protea Chemicals warehouse facilities. The Questionnaire was designed using a five point LIKERT Scale. Closed-ended questions were used in the questionnaire. The questionnaire used in the study was adapted to the quality dimensions peculiar to warehousing environment and adapted to the SERVQUAL instrument developed by Parasuraman et al., (1985).

The researchers distributed all questionnaires via electronic mail to respondents inviting them to participate in the survey.

Probability sampling procedures were used by the researchers as they met the sampling objectives adequately. Stratified random sampling was chosen as it provides more information with a given sample, (Sekaran 2003:272). The sample was stratified according to the following groups in Protea Chemicals namely: the warehouse Operations staff, Line Managers and Internal Customers (telesales and sales representatives).

The researcher chose internal customers (telesales and sales representatives) as respondents due to their direct interaction and reliance on the warehouse to perform their selling functions effectively and efficiently. In addition to the sales team, the researcher also chose line managers as respondents as they have a direct vested interest in the operation of the warehouse and the service delivery offered to the end customer. Furthermore, the researcher chose warehouse and Operations staff as it is imperative to understand these staff members' perceptions and expectations of the facilities and service quality which they provide.

The study adhered to the specific ethical guidelines by Cavana, Delahaye and Sekaran (2001: 165) that the information provided by the respondent be treated as strictly confidential. A primary ethical responsibility of the researcher was the guarding of the privacy of the respondent.

The size of the population for the study was eighty Warehouse Operations staff, Line Managers and Internal Customers (telesales and sales representatives). The researchers had access to all four warehouses nationally. The members of the population were located in Durban,

Johannesburg, Port Elizabeth and Cape Town Distribution Hubs of Protea Chemicals.

Sample Size

According to Krejcie and Morgan's sample size table (Cavana, Delahaye & Sekaran 2001:278), for a given population of eighty, the sample size is sixty-six. The researchers had access to all four regional hubs throughout the South Africa and distributed the questionnaire using stratified random sampling.

Out of the sixty-six questionnaires distributed, only fifty-one completed questionnaires were returned to the researchers.

The Cronbach Alpha coefficient for Warehouse Perceptions was 0.947 and Expectations was 0.909, which represented an above average level of internal reliability.

The Limitations of the Study

- This study was confined to Protea Chemicals four Distribution Hubs in Durban, Johannesburg, Port Elizabeth and Cape Town and cannot be generalized to other chemical businesses in the same industry
- The study made use of stratified random sampling. Therefore a subsequent research study is required to build on the findings of this research study. All the employees of Protea Chemicals were not included in the research study, only those which are directly related to the warehouse function were included namely, warehouse staff, internal customers (external sales representatives and call centre consultants) and line managers of Protea Chemicals.
- Due to logistical, time and cost constraints, other Protea Chemicals business units were not included in the research study.

Results and Discussion

The table 1 below illustrates the gaps in scores revealed in the study.

Service Quality (SQ) By Dimension		
Dimension	SQ for Internal Customers	SQ for Warehouse Staff and Line Managers
Reliability	-1.68	-1.11

Responsiveness	-1.62	-1.11
Assurance	-1.27	-0.93
Empathy	-0.45	-0.44
Tangibles	-1.7	-1.09

Table 1: Service Quality by Dimension for internal Customer and Warehouse Operations staff and Line Management

The negative Gap scores are an indication that the internal customers and the operations and line management staff are dissatisfied with the quality of services provided by Protea Chemicals warehousing function. As illustrated in Table 1, internal customers believe that tangibles, followed by reliability and then responsiveness, are the dimensions which yield the most serious shortfall. Warehouse operations staff and line management believe that the dimensions of reliability and responsiveness have an equal (-1.11) service quality shortfall, followed by the tangible dimension.

