NTUC Fairprice, Singapore

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Duration of the study : October 2010 – March 2011

4.1 Introduction to the project and overview

The key objective of the ISO pilot project is to determine in a quantitative manner the benefits companies can derive from the use of standards in their business. Such knowledge is useful to demonstrate the advantages of participating in standards development initiatives and/or the use of standards. While many organizations realize the importance of the use of standards, few have analyzed their impact on the company bottom line and their key role in an organization's strategy.

The ISO pilot project in Singapore was conducted from October 2010 to January 2011 with the finalization of the report in March 2011. The project was led by SPRING Singapore [1] with the guidance of ISO and support of MBA Interns from the Nanyang Business School [2].

4.2 Introduction to the industry and selected company

This study is focused on the impact of standards in the supermarket sector of the food retail business. The supermarket is the defining retail element of the food industry. Restaurants, cafes, bakeries, food courts

1 SPRING Singapore is the enterprise development agency responsible for helping Singapore enterprises grow. We work with partners to help enterprises in financing, capability and management development, technology and innovation, and accessing new markets. As the national standards and accreditation body, SPRING develops and promotes an internationally-recognised standards and quality assurance infrastructure that builds trust in Singapore enterprises, products and services, thereby enabling their global competitiveness and facilitating global trade.

2 The NANYANG MBA is recognized internationally for its prestige and lifelong learning experience. Delivered by a top international faculty, The NANYANG MBA has consistently been recognized among the Top MBA programmes globally. Ranked amongst Asia's best, it is the first in Singapore and among a select few in the world to attain both highly prestigious accreditation from higher education bodies, EQUIS (EU) and AACSB (US). A select group of high calibre individuals from more than twenty nationalities from diverse backgrounds attend The NANYANG MBA to prepare them to lead and manage organizations in a global business environment, with a strong focus on Asian know-how.

and hawker centres are also ways consumers can purchase food. About 60 % of the food retail sales takes place in supermarkets, hyper marts and modern mini marts. The rest takes place in traditional provision stores, wet market stalls and convenience stores. Increasingly over the last 10 years or so, more households are going to supermarkets for their fresh produce, meats and fish requirements.

NTUC FairPrice Co-operative Ltd. was founded by the labour movement in Singapore in 1973, with a social mission to moderate the cost of living in the country. In 1983, NTUC Welcome merged with the Singapore Employees Co-operative to form NTUC FairPrice Co-operative Ltd., (FairPrice) selling groceries, household items, beverages, food items and other merchandise.

NTUC FairPrice has grown to become Singapore's largest supermarket retailer, with a network of more than 240 outlets and a market share of over 50 %, making it a household name and a highly trusted brand. The company achieved strong performance with revenues over SGD 2 billion in 2010 and has witnessed a CAGR of over 8 % over the past decade. Net profit of the company too has shown a steady increase to over SGD 120 million and it employs over 7 000 employees.

Today, with its multiple retail formats, the social mission of NTUC FairPrice has evolved to make the dream of living well accessible to everyone by moderating the cost of living in Singapore. Its service motto " Service from the Heart " is a part of Fair Price's corporate vision – " To Be Singapore's Leading World-Class Retailer with a Heart ".

The key value chain of NTUC FairPrice, which is impacted by the consensus standards identified, consists of three major business functions : procurement, warehousing/distribution and retail. The other business functions include finance, information systems and human resources.

The scope of the assessment in the pilot project focuses on the three major business functions – procurement, warehousing/distribution, and retail (only FairPrice Hypermarkets, supermarkets and FairPrice Finest).

4.3 Attitude of the company towards standardization

NTUC FairPrice is a believer and advocate of standards and hence is an ideal company for this project. Being the largest supermarket retailer, NTUC FairPrice not only uses standards to help increase its operation and cost efficiencies, it also helps to raise the standards of Singapore's retail industry by facilitating many local companies, namely its suppliers, to also use standards. It was among the first supermarkets to introduce many standards – both mandatory and voluntary in its business operations.

4.4 Analysis of the value chain

The supermarket industry is a complex, global collective of diverse businesses that together supply much of the food consumed by the world population. A value chain for any product or service extends from research and development to raw materials supply and food production, delivery to international buyers and disposal/recycling. A highly integrated supply chain helps to pull together the complex processes in this industry to ensure quality, safety and efficiency in its processes.

