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Factors that influence the implementation of warehouse management systems in selected South African companies

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FACTORS THAT INFLUENCE THE IMPLEMENTATION OF WAREHOUSE MANAGEMENT SYSTEMS IN SELECTED SOUTH AFRICAN COMPANIES

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A Research Project submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in fulfilment of the requirements for the degree of Master of Science in Engineering

Date: 10 July 2020

ABSTRACT

Some global studies estimate that 30% to 60% of IT-related projects fail. However, there are several success stories where both local and international organisations have reaped great rewards after such implementations. The purpose of this study is to explore the factors that influence the implementation of warehouse management systems (WMS) in warehousing operations in South Africa. Previous work, from other parts of the globe, has identified such critical factors and this study aims to interrogate such factors in the South African context. A conceptual framework was built through the literature review. Research data was collected from selected supply chain organisations in Gauteng through qualitative semi-structured interviews and analysed using thematic content analysis. Several factors such as the non-availability of local software, the need to have local technical support, change management and the relationship with external consultants were cited as some of the key factors that influence such implementations.

DECLARATION

I declare that this research report is my own unaided work. It is being submitted to the Degree of Master of Science to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.



……

Signature of Candidate

On the 10th…….. day of ……July……., 2020……

(day) (month) (year)

DEDICATION

Dedicated to the living memory of my late father, Cephus Gandire Mhuri, who would have been proud to see me graduate again.

ACKNOWLEDGEMENTS

I would like to offer my gratitude to the following, in no particular order, for making this research success

i. My research supervisor, Bernadette Sunjka, for the guidance and valuable insights in the last two years.
ii. All interview respondents and companies that offered their time and resources towards this research.
iii. Alwyn Moolman for being always available to offer wisdom and knowledge when I needed it.
iv. My wife and kids, who had to endure all the times I locked myself in the garage as I burnt the midnight oil to make this dissertation a reality.

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List of Acronyms

WMS	Warehouse Management System
ERP	Enterprise Resource Planning
DC	Distribution Centre
3PL	Third Party Logistics
JIT	Just In Time
SKU	Stock Keeping Unit
ASRS	Automated Storage and Retrieval Systems
BI	Business Intelligence
SaaS	Software as a Service
RFID	Radio Frequency Identification
LPI	Logistics Performance Index
FMCG	Fast Moving Consumer Goods

1. CHAPTER ONE: INTRODUCTION

1.1. Research background/context

According to the 10th State of Logistics report of 2013, South African supply chains have moved beyond survival mode where costs, inventories, and lead-time have been minimised within individual supply chain functions (Viljoen, 2013). (Wilkinson, 2013) defines survival mode in his seven-stage model as the phase where firms operate independently with little planning, control and no regard to the threats and opportunities around them. End-to-end integration of supply chain functions is the next major shift required in South Africa to make business more customer-centric and competitive (Viljoen, 2013). The extended integration stage is when a firm has a strategic and systematic orientation that drives integration from the customer's customer to the supplier's supplier and the entire supply chain is actively collaborating for mutual success (Wilkinson, 2013). The 10th State of Logistics report of 2013 also shows that the warehousing and inventory carrying, both closely tied with warehousing operations, contribute to about 30% of supply chain costs in South Africa. This is a significant contribution and thus organisations continue to focus on how to keep the cost at a minimum lowest possible level as well as for opportunities for increasing supply chain efficiency.

One of the major keys to the success of effective supply chain management is the use of integrated information systems that enable visibility of product demand and stock levels through the full length of the supply chain. This has only become a possibility with the ongoing advances in information systems technology (Rushton et al., 2006). One of the major components of the supply chain technologies that organisations are implementing is the warehouse management systems (WMS). WMS are software applications that manage the flow of materials into and throughout the storage facilities. "A typical warehouse management system can provide detailed directions for receiving, storing, bin selecting, picking, and shipping tasks required in all warehousing operations. By shifting some of the decision making from independent human operators to a centralised planning system, measurable benefits can be achieved. These planning systems support warehouse workers through standardised processes, instructions, rules, and parameters established during system implementation" (Castle & Jacobs, 2009, p. 71). Often, the implementation of such complex systems requires expertise and involves a wide range of stakeholders both within and outside the implementing organisation (Badwi, 2018). These implementation projects also require substantial capital investments, first to procure the software itself and secondly for the actual implementation of the system. Therefore, the

successful implementation of such a system is a key strategic focus for any organisation. (Abi Saad, 2018)

1.2. Problem statement/motivation

The successful implementation of warehouse management systems (WMS) varies across organizations. For example, in early 2016, Finish Line, an American company that sells athletic shoes and apparel, recorded disappointing results where sales dropped by 3.5% with their stock price falling by 11%. In the same period, the company failed to fulfil their online orders and restocking their stores thus costing the company USD $32 million in lost sales. The chair and CEO of the company cited 'Our third quarter performance was severely impacted by a disruption in our supply chain following the implementation of our new warehouse and order management system' (Gilmore, 2016). The same misfortune hit other organisations like Adidas, Foxmeyer Drug and Hershey Foods (SupplyChainDigest, 2006) and these seem to represent the end of the spectrum of how not to implement a WMS. On the other hand, there are success stories of numerous organisations that have also implemented similar systems. Cambridge Food, a subsidiary of Massmart in South Africa managed to increase inventory accuracy by 10%, outbound order accuracy by 42% and picking productivity by 189% (SupplyChainJunction, 2014). Barloworld Logistics South Africa deployed a warehouse management system in five months that manages over 25,000 SKU's and helps receive just under 10,000 order lines and shipping around 27,000 order lines every month. The project was within the projected go-live date and the system implemented without customisations, which allows it to be scalable for future upgrades and expansions (Bukhali, 2017). MTN, a telecommunications company in South Africa, also successfully implemented a WMS, which resulted in a 40% reduction of security and courier staff used in their network and enabled them to distribute 110% more stock in the same working hours (Conradie, 2009). There are many other such success stories of companies that have reaped good rewards through implementing WMS. These stories raise the question of why certain implementations have failed while others seem to have succeeded.

A deeper understanding needs to be developed as to how South African warehousing organisations can effectively and optimally deploy warehouse management systems. This project seeks to explore the factors that influence the implementation of WMS in warehousing operations in South Africa.

1.3. Research questions

The critical research question for this research project is as follows:

"What are the factors that influence the implementation of Warehouse Management Systems for warehouse operating organisations in South Africa?"

1.4. Research objectives

The overall objective of this research is to investigate the factors that influence the implementation of Warehouse Management Systems for warehouse operating organisations in South Africa

This was achieved by:

1. Developing a conceptual framework for the factors that affect the implementation of WMS.
2. Determining the specific factors that have influenced the implementation of WMS in South African organisations.
3. Recommending the key factors that contribute to the effective implementation of WMS in SA organisations.

1.5. Summary of Research Methods and Ethics Number

In this research study, a qualitative approach using semi-structured interviews and thematic content analysis was used to explore the factors that affect the implementation of WMS in South Africa. The research was aimed at South African warehousing enterprises that have implemented WMS and purposive sampling was used to select several organizations that have done such implementations. Semi-structured interviews were used to gather data from the identified participants. The gathered data was analysed through content analysis. Content analysis is a detailed and systematic examination of the contents of a particular body of material in order to identify dominant patterns or themes

To ensure the validity and reliability of the research, an experienced industry expert reviewed the interview questions before the interviews were conducted to address some of the bias. The same expert also reviewed the results of the data analysis. A summary of the research findings was also shared with all the participants for feedback on results.

The ethics clearance number for this research obtained from the School is **MIAEC 097/19**.

1.6. Assumptions and Limitations

This exploratory research will be conducted through semi-structured interviews of identified subject matter experts in the implementation of warehouse management systems in South African organisations. The organisations included in the research was based on the willingness of the same

organisations to participate. Due to the limited time available to conduct this research, a maximum of three organisations were identified for participation. The research was limited to only South African organisations. However, the factors were determined through literature review and each was tested for its applicability in the South African context.

1.7. Chapter Outline

This research report is divided into chapters and an appendix as follows:

Chapter 1 – Introduction

Chapter 1 has the background and motivation for the research as well as the research question, objectives and constraints and the assumptions and limitations of the research.

Chapter 2 – Literature Review

The literature review the principles of warehousing, functions of warehousing, basic definitions of WMS as well as a brief history of the evolution of WMS. The chapter also contains what considerations to be taken into account when choosing a WMS and the factors that affect the implementation of such systems. The chapter has an in-depth examination of the South African supply chain landscape. The chapter concludes with a conceptual framework of the factors that affect the implementation of WMS as revealed by the literature review.

Chapter 3 – Research Methodology

This chapter entails the methodology of the research beginning with a brief introduction to the research design, followed by a description of the research instruments, sample and research procedure. There is also a section for validity and reliability considerations in the research. The chapter ends with an explanation of ethical matters to be considered.