The main objective of the research study was to evaluate the efficiency of warehousing within Protea Chemicals and assess its impact on service quality. Relevant data was collected from warehouse operations staff, line managers and internal customers (telesales and sales representatives) on their expectations and perceptions of the warehousing function. The research revealed that for each of the five service quality dimensions (tangibles, reliability, responsiveness, assurance and empathy), Protea Chemicals failed to meet the operational staff, line managers and internal customer expectations.

Recommendations

In order to improve the quality dimensions and have a significant impact on service quality afforded to the operations staff, line management and internal customers, the warehouse operations of Protea Chemicals need to focus on improving warehousing operational efficiencies. The significant Gaps found in tangibles, reliability, responsiveness, empathy and assurance have revealed that there is a problem with Protea Chemical's warehouse quality. The following recommendations were put forward.

Implementation of Warehouse Management System

Protea Chemicals can implement a Warehouse Management System. In order for managers to make good decisions, it is import that the quality of information and communication technology within the system be accurate and timely. As Protea Chemicals customers strive to achieve Just In Time (JIT) production facilities, there is an increasing need to have access to inventory without unnecessary delays. Protea Chemicals can implement bar-coded tracking systems as opposed to the paper- based manual methods. Mobile computing in the form of onboard computers systems on forklift trucks and handheld laser scanners capture data with real- time wireless communication which result in real- time decision making information and increasingly accurate stock.

A Warehouse Management System assembles, analyses, and reports information required to process the flow of inventory through a warehouse. A Warehouse Management System directs human resources on the optimal way to perform warehouse activities and guides the flow of inventory through the warehouse facility. Warehouse Management Systems can facilitate the transition in Protea Chemicals warehousing from a manual operation to an automated storage and retrieval system. Warehouse management systems can integrate all handling operations within a warehouse into one system, including receiving inventory through automated scanning, put-away or storage facilitated by automated bin locations, generating pick-lists of specific product batches to promote first-in-first-out and automated replenishment and distribution load planning and scheduling. As this process is automated, significant economic benefits can be achieved as a result of faster processing of transactions and reduction of errors.

Implementation of Radio Frequency Identification

Protea Chemicals can implement Radio Frequency Identification (RFID) technologies which is an information gathering system that enables automatic identification of products through tags which emit a continuous signal. An item bearing a RFID tag becomes networked without human intervention or manipulation by machinery.

Through the use of RFID Technology warehousing tasks can be automated to speed up the flow of inventory and to enhance customer service. It is common practice at Protea Chemicals that employees reconcile

shipments against delivery notes by performing physical counts and manual data entry which leads to counting and picking errors as well as slower processing times. By implementing RFID Technology, Protea Chemicals will have increasingly accurate orders and faster dispatching times which provide superior customer service and loyalty, ultimately contributing to an overall improvement in customer service. By removing personnel from performing the physical manual counts and documentation processing tasks, Protea Chemicals will reduce labour costs as people are increasing required to perform these functions.

An additional benefit of reduced labour is the reduced risk of error and exposure to product loss through theft. A third disadvantage of manual order processing is the friction as a result of the slowing down of the flow of goods. Each time an employee has to count, check and double- check the goods against documentation to process an order reduces the speed of goods moving within the supply chain

Cooke (1996:51) argues that in distribution businesses, where the quality of customer services is a key factor, RFID Tags can assist in achieving error-free delivery, reduced lead-times and availability of goods. The cost of implementing the automated RFID systems and the payback period will need to be determined and shown in order for Protea Chemicals to invest in this new technology. The Operations Manager of Protea Chemicals will need to conduct an analysis of the service and economic benefits and costs and payback period of implementing a radio-frequency system in the warehouse facility.