4.4.1 Industry value chain

Walmart, Carrefour, Metro Group, Tesco, Schwarz and Kroger are the top 5 giants in the global retail industry. Quality management and cost control are the key value drivers that increase their revenue and drive more benefits for their shareholders.

In Singapore, there is a rapid growth in the consumption of grocery products. Some 20 % of our annual household expenditure is on food and grocery. NTUC FairPrice [3], Cold Storage [4] under Dairy Farm International and Carrefour, are the three major supermarkets retailers in Singapore. NTUC FairPrice has been involved in the leadership of the Efficient Consumer Response (ECR) Singapore initiative since its launch in 1998 and focuses on the supply and demand management for the fast moving consumer goods industry,

Figure 1 shows the typical supermarket industry value chain.

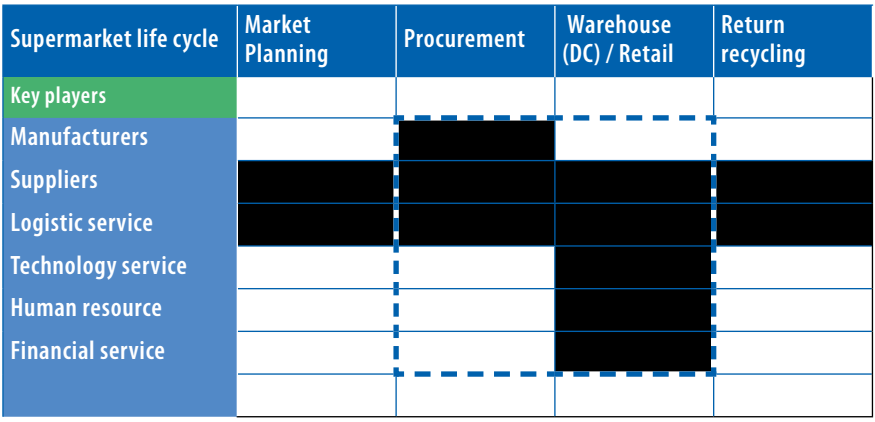

Figure 1 Supermarket industry value chain and scope of the ISO pilot study[5] (area in dotted lines)

3 Including FairPrice supermarket, FairPrice Finest

4 Cold storage supermarket only

5 http://www.slideshare.net/smehro/wal-mart-value-chain-analysis-by-sandro

The dotted line indicates the business functions that were identified as being key parts of the value chain assessed in this study.

4.4.2 Company value chain

The value chain of NTUC FairPrice was confirmed as being similar to that of other major supermarket companies, and the report provides an overview of the three major business functions – procurement, warehousing/distribution, and retail in NTUC FairPrice, which are directly involved in the processing and distribution of products and are impacted by the selected consensus standards.

Table 1 shows the business functions that constitute the company value chain.

Technology services – e.g. automatic sorting system, data synchronisation			
Financial services			
Human resource e.g. technical capability training			
Other supporting functions – e.g. governance, quality control, food safety and coordination, market research			
Procurement	**Inbound logistics to warehouse**	**Outbound logistics to retail**	**Retail**
Selection of suppliers * *(quality of process, quality & safety compliance)*	Receipt of goods *(efficiency of process)*	JIT-delivery to retail units *(efficiency of process)*	Receive goods *(efficiency of process)*
Relationship with suppliers *(partnership)*	Return goods *(efficiency of process)*	Return goods *(efficiency of process)*	Return goods *(Efficiency of process)*
Sourcing from suppliers *(quality of process)*	Warehouse mgt *(efficiency of process)*	Transaction mgt *(efficiency of process)*	Shrinkage mgt *(efficiency of process)*
Training of suppliers *(partnership)*	Transaction mgt *(efficiency of process)*	Asset utilisation *(efficiency of asset utilisation)*	Product category mgt *(quality of product)*
Communications *(quality of process)*	Asset utilisation *(efficiency of asset utilisation)*		Temperature/ environment mgt *(quality of product, quality & safety compliance)*
Product evaluation *(quality of product)*	Inventory management *(efficiency of process)*		Demand plan *(quality of process)*
			Order fulfilment *(quality of process, transparency)*
			Customer service *(sales effectiveness-retain customer)*