Chapter 4 – Analysis and Results

This chapter presents the results of the field research including the biographical data on the respondents and the results by way of thematic content analysis.

Chapter 5 – Discussion

This chapter is a discussion of the themes emerging from the thematic content analysis procedure with regards to the dominant factors that would have come out of the research.

Chapter 6 – Conclusions and Recommendations

This chapter presents the conclusion to the research including the final evaluation of the research objectives met, the confirmation of the hypothesis and recommendations for future research questions arising from the research.

References

This section has a full list of references used in the research report.

Appendices

This section has all the other supplementary documentation relevant to the research report.

2. CHAPTER TWO: LITERATURE REVIEW

This literature review presents an overview of principles of warehousing, functions of warehouses as well as some factors that affect the implementation of WMS.

2.1. Principles of warehousing

Warehouses are an integral part of the supply chains. Rushton et al., (2006) explain that the main objective of warehouses is to facilitate the movement of inventory/goods throughout the supply chain. Warehouses are involved in various stages of the sourcing, production and distribution of goods, from the handling of raw materials and work-in-progress through to finished products as well as being the dispatch point serving the next customer in the chain. More often than not, it becomes necessary to hold inventory within the supply chain, which brings the warehouse into play (Rushton et al., 2006).

Rushton et al., (2006) cite the following as some of the reasons to hold inventory

- To provide a buffer to smooth variations between supply and demand. This variation is also known as the Bullwhip effect
- To enable economies of long production runs in manufacturing.
- To provide a buffer between different manufacturing operations.
- To enable procurement savings through large purchases.
- To allow cost trade-offs with the transport system by delivering full truck loads
- To cover for seasonal fluctuations and peaks.
- To provide a wide range of different products, from different suppliers, in one location.
- To cover for planned or breakdown production shutdowns.

2.2. Functions of a warehouse

According to Rushton et al., (2006), a warehouse will typically have the following functions;

- **Receiving**: This involves the physical unloading of incoming transport, checking, and recording of receipts. It can also include such activities as unpacking and repackaging in a format suitable for the subsequent warehouse operations. Quality control checks may be undertaken as part of this activity. From here, the goods are then put away in the warehouse.
- **Reserve storage**: Goods are normally taken to the reserve or back-up storage area, which is the largest space user in many warehouses. This area holds the bulk of warehouse

inventory in identifiable locations. When required, the goods are taken from reserve storage either directly to marshalling (if, for example, a full pallet is required by a customer) or to replenish a picking location. (Rushton et al., 2006)

- **Order picking**: Goods are selected from order picking stock in the required quantities and at the required time to meet customer orders. Picking often involves break-bulk operations, when goods are received from suppliers in, say, whole pallet quantities, but are ordered by customers in less than pallet quantities (e.g. cases or items). If only small quantities of a product are stored in a warehouse, then the reserve and picking stock may be combined, and goods picked from this consolidated area. Accurate order picking is important for achieving high levels of customer service. It traditionally also takes a high proportion of the total warehouse staff complement and is therefore expensive. The good design and management of picking systems and operations are consequently vital to effective warehouse performance.
- **Sortation**: For small sizes of orders, it is sometimes appropriate to batch several orders together and treat them as 'one' order for picking purposes. In this case, the picked batch will have to be sorted down to individual orders, i.e. secondary sortation, before dispatch.
- **Collation and Value-Added services**: After picking, goods are brought together and consolidated as completed orders made ready for dispatch to customers. This can involve packing into dispatch outer cases and cartons, and stretch and shrink-wrapping for load protection and stability. It may also involve final production postponement activities and value-added services, such as kitting and labelling.
- **Marshalling and dispatch**: Goods are marshalled together to form vehicle loads in the dispatch area and are then loaded on to outbound vehicles for onward dispatch to the next 'node' in the supply chain. (Rushton et al., 2006)

2.3. Definition of Warehouse Management Systems (WMS)

A warehouse management system (WMS) is computer software that can handle operations in the warehouse such as receiving stock with receipt documentation, put away labels, generating pick instructions, replenishing pick locations, etc. WMS gives tremendous benefits, such as improved stock control, traceability, improved productivity levels, and better management reporting. They also can be integrated with ordering systems, thus giving direct links from the order receipt to picking and despatching operations, along with finance and credit control (Emmett, 2005).

These planning systems support warehouse workers through standardised processes, instructions, rules, and parameters established during system implementation. (Castle & Jacobs, 2009). Figure 2 below shows the key and extended functions of a WMS.

2.4. Functionality of Warehouse Management Systems

Current WMS applications are viewed as mature applications with systems now supporting eighty to ninety percent of most warehousing functional requirements, with such systems installed in most large companies. (Thompson, 2010). According to Schmeltzpfenning, et al., (2018), the core functions of a WMS can be categorised into three, namely; managing incoming goods (receiving), inventory management and managing the despatch of goods (outbound) to customers or consumers. Figure 1 below outlines the core and additional functions of a fully-fledged WMS.

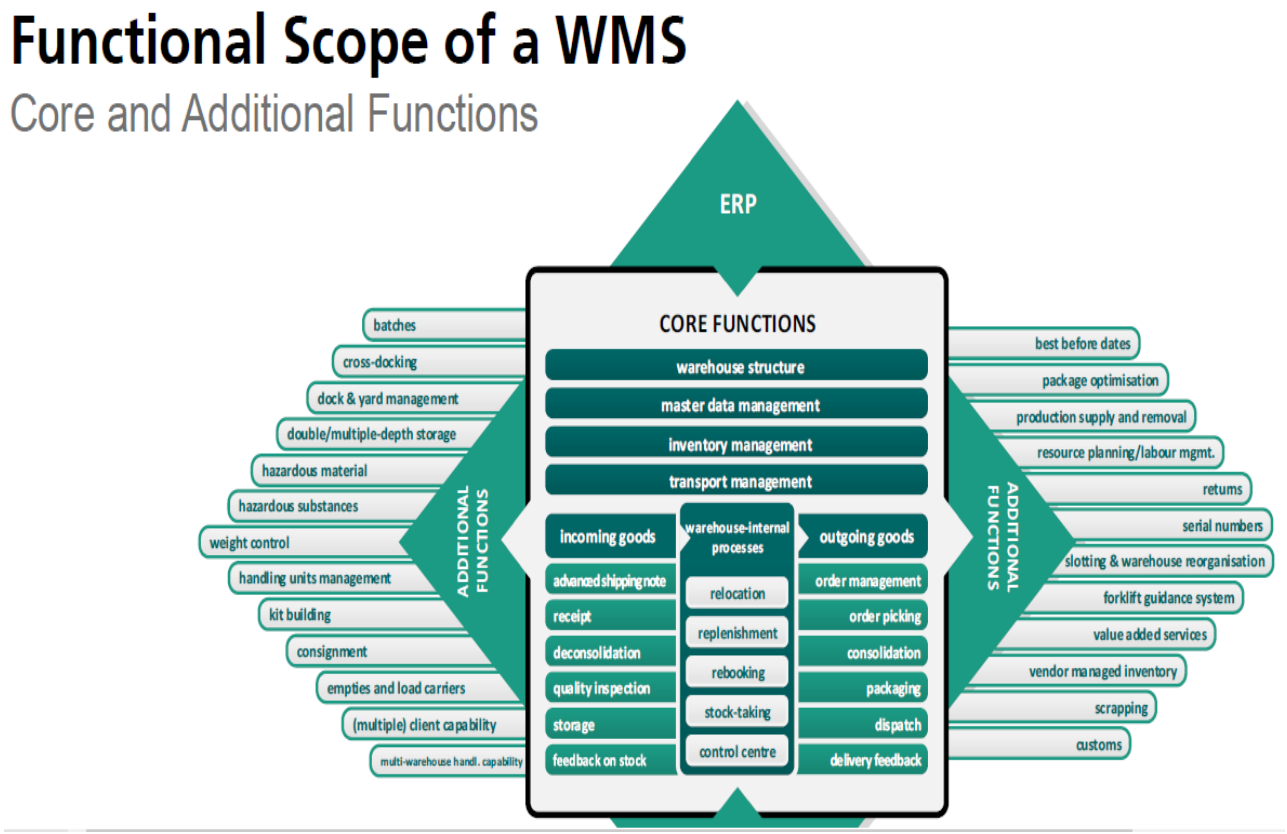


Figure 1: Functional Scope of a WMS (Schmeltzpfenning, et al., 2018)

In addition to the above functions, Thompson (2010) also adds that most current applications available in the market also offer the following listed options;

- Management of multiple warehouses within a single installation of the database and application server
- Voice picking functionality which allows for picking through voice commands
- Integration points to warehouse automation equipment such as pick to light, conveyor controllers and Automated Storage and Retrieval (ASRS) systems.
- Exception based alerts and messaging event management
- External data visibility plug-ins that allow remote users to view WMS data via the internet
- Integrated RFID support
- Integrated business intelligence (BI) in which WMS data can be reported on across the business (Thompson, 2010).