Focus on Operational Process Improvements

Protea Chemicals will need to focus on operational process improvements. Protea Chemicals Management will need to perform a detailed audit of the warehouse operation in order to identify ineffective processes. The objective is to transform the warehouse operation into an effective and efficient operation that ultimately reduces costs and improves customer service levels. A framework needs to be developed to evaluate Protea Chemicals performance and design a procedure. Once the framework is ascertained, the Operations Manager can create a detailed audit format based on history, projections, and reasonable goals. Key focus areas of an audit include:

- Monitoring customer relationships
- Auditing for process and cost control
- Auditing to maintain quality
- Auditing the performance of people in the warehouse
- Monitoring physical assets
- Using audit data to justify warehouse improvements

Protea Chemicals has various warehouses across the country, therefore service performance should be compared and visual performance management tools (graphs and tables) should be used to identify the better performing sites from the weaker sites.

Performance audits can prove valuable in ensuring consistency of service at each of the Protea Distribution Hubs. The performance audits can be used as a powerful motivator when utilized on the basis of recognition and reward. National Scorecards can be used to the same effect as performance audits.

Ask Questions which Focus on Closing Service Quality Gaps

In order to improve customer service to internal customers and ultimately external customer Protea Chemicals needs to find ways and ask it questions to close each of the service quality gaps:

- Gap 1: For closing the market information gap. Does the company have mechanisms in place for channeling feedback from front line staff (sales or telesales staff) to warehouse and operations staff?
- Gap 2: For closing the service standard gap. Is warehouse staff quick to dismiss customer expectations as unrealistic and unreasonable?
- Gap 3: For closing the service performance gap. Does the company support warehouse staff with appropriate information systems and adequate training?
- Gap 4: For closing the internal communication gap. Do you have mechanisms in place for encouraging communication across different functional departments?

Each of the above Gaps is a result of a series of shortfalls within Protea Chemicals warehouse facility. Protea Chemicals need to diagnose the causes

and correct internal deficiencies (Gaps 1 – 4) which will result in improvement of service experienced by customers and closing Gap 5.

Review Warehouse Layout

In determining the warehouse layout, the Warehouse Manager of Protea Chemicals needs to develop a floor plan which facilitates inventory flow whilst also taking into consideration the proposed materials handling system. As warehouse layout is an essential factor in obtaining the lowest total cost of materials handling, a systematic flow of materials through the warehouse improves staff morale and productivity. Most of the handling operations in the warehouse are repeated daily. The optimal method to improve quality of packaging and condition of inventory is to reduce the handling of stock.

Warehouse Management can minimise material handling by reducing the distance between storage locations and inbound or outbound areas. The time required to transport the inventory will be shortened. The shorter travel distance enhances productivity of the operation whilst reducing wear and tear on material handling equipment and employee fatigue. Inventory will be handled less and employees will be less fatigued and less likely to make errors when picking, binning and loading stock.

Focus on Housekeeping and the Aesthetics of the Warehouse Facility

In order to facilitate safe and efficient handling and storage of materials, stock is required to be stored and stacked according to safe and efficient standards whilst continuously maintaining cleanliness. Designated locations should be marked for receiving, dispatch, storage locations, quarantine and inspections locations. Warehouse management should conduct random spot checks to ensure that stock is in the correct location as compared to the Enterprise Resource Planning System (ERPS). Materials should be stored neatly and squared off according to safe and efficient.

An additional option for cleaning and housekeeping of the warehouse facility is to outsource the cleaning of the warehouse. A contract and service level agreement can be agreed upon with the service provider and Warehouse management will only be required to manage the performance of the cleaning contractor. The benefit of outsourcing the cleaning function is that the cleaning company has specialised sweeper and scrubber equipment

to effectively and efficiently clean the warehouse facility. An additional benefit is that Protea Chemicals Warehouse Management will be able to focus on their core competencies and leave cleaning to the specialists. The financial implications of outsourcing this function will have to be taken into consideration.

Training of Warehouse Personnel

Protea Chemicals' success depends on the knowledge, skills, motivation and creativity of employees and partners. In order for Protea Chemicals to be a quality organisation it has to demonstrate commitment to employees and partners by providing training, opportunities for growth and development, provide recognition and share knowledge.