*Includes logistics capabilities
() Explanation of relative value driver

Table 1 NTUC FairPrice key value chain components

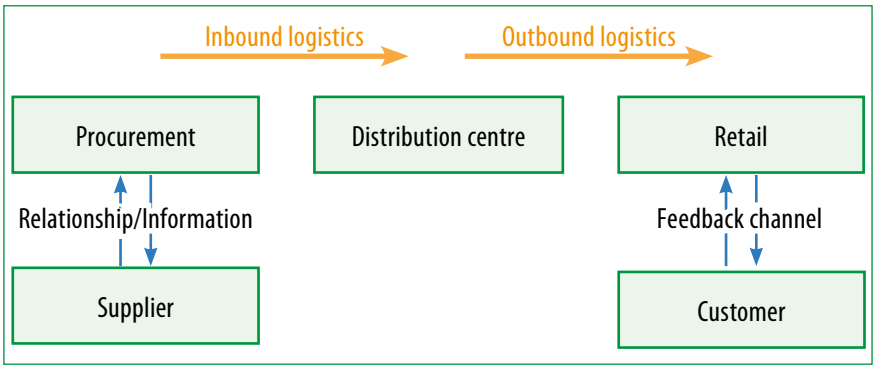

Figure 2 Process flow between the three business functions

The process flow between the three key business functions is as follows:

1. Procurement refers to the management of sourcing and supplier relationship;
2. Warehousing/distribution comprise inbound logistics and outbound logistics. Inbound logistics refer to the delivery of products to the distribution centre (DC), whereas outbound logistics pertain to the delivery of products from the point of production or the DC to retail;
3. Retail serves the daily demands of the consumers who also play a role in feeding back to NTUC FairPrice on its products and processes.

4.4.3 Key value drivers

The key value drivers are the crucial capabilities that provide the competitive advantages for the company. These capabilities are likely to reduce the risk associated with owning the business or enhancing the prospect that the business will grow significantly in the future. The key value drivers for NTUC FairPrice are its partnership with its suppliers, the quality and efficiency of its processes and its relationship with its customers:

Partnership with suppliers

The partnership between NTUC FairPrice and its suppliers is based on trust with standards being used to ensure quality and safety. The selected suppliers all comply with HACCP (Hazard and Critical Control Point) if they are food suppliers. The adoption of ISO 9001 is recommended to non-food suppliers who may also demonstrate that they have similar quality systems as an alternative to ISO 9001. For house brands, HACCP certification is a must or suppliers must be at least ready for a HACCP certified process. The Cold Chain Management Standard for Milk and Dairy as well as for Chilled Pork and the Standard Pallet are the other standards which NTUC FairPrice's suppliers are required to comply with. The efficiency of delivery is also essential as this helps to keep the costs down for both the supplier and NTUC FairPrice.

Quality of products and processes

NTUC FairPrice has increased the number of stores from 65 to 98 from 1999 to 2009, whilst the level of working capital per store has been reduced, and the number of staff who work in the procurement department and the DC (GLS) are maintained at the same level. Internally, systematic training programmes have enlarged the knowledge of the operating processes and enabled NTUC FairPrice to maintain or enhance the quality and variety of its products and enabled its suppliers to deliver the products in good condition.

Safety compliance

A temperature-controlled supply chain for critical perishable products like milk and dairy and chilled pork to ensure that health and safety is not compromised along the supply chain has also helped to expand the number of sources of milk and dairy products and chilled pork, and helped to extend their shelf life.

Efficiency of processes

NTUC FairPrice is constantly looking at ways to improve their processes. The implementation of a warehouse management system and the introduction of an innovative automatic sortation system in the main distribution centre smoothly integrates the information and product flow in the warehouse. Furthermore, consistent and reliable data exchange enhances the communications across different departments and reduces the time to fulfill the retail stores' orders. This results in an increase in its operational accuracy and throughput. The enhanced processes have helped to reduce operational costs in the warehouses and significantly increased the productivity of its existing resources. Efficient tracking of the goods within the DC using the centralized warehouse management system helps to reduce costs with an improved utilization of personnel time and the more efficient delivery and retrieval of goods.

Sales effectiveness retains customers

NTUC FairPrice, as a co-op organization, helps to stabilize the cost of living by providing reliable and efficient services that result in safe and cost efficient products for its customers. Customers who join its membership plan will receive rebates and dividends as part of the NTUC FairPrice's royalty programme.