Another current technological trend is software as a service (SaaS), where the WMS application is not licensed as a standalone installation but is provided as a service and an organisation only pays for usage through a monthly fee (Thompson, 2010). The advantages for opting for such a hosted service are:

- No need for costly hardware infrastructure that comes with a standalone installation as the client only needs a computer with internet access.
- No need for internal
- Support teams to support the hardware.
- Availability of unlimited storage and data archiving services that often come with hosted applications (Blokdijk, 2008)

2.5. Choosing a Warehouse Management System

Every organisation typically goes through some process when choosing a WMS to implement. There are several factors that they would need to consider to come to an informed choice. The company needs to consider key business requirements for both now and the future, align the choice to the business strategy and ultimately the return on investment for acquiring the WMS (Richards, 2018).

Organisations need a thorough evaluation of various vendors and applications on the market to ensure that their choice can provide what they need. The evaluation should also centre on choosing the right type of system, either mobile business Apps, SaaS, on-premise systems or bespoke developed software (BASDA, 2020).

According to Badwi (2018), third-party logistics companies need to specifically evaluate their choice of a WMS based on the following key enablers to ensure that they meet their client's needs;

- Ability to implement customer requirements speedily and cost-effectively.
- Product stability and capability to integrate into various ERP systems as standard.
- Scalability is critical so that a 3PL can implement it any size customer and deploy the WMS as the number of warehouses, industries and customers.
- Flawless skills transfer to empower a 3PL to utilise internal resources to quickly and cost-effectively deploy, thus allowing the 3PL to independently service its client requirements.

Another point to consider when choosing a WMS is modularity (Richards, 2018). A modular system has the different functionalities of the systems packaged as modules and the organisation only pays for the modules they require. Another requirement often least considered is the reporting capabilities of a system and this usually becomes a pain point as soon as the system is deployed for use (Richards, 2018).

2.6 Implementation of Warehouse Management Systems

For a first-time implementation at a brand new facility, the process typically takes six to eight months, however, this may vary based on multiple factors (Sudding, 2019). A typical implementation would involve the following phases

i. Definition of the business processes outcomes
ii. Definition of integration process requirements
iii. Ensuring that the team you put in place has the right involvement and focus.
iv. Configuration and preparation of the systems
v. Testing, Training and Go-live approach
vi. Project and Change Management
vii. Go live and Ramp-up
viii. Post Go-live support and stabilisation (Sudding, 2019)

2.7 Factors that affect a WMS implementation

Several authors have suggested a range of factors that influence WMS implementations. These aspects vary from business, technological, human resource, infrastructure, planning to change management. Emmett (2005) argues that a visible and involved top management is key to a successful implementation. Further to that, the management needs to put "its money where their mouth is" by ensuring that the same commitment

is cascaded down the lower ranks of the organisation (Hammant, 1997). In order to get the rest of the people on board, a comprehensive change management programme may be required to overcome people's uncertainty and anxiety. As well as to intentionally involve all stakeholders at the earliest stage as far as possible to ensure that all stakeholders are involved (Emmett, 2005). All large technology deployments involve changes in processes that affect people who must cope with them for successful implementations (Sehgal, 2009). Change management is a comprehensive, cyclic, and structured approach for transitioning individuals, groups, and organizations from a current state to a future state with intended business benefits. This helps organizations to integrate and align people, processes, structures, culture, and strategy (PMI, 2013). It is common for people to resist changes to the ways and methods that they have been used to working for long periods thus a proper management program must be in place to achieve success. Similarly, Gourley (1998) emphasises that participation of the warehouse staff in the implementation process is a factor critical to success. He cites that for a company to succeed, it must actively encourage the involvement of staff in decision-making and welcome input from suppliers to identify areas for potential productivity improvements.

Another aspect often cited by several authors is the need for proper project management and planning. Project planning with realistic timescales needs to be managed internally and not left to an external software vendor, who has no idea of the fine complex details of the user's business (Emmett, 2005). On the same breadth, the program needs to be flexible and changeable where necessary (Hammant, 1997). Coupled with the project planning is the development of contingency plans if there are deviations from the initial plans (Emmett, 2005).

Sehgal (2009) also contends that aligning the processes with the solution being deployed is a critical success factor for any technology deployment project. He also argues that a solution can be custom developed to support a business function to suit the process exactly as required but such a solution can become a liability when the underlying business process changes by constraining the business's ability to adapt. Such solutions are also difficult to upgrade to newer evolutions of the software, as the customisations would have to be re-developed into the newer versions (Sehgal, 2009).

Master data is the base data that provides the basic references to the organizational transactions. This includes item information, warehouses, stores, and virtual objects like account codes. The consistent use of such data provides a consistent structure to the transactions so that these transactions can interact with each other, as well as consolidating for creating meaningful corporate-level metrics. This consistency is more critical when there is integration and interfacing with other enterprise systems as

the data and transactions need to be uniform across the various systems. A system implementation will likely fail if there is unclean master data (Sehgal, 2009).

Collaboration within the supply chains will lead to greater consolidation and an increase in shared-user operations (Richards, 2018). Running supply chains, more often than not, involves interacting with other enterprises and entities; hence, there the relationship with other stakeholders will affect the implementation of a WMS (Sehgal, 2009). However, Emmett (2005) stresses the point that the ownership of an implementation should remain within the organisation, especially with software vendors as at some point, they will not be there and the local teams should continue to provide support.

RectechSolutions (2016), through years of research, has developed a framework of what they consider critical success factors in system implementations. They have classified and summarised these factors as shown in the below figure.

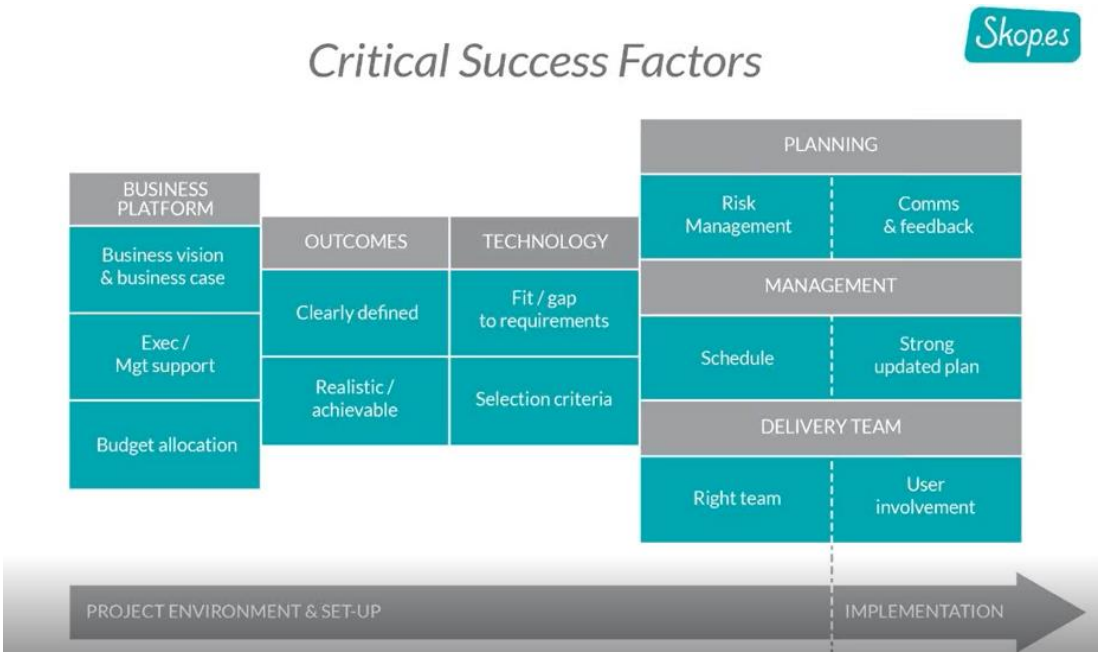


Figure 2: System Implementation – Critical Success Factors (RectechSolutions, 2016)

2.8 Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is a business model framework, composed of integrated modules, for planning all of the resources of a business, starting with strategic planning and linking through to execution in an organisation (Woziniakoski et al., 2018). Process disciplines are integral to successful

ERP predictability, and management systems can provide accountability (Castle & Jacobs, 2009). Enterprise Resource Planning (ERP) software, automates the activities across all the departments in an organization including accounting, customer relationship management and inventory management. ERP software mainly facilitates the flow of information among all functional areas. On the other hand, a WMS is mostly for managing the storage and the movement of inventory to track the movement of every stock item from receiving, putaway, replenishment of stock to the pick faces, picking, packing and shipping (Emmett, 2005).