A structured training schedule has to be developed that will address gaps in warehouse operations and staff skill. Training is required to commence at the shop floor level of picking inventory. As training improves the level of skill, attention to detail will improve which will result in improved picking accuracy. The morale of employees usually also improves as knowledge is enhanced. The real value of improvements will be the service quality perception as rated by internal customers.

Outsource the Warehouse and Logistics Function

Due to the competitive chemical environment in which the firm operates, a further recommendation would be to consider focusing on their core competencies and outsource their non-core functions such as logistics (warehouse, primary distribution and secondary distribution) to third party logistics (3PLs) providers.

In deciding on whether to outsource their logistics functions, Protea Chemicals will base the decision on the following:

- To focus on their specialist function
- Adapt to new ideas or developments in thereby allowing a world class logistics organisation to perform logistics function
- 3PLSP can perform the logistics function with improved customer service and reduced cost
- Develop a strategic partnership based on mutual trust with world class logistics leader

Recommendations

By conducting a survey, valuable information came to light to improve service quality within the warehousing function at Protea Chemicals. It is a complex task as it involves constant monitoring, training and using the proper technology to improve overall warehouse function efficiencies. The following managerial recommendations are made:

1. In order for Protea Chemicals to be a quality organisation it has to demonstrate commitment to employees and partners by providing training, opportunities for growth and development, provide recognition and share knowledge.
2. A structured training schedule has to be developed that will address gaps in warehouse operations and staff skill.
3. Training is required to commence at the shop floor level of picking inventory.

References

Ackerman, KB 2004. Auditing Warehouse Performance. Available at: http://www.distributiongroup.com/auditing_warehouse_performance .php#table. (Accessed on 31 August 2010.)

Bailey, D 2010. Investigating Warehouse Quality: A Case study on Protea Chemicals. Honours Thesis, Unpublished. Durban, South Africa.

Bhattacharjee, C 2010. *Services Marketing – Concepts, Planning and Implementation*. New Delhi: Excell Books.

Bowersox, DJ, DJ Closs & MB Cooper 2010. *Supply Chain Logistics Management.* 3rd Edition. New York: McGraw-Hill

Cavana, RY, BL Delahaye & U Sekaran 2001. *Applied Business Research: Qualitative and Quantitative Methods.* Richmond: Australia: John Wiley & Sons.

Cooke, JA 1996. A Sneak Peak at Tomorrow's Technology. *Logistics Management* 35,12.

Cravens, DW, VL Crittenden & CW Lamb 2002. *Strategic Marketing Management Cases.* 7th Edition. New York: McGraw-Hill Irwin.

Emmet, S 2005. *Excellence in Warehouse Management: How to Minimize Costs and Maximize Value.* Chichester: John Wiley & Sons Ltd.

Evans, JR & WM Lindsay 2005. *The Management and Control of Quality*. 6th Edition. Singapore: Thomson South Western.

Murphy, PR & DF Wood 2008. *Contemporary Logistics.* 9th Edition. Singapore: Pearson.

Omnia Holdings 2010. Omnia Remains Strategically Positioned to Benefit from Changing Market Dynamics. Available at: http://www.omnia.co.za/MediaLib/OmniaHome/Financials/AnnualResults/20102/annual_results_2010_eng.pdf. (Accessed on 19 October 2010.)

Parasuraman, A 2004. Assessing and Improving Service Performance for Maximum Impact: Insight from a Two Decade Long Research Journey. *Performance Measurement and Metrics* 5,2. Available at: www.emeraldinsight.com/1467-8047.htm. (Accessed on 17 October 2010.)

Parasuraman, A, VA Ziethaml & LL Berry 1985. A Conceptual Model of Service Quality and its Implications for Future Research. *Journal of Marketing* 49.

Sekaran, U 2003. *Research Methods for Business: A Skill Building Approach.* New Jersey: John Wiley & Sons, Inc.

Waters, D 2009. *Supply Chain Management: An Introduction to Logistics.* 2nd Edition. New York: Macmillan.

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