4.5 Scope of the ISO pilot study

4.5.1 Key business functions of the value chain :

The ISO pilot study looks into the three major business functions that are critical to the value chain of NTUC FairPrice :

1. Procurement
2. Warehousing and distribution
3. Retail

1. Business Function : procurement

Procurement refers to the management of sourcing and supplier relationship. The core activities involved in this business function are shown in **Figure 3** below :

Figure 3 Procurement function activities

The prime responsibility of procurement is to ensure long lasting and smooth supplier relationship.

2. Business function : warehousing and distribution

The business function of warehousing and distribution is done through NTUC FairPrice's two major centralized warehousing and distribution centres which comprise inbound logistics and outbound logistics. The key activities are shown in **Figure 4** and include :

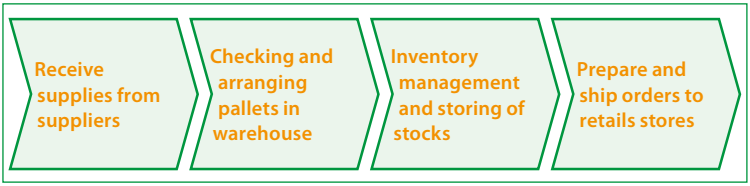

Figure 4 Warehousing/distribution function activities

Throughout the process, the warehousing and distribution centres are expected to operate in a cost-efficient manner as the overheads directly affect the bottom line of NTUC FairPrice.

3. Business function : retail

Retail, the key function in NTUC FairPrice's value chain is where the daily needs of its customers are met and is also where customer feedback on its products and processes is the most crucial for the company's viability. A well-managed supply and demand value chain results in the retail products and services meeting or exceeding the customers' expectation. **Figure 5** below shows the key activities of the retail function.

Figure 5 Retail function activities

4.5.2 Product types

Furthermore, due to the multitude of products handled by NTUC FairPrice, it was decided to restrict the assessment to the following two product types where consensus standards were applied and benefits are measurable :

1. Milk and dairy products
2. Chilled pork

4.5.3 Retail outlets

The focus of this pilot is on the following NTUC FairPrice food retail outlet types given that they contribute a high percentage of the supermarket revenue for NTUC FairPrice :

1. FairPrice Finest
2. FairPrice Supermarkets and
3. FairPrice Xtra (Hypermarkets)

4.5.4 Warehousing/distribution

The warehouse and distribution function is operated primarily through the central distribution centre, Grocery Logistics of Singapore (GLS) Distribution Centre and is supplemented by the Fresh Food Distribution Centre (FFDC).

4.6 Standards used in the company value chain

4.6.1 As mentioned in section 4.3, the company is actively using standards, and is certified to ISO 9001:2008 and HACCP. However, for the purpose of this study, we will focus on other consensus standards used by NTUC FairPrice in the three key business functions identified earlier.

4.6.2 The list of standards considered for this pilot study is as follows:

1. Cold Chain Management – Milk and Dairy Products (TR 2:2000 followed by SS CP 95:2002)
2. Cold Chain Management – Chilled Pork (TR 20:2005 followed by SS CP 552:2009)
3. Standards on Pallet: ISO 6780:2003 and SS 334:2010
4. Standards on Barcode:
    - Primary barcodes
        - EAN 13 [6]
        - ISO/IEC 16390 [7]:2007 (or ITF i2of5)
        - ITF-14 [8]

6 EAN 13 (European Article Number 13) is a barcode symbology defined by GS1 which encodes 13 characters

7 ISO/IEC 16390: 2007, *Information technology – Automated identification and data capture techniques – Interleaved 2 of 5 symbology specification*

8 ITF-14 is GS1's implementation of ITF i2of5 symbology but with 14 digits being used in the encoding

- Secondary barcodes
  - ISO/IEC 15417:2007 [9](or EAN 128 or SS 362 Part 2:2004)
  - EAN 8 [10]
  - ISO/IEC 16388:2007 [11] (or Code 39)
  - Code 93 [12]
  - Codabar [13]
  - UPC A (XMIT 12) [14] Carton Barcode

4.6.3 The more technical standards that are key to the company's primary purpose are the focus of this pilot.

The ISO 9001 quality management system standard, being a management standard, was not included in this study. ISO 9001 is used by NTUC FairPrice and is also recommended to its suppliers of non-food products. Direct economic benefits would be difficult to derive given that it would not have direct attributable economic benefits as it is used more to assure customers that the company has a proper quality management system in place.