A WMS can be either stand-alone or can be part of ERP systems supporting the latest technological advances within the warehouse such as automation and Radio Frequency Identification (RFID) (Richards, 2018). Many ERP vendors are increasing the capabilities of their system's functionality while most WMS vendors are adding supply chain visibility and other management capabilities. As customers constantly ask for further functionalities to realize the possibilities of cutting the costs for their warehouses, vendors of warehouse management systems constantly enlarge the scope of their software systems, thus warehouse management systems nowadays increasingly offer functionalities, which have their origin in enterprise resource planning software (ten Hompel et.al, 2015). Most common ERP systems like SAP have WMS modules as part of the extended SAP suite (SAP, 2019). Therefore, the implementation of ERP and WMS continues to be closely tied due to the continual integration and interfacing between these two.

Garg et al., (2014) group the factors that influence the implementation of ERP into the following categories; Strategic, People, Technological, Project Management. The below figure details each of these categories.

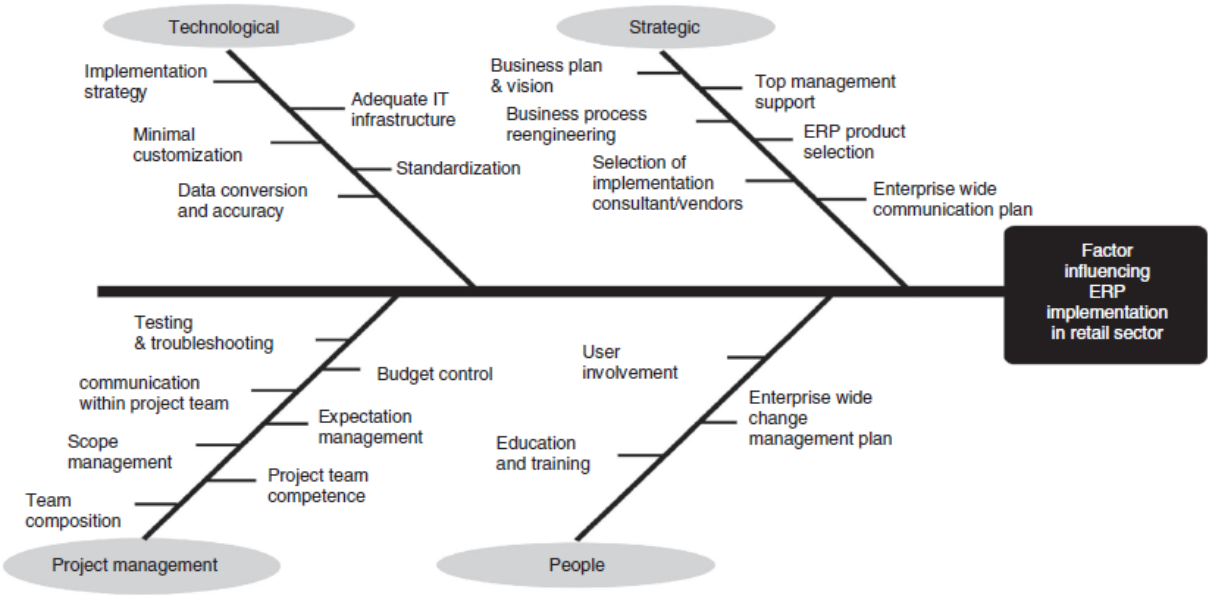


Figure 3: Items Influencing ERP implementation (Garg et al., 2014)

The above factors are not a comprehensive list of factors and further exploration of the literature is required to develop a conceptual framework for this research. Literature on the state of supply chains and warehousing trends will be covered in the next section to further assist in developing the conceptual framework.

2.9 South African context for supply chain and warehousing

This section describes the South African context within which this study is being carried out. The chapter seeks to explore the state of supply chains and more specifically, warehousing, in South Africa and the maturity levels industry and how these have shaped the topic under study.

2.9.1 South African Logistics

South Africa is a regional economic powerhouse of both the Southern African region as well as the whole of Africa. It is one of the most sophisticated and emerging markets in the world. The country is known as the gateway into Africa because of its well-developed first-world financial markets and fast-paced emerging economy (Patel, 2019).

The World Bank, through its Logistics Performance Index (LPI) report of 2018, rates South African at number 23 in the world and 1st in the continent over a period from 2012 to 2018. The index is a unique benchmarking tool, providing the same measure for more than 160 countries of how easy or

difficult it is in these countries to transport general merchandise typically manufactured products in a unitised form (Arvis et al., 2018).

South Africa is the most developed in sub-Saharan Africa and has been the largest economy in Africa for a long time (Ruske et al., 2013) until recently when it was overtaken by Nigeria (BusinessTech, 2018). It is a member of the BRICS countries, an association of five major emerging market economies, namely, Brazil, Russia, India and China wherein it aims to strengthen relations with these countries and consolidate its position in the global economy (BRICS, 2020).

The country's economy is diversified with key sectors including mining, agriculture and fishery, vehicle manufacturing and assembly, food processing, clothing and textiles, telecommunication, energy, financial and business services, real estate, tourism, transportation, and wholesale and retail trade (Ruske et al., 2013). However, the economy has been under a lot of strain as witnessed by the recent slip into a technical recession (StatsSA, 2020) as well as the downgrades from the rating agencies (BusinessTech, 2019).

South Africa has eight main commercial ports with the Durban harbour being the largest port in Africa and is also the container handling facility in the southern hemisphere. Some focus almost exclusively on bulk commodities, while others serve one major industry only, such as the offshore oil industry in the case of Mossel Bay. Richard's Bay has the world's largest bulk coal terminal that opened in 2009 near Port Elizabeth in the Eastern Cape, is the deepest container terminal in Africa (Ruske et al., 2013).

In the context of Africa, South Africa's logistics performance outperforms its regional counterparts (Ruske et al., 2013). This is demonstrated by Figure 4 below, which shows intra-regional flows between the African countries and also imports and exports to and from other continents and the rest of Africa. The density of the flow around the South African map illustrates how South Africa continues to lead in the region (Viljoen, 2013).

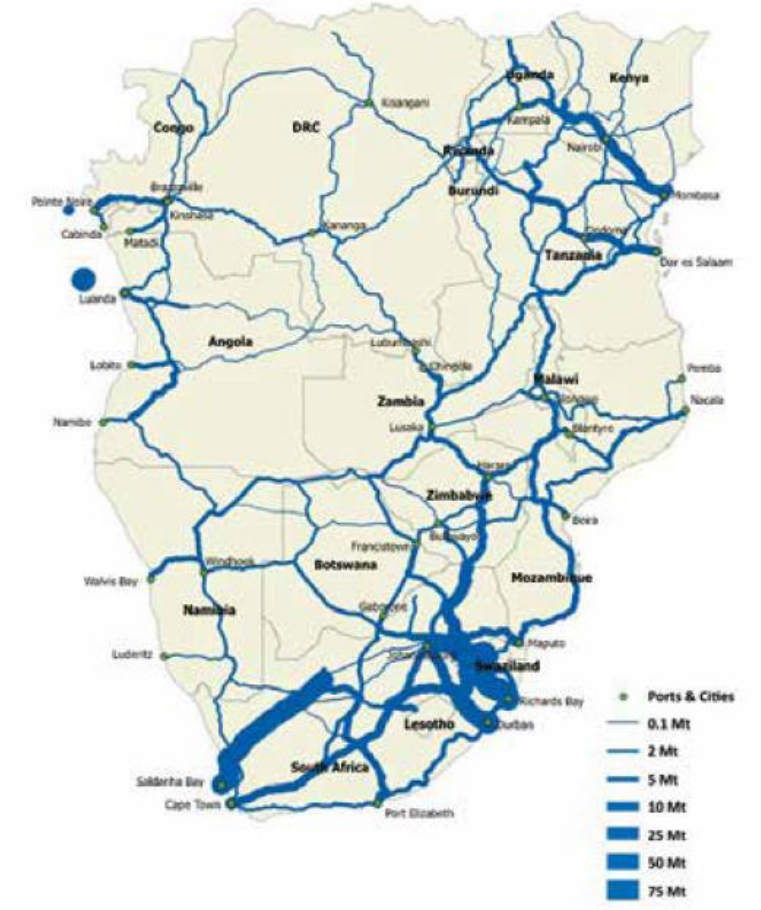


Figure 4: Freight flow on the major corridors of sub-Saharan Africa (Viljoen, 2013)

2.9.2 Supply Chain Trends in South Africa

According to Frost & Sullivan (2014), South African companies are realising the importance of being more customer-centric. To achieve this, alignment is needed between overall business strategy and supply chain strategy. In a 2014 survey, most senior managers and directors in South African supply chain organisations, ranked customer service improvement, technology integration, lowering procurement costs, reducing order lead time, supply chain visibility, business intelligence and alignment of supply chain role players as one of the top three objectives in their supply chain (Frost & Sullivan, 2014).

According to recent studies on supply chains where respondents from various industries and sectors including consumer packaged goods, retail, diversified industries, logistics providers, utilities, and telecommunications were surveyed, the following valuable insights and the most relevant themes that came out are summarised as follows (Viljoen, 2013).

i. Customer-focused

For the ten years since 2004, the supply chains in South Africa have been experiencing falling customer service levels. Some of the biggest factors were the lack of appropriate skills and entrenched silo-based corporate cultures. There were few or ineffective change management initiatives to the shift from silo-based management to integrated organisations. Many organisations could therefore not make the required adjustment from these traditional practices. In response to this challenge, South African companies are adapting to the shift in consumer power and are realigning their supply chain strategies and business models to meet customer expectations by designing their supply chains to be customer-focused. Of the surveyed organisations, 70% of supply chains mostly or always attempted to be customer-focused, while 27% of the supply chains partially implemented strategies to be customer-focused. The participants broadly acknowledge the importance of being customer-focused, which is a positive indicator of supply chain best practice within South African organisations.

ii. Supply chain agility

Supply chain agility is the ability to respond quickly and effectively to sudden changes in supply or demand. It is the capability to handle unexpected external disruptions smoothly and cost-efficiently (Lee, 2004). South African organisations are on average not placing emphasis on designing agility into their supply chains. Only 50% of retail organisations are barely or partially incorporating agile design, while 68% of manufacturing organisations barely or partially design agility into their supply chains. Practical agility requires integrated supply chain structures in order to detect quickly enough any sudden surges in demand or supply.

iii. Supply chain collaboration

Supply chain collaboration is simply when two or more organisations that are separate work closely together to meet common objectives (O'Byrne, 2016). According to the 10th State of Logistics survey of 2014, in 2004 the approach of silo-based, incremental improvements gave very little acknowledgment to establishing outward-facing demand networks needed with customers and suppliers. In 2014, only 46% of South African organisations still never or rarely collaborate with their supply chain partners, while 46% of South African supply chains were only partially managing to successfully collaborate and fully utilise aligned incentives within their supply chains. The survey showed that there was still a significant gap between the knowledge of supply chain management and the successful implementation of supply chain collaboration strategies within South African organisations.

iv. Supply chain maturity

South African supply chains in the fast-moving consumer goods (FMCG) industry are far more customer-focused and demand-driven than those in industries dealing with semi-durable and durable products as well as industrial products and feedstock where product 'freshness' is not so much of a performance metric (Viljoen, 2013). This is demonstrated by the fact that 62% of FMCG supply chains were found to be mature while only 44% of supply chains in these other industries made the grade. In general, over the period from 2004 to 2014, South African supply chains have migrated from 'survival' to 'optimised' mode, allowing organisations to harness efficiencies, reduce costs and improve service levels. In other developed nations, supply chains are migrating to the 'sustainable' mode, an area where South African supply chains are lagging behind. Main challenges faced in reaching 'sustainable' mode include a lack of infrastructure, advanced technology, skills and embedded processes.

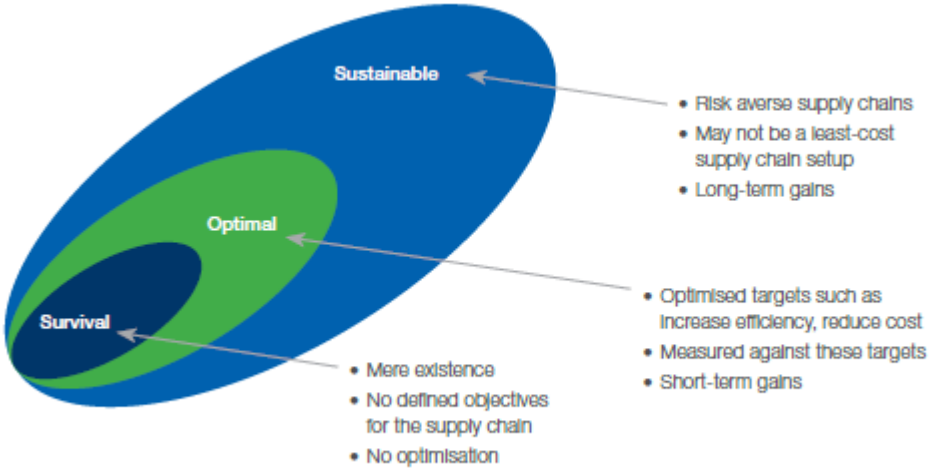


Figure 5: Supply Chain maturity levels (Viljoen, 2013)

2.9.3 Technology within South African supply chains

According to the 10th State of Logistics survey of 2014, many South African companies have been working from severely disjointed enterprise resource planning (ERP) and supply chain management (SCM) systems that have been designed for an individual company and offer little opportunities for integration; trend to a globally connected world (Viljoen, 2013). However, organisations continue to adopt some of the technologies as South Africans increasingly look to online digital platforms to carry out activities such as banking, shopping and trading. (McMurdo, 2019). One of the technologies that has gain traction is the "as-a-service channel offerings" where partners used on-demand platforms where they pay for usage as opposed to on-premise systems where you have to pay for the

infrastructure as well (McMurdo, 2019). This is also enabled by the fact that excellent cloud data centres are becoming more available to South African organisations with Microsoft and Amazon setting up their data centres in the country (Mcleod, 2019).

It is expected that adoption of automation will increase in South African organisations (McMurdo, 2019). The same trend was observed by Schreuder (2017) in which South African and African organisations have begun to implement automated storage solutions in warehouses. One example of such is the most automated pharmaceutical distribution facilities in the Southern Hemisphere (DSV, 2020), which is a testament that South Arica organisations are prepared to, invest in such technologies.

2.9.4 Inventory Management

South African companies generally hold large amounts of buffer stock in all the major industries such as mining, manufacturing and FMCG. However, there has been some recent implementation of just-in-time (JIT) supply models in retail and automotive supply chains which has resulted in reduction of the need to hold more inventory (Dawson, 2019). Responsive and flexible inventory management, drilling right down to individual line items in different stores, is also becoming apparent in some retail chains.

Figure 6 below shows that warehousing and inventory carrying, both closely tied with warehousing operations, contribute to an average of 30% of the supply chain costs in South Africa thus inventory management and warehousing remain a focus in order to manage total logistics costs. Integrated supply chain systems will be a key enabler in driving down excess buffer stock in South African supply chains.

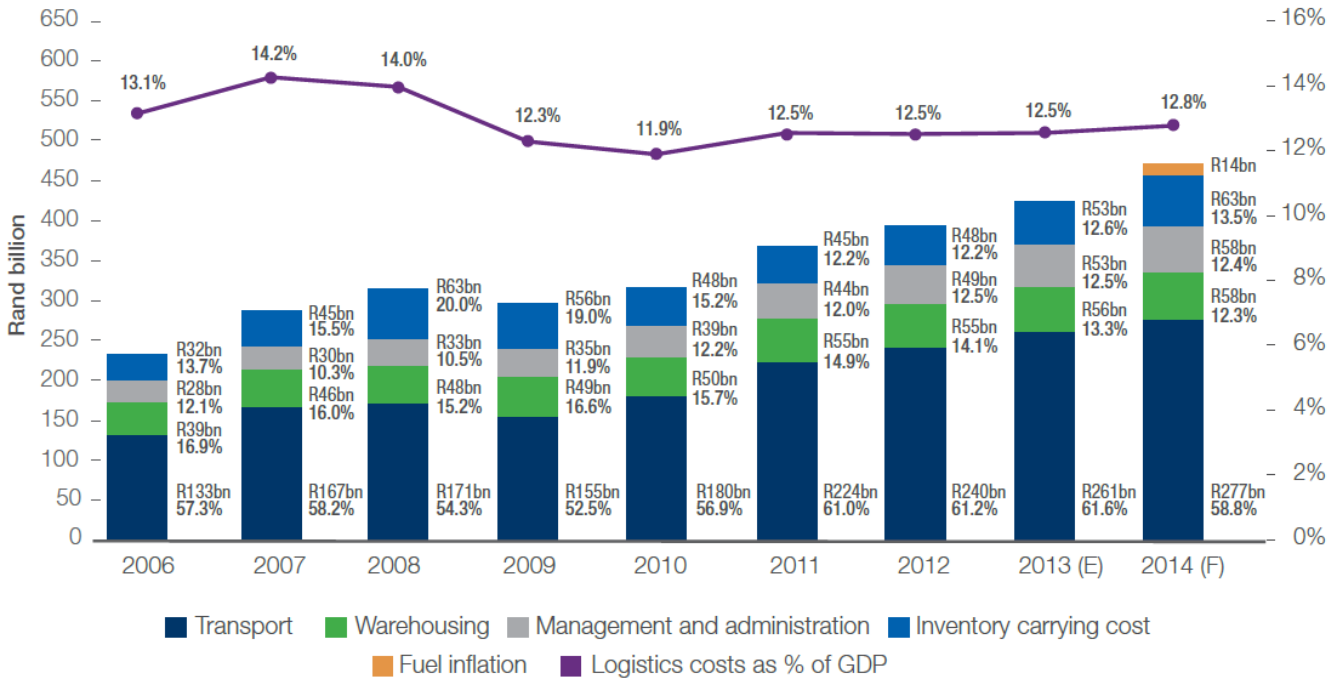


Figure 6: Total national logistics costs and the components from 2006 to 2014(Viljoen, 2013)

2.9.5 Future insights and trends for South African supply chains

Below are some of the key insights and trends that experts have predicted for the South African supply chain environment.