The HACCP standard is required for all food suppliers to NTUC FairPrice and its possible economic benefits were discussed with the company. However, after detailed discussions, it was decided by all parties concerned that as the main outcome of HACCP for NTUC FairPrice was food safety and the economic benefits are indirect and not easily traceable, the HACCP standard would not be included in this study.

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9 ISO/IEC 15417:2007, (or EAN 128 or SS 362 Part 2 : 2004) *Information technology – Automatic identification and data capture techniques – Code 128 bar code symbology specification*

10 EAN 8 is the short form of EAN 13. This code is only used if the article is too small for an EAN 13 code

11 ISO/IEC 16388:2007, *Information technology – Automatic identification and data capture techniques – Code 39 bar code symbology specification*

12 Code 93 is a barcode symbology designed in 1982 by Intermec to provide a higher data security enhancement to Code 39.

13 Codabar is a linear barcode symbology developed in 1972 by Pitney Bowes Corp.

14 UPC A (XMIT 12) is Universal Product Code A barcode symbology

4.6.4 The application of the standards in the three business functions are given in **Figure 6**:

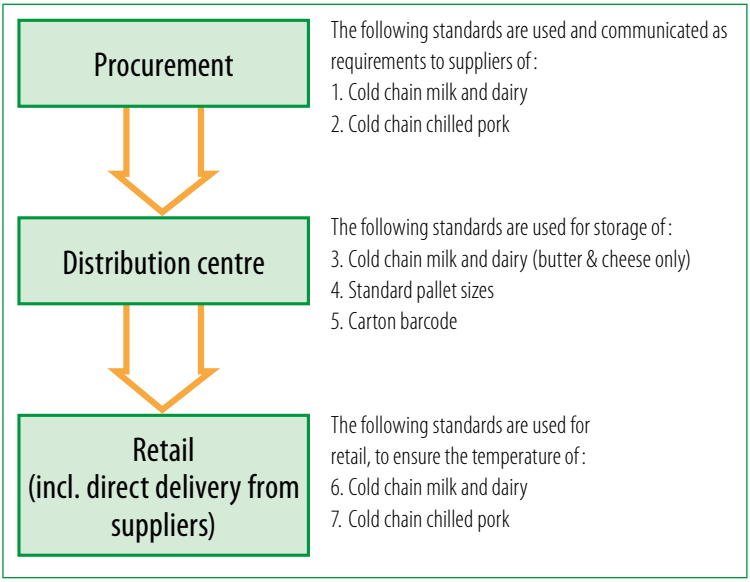

Figure 6 Business functions and their related standards

4.6.5 Key functions and objectives of the standards assessed

1. Cold chain standard for milk and dairy

The objectives of this standard are to establish and provide benchmarks for the management of temperature profiles along the supply chain for milk and dairy products manufactured under hygienic and sanitary conditions. It also aims to uphold the quality of products and reduce unnecessary wastage. It sets out the guidelines for the proper management of milk and dairy during the production, storage, transportation, manufacturing, distribution, handling and treatment at point of sale.

2. Cold chain standard for chilled pork :

The objectives of this standard are to establish and provide benchmarks for the management of temperature profiles along the supply chain for chilled pork to ensure the meat is processed, stored, transported and handled under proper hygienic and sanitary conditions. It aims to set out best practices in cold chain management for chilled pork so as to uphold the safety, quality and wholesomeness of chilled pork, safeguard public health, provide protection for consumers and reduce unnecessary wastage. This standard was implemented in 2005.

3. Pallet standard :

A significant portion of the benefits came from increased labour productivity and reduced cost of ownership of the pallets. Standardization has facilitated the movement and handling of goods, optimized the use of storage and warehouse space, reduced delivery costs and facilitated the automation of warehouse operations. More than 300 000 standard pallets are in use currently by the industry, resulting in savings of SGD 7.8 million for the fast moving consumer goods industry as a whole.

4. Carton barcode standards :

Before the use of carton barcodes, NTUC FairPrice manually recorded the information of products received by the distribution centres and delivered to their retail stores. This method was prone to errors. Carton barcodes were introduced in NTUC FairPrice in 2000 to improve the operational efficiency, accuracy of information and delivery of products from their distribution centres.

NTUC FairPrice does not use one but several barcode standards to accommodate the variety of barcode standards adopted by its different suppliers.

The use of carton barcodes has enabled the distribution centres to:

- Increase accuracy in the receipt and tracking of its products.
- Move the products from receipt to storage to assembly as well as delivery to retail stores in the shortest possible time. It generally takes a few seconds to scan the carton barcodes compared to a few minutes to write down the product codes by hand. This has helped to increase its productivity and throughput significantly.

5. Selection of operational indicators to measure the impact of standards

The objective of the study is to quantify the economic impact of standards. In order to do so, we apply a set of operational indicators to measure the impact before and after the introduction of the standards. These operational indicators have been carefully chosen on the basis of a series of interviews with FairPrice. Some of these indicators have originally not been designed to measure the economic impact of standards, but most have been used to measure the company's business performance in terms of non-economic indicators such as customer satisfaction, growth, operational excellence, etc. In the discussions with the company, a number of the operational indicators were developed that were specific to measuring the impact of standards. The operational indicators derived and confirmed by the company leaders are also aligned to the company KPIs.

ID of indicator	Operational indicators	Business function	Standards	Definition of the indicators
1	Time spent on communication with supplier	Procurement	CC Milk & Dairy, CC Pork	Time spent on communicating product requirements – AVA requirements, standard compliance, package size, quality, etc., while placing orders and general matters
2	Contracting activities with suppliers	Procurement	CC Pork	Long term contracts are concluded with selected suppliers on basis of their quality and standards in factory / abattoir
3	Number of customer return cases	Procurement, distribution centre (FFDC), retail	CC Milk & Dairy, CC Pork	Customer returns cases from retail store occur due to spoilt product after purchase
4	Number of non-conformance cases	Procurement, distribution centre (FFDC), retail	CC Milk & Dairy, CC Pork	Cases of product supplied by suppliers not meeting quality / standard requirement (at receiving point at distribution centre (DC) and retail stores)
5	Space savings	Distribution centre (GLS)	Barcode	Warehouse space savings with implementation of automated sortation system
6	Order fulfillment	Distribution centre (GLS)	Barcode	Speed of fulfilling orders of retail stores, thereby freeing up space at DC
7	Reduction in amount of handling damage cases	Distribution centre (GLS)	Barcode	Costs associated with handling damages during goods movement in the DC
8	Reduction in amount of stock-take	Distribution centre (GLS)	Barcode	Time spent on checking and tallying physical inventory in DC with book inventory
9	Reduction in amount of assets	Distribution centre (GLS)	Barcode	Machinery and equipment used in managing logistic operations at DC
10	Throughput rate	Distribution centre (GLS)	Barcode	Throughput rate (speed) in receiving, picking and packing of goods/ supplies

ID of indicator	Operational indicators	Business function	Standards	Definition of the indicators
11	Better information transfer about pallets	Distribution centre (GLS)	Standard pallet	Internal communication between employees on configuration and quantity of pallets and cartons
12	Expenditure on pallets	Distribution centre (GLS)	Standard pallet	Annual cost on pallets paid to external suppliers / leasors of pallets
13	Space requirement for receiving supplies	Distribution centre (GLS)	Standard pallet	Area (in sq m) in DC dedicated for receiving supplies which come in trucks (" receiving bays ")
14	Space requirement for storing pallets	Distribution centre (GLS)	Standard pallet	Area within the DC to store pallets when not used to stack goods/ supplies
15	Time spent on checking, receiving and arranging supplies	Distribution centre (GLS)	Standard pallet	Time spent by personnel on checking quantity of supplies received (whether the quantity matches the invoice)
16	Time spent on sorting pallets	Distribution centre (GLS)	Standard pallet	Time spent by personnel on sorting different types of pallets in the DC for storage and use
17	Value of write-off / disposal of spoilt or expired stock	Distribution centre (FFDC), retail	CC Milk & Dairy (Butter & Cheese), CC Pork	Product cost of goods/ supplies disposed off due to spoilage / expiry during storage or display at DC or retail
18	Customer returns	Retail	CC Milk & Dairy (All)	Product cost of goods/ supplies returned by customer due to spoilage or poor quality
19	Time required for quality checking	Retail	CC Milk & Dairy, CC Pork	Time spent on quality checking of goods while being displayed at retail
20	Time spent on daily disposal of pork	Retail	CC Pork	Time spent by personnel on disposal of spoilt / expired goods/ supplies at retail
21	Time spent on receiving supplies	Retail	CC Pork CC Milk	Time spent by personnel on receiving and checking quality conformance of supplies at retail