Growth of omnichannel strategies

Many companies are now seeking to increase their use of omnichannel retailing. In the omnichannel model all routes to market are served through the same supply chain wherever possible, making use of shared facilities and inventory. Potentially the omnichannel model cannot only create high levels of customer satisfaction but also can bring down costs (Martin, 2016).

In the South African retail sector, customers are increasingly expecting the convenience and of omnichannel service which gives them the flexibility to choose between various shopping channels, which are all seamlessly integrated. Because of this, there is a continuous initiative to invest in these strategies, but there is complexity and financial impact of implementing omnichannel supply and this could be a deterrent (Ralf, 2018)

Cloud-based supply chain management

To make the most of all of the efficiencies offered by other technologies, many companies are moving their WMS to the cloud. There are many benefits to this adoption, which include the ability to scale

your business as required, with their rapid upgradeability you will always be able to take advantage of the latest features and functions resulting in a reduced internal IT burden (Abi Saad,2019).

The use of cloud-based technologies and other related technologies inevitably leads to big data. More than ever, data is readily available and easy to capture. Technologies available now use hardware such as sensors, scanners and GPS trackers to collect and mine to analyse the data for valuable insights that are then used to make informed business processes (Ralf, 2018).

Collaboration

Companies are seeing their partners as a network rather than a chain with valuable insight that can lead to mutual benefit. Shared logistics, where companies pool warehousing, distribution and transport resources, is also fast becoming a very attractive reason for companies in parallel supply chains to collaborate, especially given the rising trends in South African logistics costs. The role of third party logistics (3PL) and other service providers (software vendors, trainers and infrastructure companies) cannot be discounted in creating an integrated supply chain (Viljoen, 2013).

In South Africa, there is an urgent need for industries to work more closely with government and state-owned enterprises (SOEs) so that companies can more effectively optimise their supply chains and tackle spiralling costs. Such collaboration needs to involve all industries and all public/ private partnerships (Kate, 2016).

Talent

Leading companies appreciate the value of talent across all organisational levels. Having extremely well-qualified, talented people at the senior levels in an organisation can be a wasted investment if these people are not supported by equally well-qualified and skilled staff at each level and for each supply chain function. Excellent logistics and supply chain people development programmes are (Viljoen, 2013):

a. Inclusive, catering for personnel at all levels;
b. Supported from the highest level within the organisation to ensure continuity; and
c. Based on learning outcomes and objectives, which are aligned to business objectives.

At the same time, there is a need to balance technology with the rightly trained people. For example in warehousing, automation makes businesses more agile, as you do not have to rely on employing human beings for every task in your warehouse (Badwi, 2018). The challenge in South Africa is that it is a low-cost, low-skilled labour country as well as high unemployment hence many businesses have delayed automation and technological investments. The challenge of the future is balancing people with technological advancements, as there should be a place for both (Reddy, 2019)

2.10 Conceptual Framework for factors that affect WMS Implementation

Below is a conceptual framework for the factors that affect the implementation of a WMS as identified in the literature review.

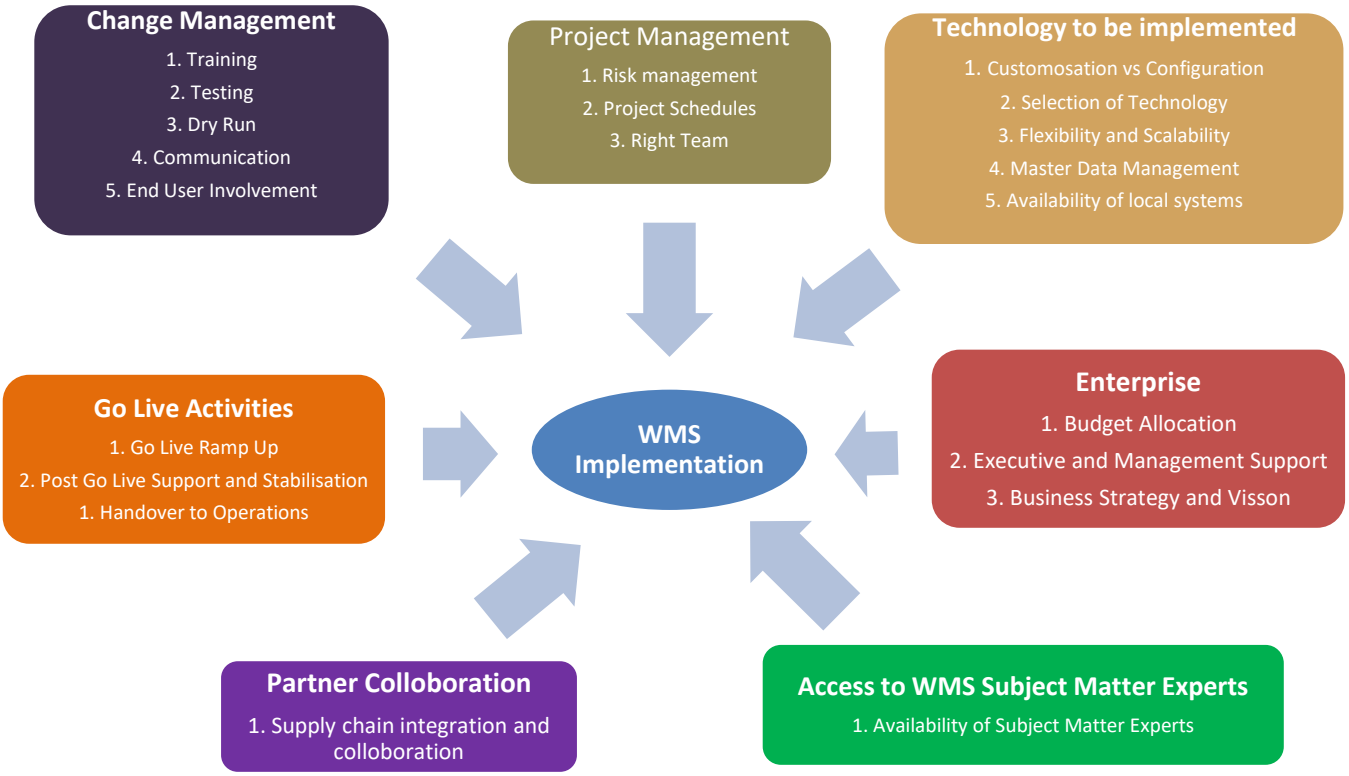


Figure 7: Conceptual Framework for factors affecting WMS implementations

The Enterprise represents the corporate structure and the business environment within which an organisation operates. This includes the management structure, the financial position of the company as well as the mission, vision and strategic plans for an organisation. Either all the above factors can create an environment in which any endeavour by an organisation can flourish or fail, hence it was included in the conceptual framework.

Under the Technology aspect, the process of choosing the systems to implement, availability and accessibility of implementation partners, master data availability and quality, system integration capabilities and many other characteristics need to be considered before and during implementation. In choosing the technology, the business needs influence the considerations to be made in order to select the technology and implementation approach that best addresses the business need. Repeatedly,

the organisational environment outlined on the Enterprise section above impacts the choice of the technology.

Organisations can hardly operate in isolation and be successful in today's business environment, thus they continue to seek partnerships that allow them to work alongside other organisations in their value chain as a means to achieving competitive advantage (Cao & Zhang, 2010). Therefore, the collaboration, or lack thereof, can affect how an organisation implements its internal processes and systems.

Any system implementation brings change to an organisation hence the change must be managed. The success of such an implementation will depend on how the staff is introduced to the new changes, trained on the new systems, how the change is communicated and the extent of involvement and buy-in of all stakeholders affected by the implementation.

For an implementation, financial, human resources and infrastructure need to be made available and a solid plan needs to be in place. The execution and management of this plan and resources can influence whether the implementation will succeed or not. How the organisation anticipates and plans for any risks is also key.

The activities around the go-live date can also determine the success of an implementation. These include the deployment of the systems to the production environment, planning for the switch over to the new system, planning for a rollback in the event of a go-live failure and the handholding of the staff after the switch over to the point where the system is stabilised and the operations can comfortably operate the systems with minimal involvement from the project team

Like any other system implementation, there is a need to involve the technical and solution experts who know the system better. The relationship between the implementing organisation and these experts, called implementation partners or vendors, will have an impact on the successful implementation of a system. Often, there can be conflicting ideas that could arise which can derail the progress of the implementation, for example, the implementation consultants maybe be reluctant to share knowledge so that the implementing organisation remains dependent on them while they continue to bill for work done

3. CHAPTER THREE: RESEARCH METHODS

This chapter covers the methodology of the research design, the research instruments to be employed to gather, the sampling procedure to be followed as well as the data analysis procedures.

3.1 Research Design

In this research study, a qualitative approach using semi-structured interviews and thematic content analysis were used to explore the factors that affect the implementation of WMS in South Africa. Qualitative research is a more appropriate approach to this research because it provides a complex textual description of how experts that have vast experience in this field have encountered (Mack et.al., 2005). Qualitative methods have become important tools within the fields of applied research because they provide valuable insights into the local perspectives of study populations as well as producing culturally specific and contextually rich data (Mack et.al., 2005). The qualitative approach to research provides for data to be collected as close as possible to the specific situation under study thus the influences of the local context are not disregarded but are taken into consideration (Miles & Huberman, 1994)

Extensive research has previously been done for similar WMS implementations in other parts of the world and for similar enterprise systems such as ERP. Through a literature review, various factors identified as affecting similar implementations were used to develop a conceptual framework (Figure 7). This framework was then used to explore WMS implementations in the South African context.

3.2 Sampling

The research was aimed at South African warehousing enterprises that have implemented WMS. Purposive sampling was used to select several organizations that have done such implementations.
According to, Jankowicz (1995), purposive sampling involves choosing people whose views are relevant to an issue because it is believed that their views are particularly worth obtaining and typify significant varieties of viewpoints. This can be achieved by identifying key informants with specialised knowledge about a particular subject within a group. Purposive samples are the commonly used form of non-probabilistic sampling, and their size typically relies on the concept of “saturation”, the point at which no new information or themes are observed in the data. The difficulty is to determine this point of saturation in a more practical way (Guest et al., 2006).

The process of using purposive sampling first includes establishing the participant profile. A list of potential research subjects is identified to match the needed characteristics and knowledge. Finally, specific individuals from this list are asked to participate (Bonita, 2008). For this study, the participants chosen were the project champions who led in the various implementations of WMS. They are believed to be better suited to shed insights on the various factors that were at play in the implementation in their organization.

The participants were chosen from various industries, namely:

- A Fast Moving Consumer Goods (FMCG) company in South Africa.
- The longest-established IT (software and hardware) distributor in South Africa
- A global leader in international transport & logistics specialising in third party logistic services in South Africa.

According to (Bonita, 2008), qualitative research is only effective if the right participants are selected and it is critical to determine the common characteristics the participants should share. (Bonita, 2008) suggests the following important factors when choosing qualitative research subjects.

- Knowledge of the research subject by the prospective participant.
- Personal characteristics of the prospective participant.
- Location and accessibility of prospective participant.

For this research, participants were chosen from experienced employees who have been involved at senior levels in implementation WMS projects. Some of the positions of the participants identified from the various organisations included Supply Chain Executive, Supply Chain Manager and Applications Manager. Very few potential participants who were approached for this study were prepared to participate in interviews. This resulted in only three organisations being utilised for this research investigation

3.3 Instrumentation

Semi-structured interviews were used gather data from the identified participants. (Jankowicz, 1995) explains that this technique involves asking open-ended questions whose content and sequence are not fully specified in advance. In this form of questioning, the respondents are encouraged to answer in their own words. The semi-structured interview is the most common of all qualitative research methods because it is flexible, accessible and intelligible and, more important, capable of disclosing important and often hidden facets of human and organizational behaviour (Qu & Dumay, 2011). Semi-structured

interviewing has a characteristic pattern of a small number of prepared interviewer-questions followed by further questions improvised to follow-up the interviewee's response to the original question. Semi-structured interviews may be used to explore the subjective world of the interviewee. This, however, does not mean that the responses of the interviewees are treated uncritically or accepted at face value (Wengraf, 2001).

3.4 Development of interview questions

Wengraf (2001) suggests a model for developing Interview Questions (IQ) that addresses the Theory Question and ultimately the Critical Research Question (CRQ). The sequence of activities for this model are as follows:

- Define your research objectives.
- Expand the critical research question into several theory research questions, which must be answered in the interview. The conceptual framework is the basis upon which the interview questions will be drafted based to the themes and common constructs identify in the framework.
- For each of the theory questions or themes, develop suitable sets of interview questions appropriate for different interviewees should be developed.

Below is the pyramid model suggested by Wengraf (2001) for the development of interview questions that was followed.

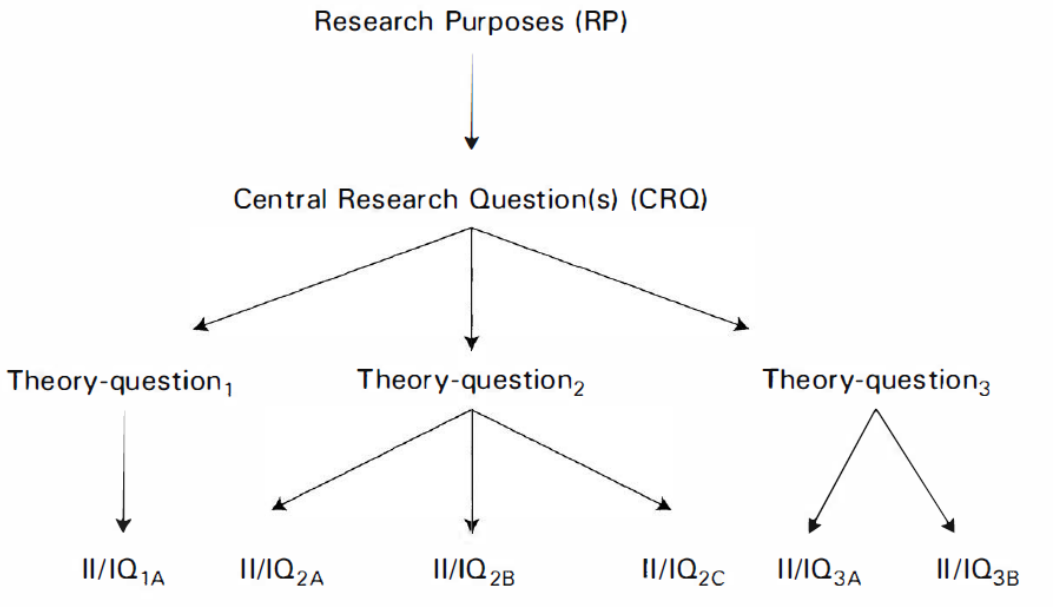


Figure 8: Critical Research Question →Theory Questions→ Interview Questions pyramid model (Wengraf (2001)

Figure 9 below is an example of how interview questions were developed for one of the codes (Technology) using the above framework. The remainder of the interview questions may be viewed in Appendix A