Table 2 Operational indicators applied in the assessment

CC = Cold Chain / FFDC = Fresh Food Distribution Centre / GLS = Grocery Logistics of Singapore
AVA = Agri-Food and Veterinary Authority of Singapore

4.7 Financial impacts of the standards

The total financial impact of the implementation of the standards is **SGD 4 516 467** calculated on an annual basis. In the following this impact is presented for the three selected business functions (see 4.7.1) and by standards (see 4.7.2) on an annual basis. An overview of the cumulative impacts in the period from 1999, when the implementation of standards started, until 2009, is given in 4.7.3.

4.7.1 Financial impacts by selected business functions

The following table provides the total annual impacts of the implementation of the standards by business function:

Business functions (BF)	Implemented standards	Total financial impacts on the BF (in SGD)
Procurement	Cold Chain Management Standards for Milk & Dairy and Chilled pork	26 548
Warehousing/distribution	Carton barcodes, standard pallet, Cold chain Management Standard for Milk and Dairy	3 809 763
Retail	Cold Chain Management Standards for Milk & Dairy and Chilled pork	725 156
Total		4 561 467

Table 3 Impact of standards by business function

4.7.2 Financial impacts by implemented standards

The following table provides the total annual impacts for the implemented standards:

Standards	Affected business functions	Total financial impacts on the BF (in SGD)
Cold Chain Management Standards for Milk & Dairy	Procurement, warehousing and distribution, retail	141 677
Cold Chain Management Standards for Chilled Pork	Procurement, retail	641 639
Carton barcodes, standard pallet	Warehousing and distribution	3 733 151
Total		4 561 467

Table 4 Impact of standards by assessed standards

4.7.3 Cumulative impacts between 1999 and 2009

The implementation of the standards in the three selected business functions started in 1999. However, the standards were not implemented at the same time. If we assume that the average period of impacts of standards is approximately five years, before they become "regular" business practice, then it is possible to summarize the financial impacts over this ten-year period as follows:

Year of implementation in FairPrice	Savings from standards over time (annual averages calculated over a 5-year period)			TOTAL (per year) in SGD
	Procurement	Warehousing/ Distribution	Retail	
1999		713 600		**713 600**
2000	7 613	713 600+31 613	102 451	**855 277**
2001	7 613	713 600+31 613	102 451	**855 277**
2002	7 613	713 600+31 613	102 451	**855 277**
2003	7 613	713 600+31 613	102 451	**855 277**
2004	7 613	31 613	102 451	**141 677**
2005	18 935		622 704	**641 639**
2006	18 935		622 704	**641 639**
2007	18 935		622 704	**641 639**
2008	18 935	3 064 551	622 704	**3 706 190**
2009	18 935	3 064 551	622 704	**3 706 190**
Total	**132 740**	**9 855 167**	**3 625 775**	**13 613 682**

Table 5 Cumulative impact of standards (1999 – 2009)

The largest impact has come from the warehousing/distribution function where the estimated savings from the implementation of the automated sortation system has brought with it manpower savings that has allowed for the same number of staff to handle the significantly higher number of stores without an increase in staff.

The implementation of these four standards has brought FairPrice benefits totaling SGD 13.6 million over 10 years from 1999 until 2009.

4.8 Qualitative and semi-quantitative considerations

4.8.1 Increase in revenue

The impact of all the standards have been to increase consumer confidence and therefore market share of NTUC FairPrice by providing higher quality of goods as well as increased operational efficiency.

The use of technology has helped to reduce the need for additional manpower to serve a more than double growth in the number of stores over the last 10 years and in handling the increasing demand for fresh foods which has more than doubled in the past 7 years. This has helped NTUC FairPrice to reach the high income market which has higher margins without sacrificing the needs of the middle and lower income markets.

While the impact of the cold chain standards in dollar terms would seem small, it is important to understand the qualitative aspects behind each of these benefits. The operational efficiency improvement has been crucial in streamlining the operations of NTUC FairPrice to meet the pace of sales growth as the number of stores has more than doubled over the last 10 years or so. For example, in the case of cold chain standards, the savings in the process of handling customer returns might not show a significant dollar benefit. However, the whole process has been streamlined and it has significantly improved inter-departmental communication and coordination.

The greater availability of chilled pork and milk and dairy products on the shelves with the extended shelf life, has helped to increase the revenue generated from these products.

In 2009, chilled pork sales increased by 22% from 2005 when the cold chain standard for chilled pork was implemented. Improved

throughput of good quality chilled pork has been made possible by the standard which has also brought with it significant operational cost efficiencies. If we assume that the contribution of the standard to establishing a more efficient supply chain resulting in increased sales of chilled pork over the 5 years, is 10 % i.e. SGD 800 000, this contribution would be significant to company revenues.

The cold chain standard for milk and dairy was implemented in 2000. Sales revenue doubled between 2003 and 2009 with the number of stores increasing from 65 in 1999 to 98 stores in 2009. Assuming that the contribution of the standard to establishing a more efficient supply chain resulting in increased sales of milk and dairy over the 6 years is 10 % i.e. SGD 5.5 million, then this contribution is of high significance to company revenues.

4.8.2 High quality products

The cold chain management standards have helped NTUC FairPrice in meeting its brand mission of providing high quality products and ensuring consumer confidence. The introduction of the standards in the supply chain has significantly reduced non-conformance incidents by suppliers, wastage during storage and the incidence of customer returns. More specialty fresh foods are also possible with the better temperature control systems in place. With better temperature control, a wider choice of suppliers overseas became also available, bringing with it both more competitive pricing and access to more specialty foods.

4.8.3 Increased operational efficiencies

Significant efficiency improvements have been seen with the reduction in product specifications for milk and dairy and chilled pork, and the greater availability of training both in house and outside the company. All operational indicators for the retail function have shown an

improvement of about 50 % except for the quality checking indicator which improved by 33 % for both milk and dairy and chilled pork. For the distribution function, all operational indicators show an increase of more or equal to 50 % annual efficiency improvement. The focus on reducing distribution costs has also helped towards FairPrice's mission of lower cost and higher quality products.

4.9 Evaluation of results

4.9.1 Cost savings

Taking into consideration the impact of standards over 5 years, the reduction of about SGD 13.6 million in operational costs over the last 10 years demonstrates the importance of standards, a point that FairPrice leaders are prompt to acknowledge.

Lower prices for good quality products are a key component of FairPrice's service philosophy. By implementing the cold chain standards, FairPrice increased the number of overseas suppliers in the sourcing of chilled pork to help to keep its prices lower.

4.9.2 Operational efficiencies

Operational efficiency gains for almost all operational indicators are above 50 %, with several indicators above 75 %.

The distribution centre throughput increased by 200 % with the automated sortation system based on the carton barcode in place, enabling the servicing of fast growing retail stores without the need for additional investment in additional shifts and warehouse space. Distribution centre savings over the last 10 years from implementing two standards is about 50 % of the total savings from the estimated SGD 13.6 million gained through the use of four standards.

4.9.3 Streamlining of procedures and processes and partnership with suppliers

While the financial impact for the other two business functions – procurement and retail, are not as significant, there are numerous qualitative and semi-quantitive benefits described in Section 4.8 above. For these functions, standards have helped reduce non-conformance and customer returns, and lowered the resulting costs for non-compliance issues. The standards have also helped to reduce wastage, increase the number of suppliers and improve the relationships with, and the benefits for, their suppliers.

The implementation of the cold chain standards by the milk and dairy and chilled pork suppliers, and the standard pallet standard, have also brought benefits in less wastage and less time spent in contract negotiations and delivery.

4.10 Conclusions

The ISO pilot study has helped the company obtain a holistic view of the quantitative and qualitative benefits of the four implemented standards as well as their contribution to the corporate mission of lower costs and higher quality. An estimated SGD13.6 million in benefits has been derived over the last 10 years with the use of just four standards. It is therefore likely the company will continue to implement standards and be involved in their development.

The company's effort to lead in standards development and implementation initiatives is highlighted by this pilot study which demonstrates the interconnectivity of the standards through the value chain, and the contribution they make to FairPrice's value drivers.

The ISO pilot has also shown that FairPrice's partnership with its suppliers, who have committed to the use of the standard pallet and the

cold chain management standards for chilled pork and milk and dairy products, have also benefitted through less wastage and improved operational efficiencies.