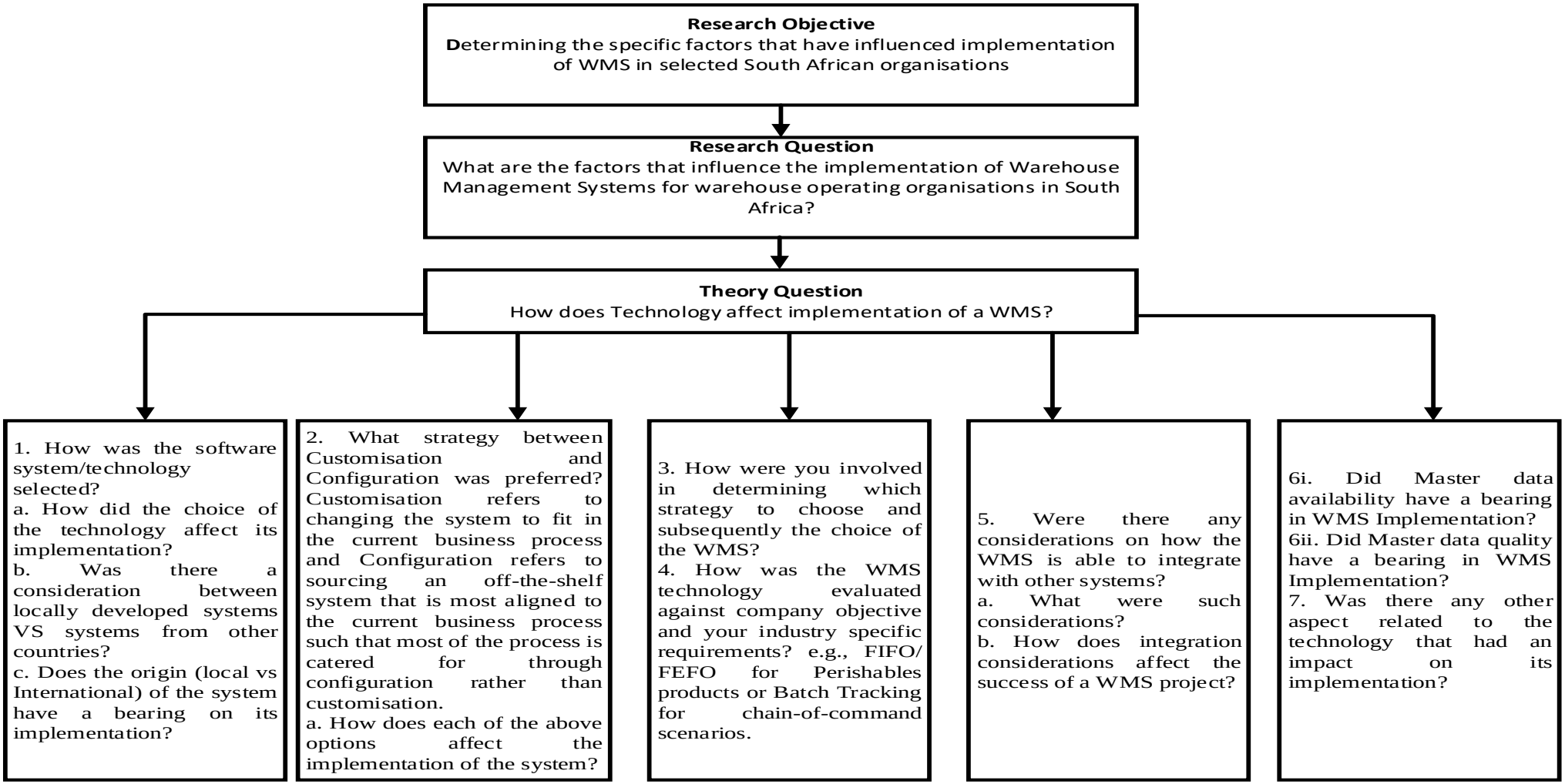


Figure 9: Example of application of Wengraf pyramid model

3.5 Data Collection and Analysis Procedures

Data was collected through interviewing identified participants. Each participant was required to sign a consent form as proof having agreed to be interviewed. This was essential for ethical reasons. The participants were informed of the nature of the study and needed to be willing to take part in it (this is informed consent), and any data collected will not be traceable back to particular individuals (thus maintaining participants' right to privacy) (Leedy & Ormrod, 2015). Samples for the consent form and participant sheet can be found in Appendix D and E respectively. Each interview was recorded verbatim for proper transcription and analysis. (Jankowicz, 1995, p. 206) advises that a tape recorder be used for any interview longer than thirty minutes. According to Shensul at al., (1999) the quality of an interview can be achieved by giving careful attention to the following three principles:

i. Maintaining the flow of the interviewee's story.
ii. Maintaining a positive relationship with the interviewee.
iii. Avoiding interviewer bias.

Each interviewee was taken through a series of open-ended questions that was informed by the interview guide questions detailed in Appendix A while the interview transcripts can be found in Appendix F. The interview questions were formulated from the conceptual framework that was developed as part of the literature review in chapter two and were spread across seven major sections, namely, Enterprise, Technology, Partner collaboration, Project Management, Change Management, Go-live activities and Access to WMS experts. Thematic analysis was then done on the interview transcripts to identify themes that emerged from the interviews. These sections mentioned above were used as codes in the thematic content analysis process. For this report, the identity of the respondents and any specific companies mentioned during the interviews have been concealed to ensure confidentiality and anonymity as specified in the methodology.

The gathered data was analysed through content analysis. Content analysis is a detailed and systematic examination of the contents of a particular body of material for identifying patterns, themes, or biases. (Leedy & Ormrod, 2015). This type of analysis categorises the answers to semi-structured questions, so that the meanings expressed in the data can be classified, coded, and tabulated. (Saldana, 2009) defines coding as a method that enables one to organize and group similarly coded data into categories or "families" because they share some characteristic. Themes were then the outcome of the coding

exercise and each theme was analysed to see if it addresses the Critical Research Question and hence the objectives of the research.

Braun & Clarke (2006) suggest a six-step process on how to analyse thematic content. The six steps are as follows:

i. Familiarising yourself with your data

This step requires the researcher to be fully immersed and actively engaged in the data by firstly transcribing the interactions and then reading (and re-reading) the transcripts and/or listening to the recordings. This step provides the foundation for the subsequent analysis.

ii. Generating initial codes

Once familiar with the data, the researcher must then start identifying preliminary codes, which are the features of the data that appear interesting and meaningful. These codes are more numerous and specific than themes but indicate the context of the conversation.

In this research, the initial codes and sub-codes were generated in the conceptual framework, which can be found in Figure 7. Some sub-codes were later emerged during the analysis of the interviews and are detailed in Appendix B.

iii. Searching for themes

The third step in the process is the start of the interpretive analysis of the collated codes. Relevant data extracts are sorted, combined or split according to overarching themes. This was done as part of the thematic content analysis where the key information related to each code was collated into an Excel file and the emerging themes were sort. The Excel file can be found in Appendix B

iv. Reviewing themes

A deeper review of identified themes follows where the researcher decides whether to combine, refine, separate, or discard initial themes. Data within themes should cohere together meaningfully, while there should be clear and identifiable distinctions between themes. This was done by conducting an interview with an industry expert where the initial themes formulated were evaluated by the expert for coherency and validity. The initial and amended themes are in Chapter 4 where the validation results are discussed.

v. Defining and naming themes

This step involved refining and defining the themes and potential subthemes within the data. Ongoing analysis was required to further enhance the identified themes as part of the thematic content analysis detailed in Chapter 4.

vi. Producing the report

Finally, the researcher needs to transform his/her analysis into an interpretable piece of writing by using vivid and compelling extract examples that relate to the themes, research question, and literature. The report must relay the results of the analysis in a way that convinces the reader of the merit and validity of the analysis. It must go beyond a mere description of the themes and portray an analysis supported with empirical evidence that addresses the research question.

3.6 Validity and Reliability in Qualitative Research

One of the critical areas to critical to the research is researcher bias, which has bearing on the validity and reliability of the research. According to Salmon & Fargotstein (2017) researcher bias occurs when some aspect of the research design and/or how the research is conducted, generates a description or a conclusion, which is not accurate. Such bias can be either deliberate or unconscious. Any bias will be addressed through objectivity as well as reflexivity.

On the other hand, ultimate objectivity may not be fully achievable and Leedy & Ormrod (2015) rather suggests rigorous subjectivity, which means that the researcher must take steps to ensure that their analyses and interpretations will ultimately be credible and defensible in the eyes of colleagues and other well-informed individuals through.

- Triangulating multiple data sources.
- Intentionally looking for outliers, exceptions, and contradictions both within the sample selected and within the data collected.
- Remembering that participants will not necessarily give you the ultimate truth; rather, they may tell you what they (a) believe to be true, (b) wish were true, or (c) think you want to hear.
- Continuing to collect data until you are no longer gaining new insights about the phenomenon of interest
- Having two or more individuals independently code the data.
- Seeking feedback from both participants and professional colleagues about your findings and interpretations.

In this research, an experienced industry expert reviewed the interview questions before the interviews were conducted to address some of the bias. The feedback from the expert was incorporated into the interview questions. The correspondence with the expert can be found in Appendix G.

After completing the thematic content analysis, a further interview was carried out with the same industry expert to discuss the results. The objective of the interview was to seek feedback and validation from the industry expert. Leedy & Ormrod (2015) also support this approach on how to

ensure credibility on the analysis. The outcomes of the expert interview are in Chapter 4 and the transcript of the interview in Appendix G.

The industry expert identified holds a Ph.D. in Industrial Systems. His experience of over 25 years includes several executive and specialist positions in established organisations as well as a start-ups. His systems and process engineering capability are founded in his extensive experience on enterprise projects backed by his academic involvement. He participated in multiple local and international projects, which included first time process and technologies in those areas.

3.7 Ethical issues/clearance

Ethics clearance was applied for and granted through the School Ethics Committee. The ethics clearance number for this research is **MIAEC 097/19.**

Letters of permission were sought from all organisations from which participants were interviewed. Each interview participant was also be asked to sign a consent form before an interview was conducted. At the outset of each interview, it was explained that all responses are to be kept confidential and that details on the business and the interviewee would not be included in this report.

4. CHAPTER FOUR: ANALYSIS AND RESULTS

This chapter presents the data analysis and results of the semi-structured interviews conducted with the respondents from the three companies that were selected through purposive sampling as outlined in the methodology in Chapter 3.

4.1 Respondent Demographics

Three respondents were selected from three different companies that are based in Johannesburg, South Africa. The table below is a summary of the companies as well as the designation of the interviewee in each company. Respondents with senior positions were identified, as it was believed that such had some good experience regarding WMS implementations to give a fair account on the subject under study.

Table 1: Respondent Demographics

Company	**Industry**	**Number of years in Operation**	**Location**	**Designation of Interviewee**
Company A	IT equipment distributor	>30 years	Gauteng	Supply Chain Executive
Company B	Food Retailer	About 30 years	Gauteng	Senior IT Manager: Supply Chain Systems
Company C	Third-Party Logistics	>30 years	Gauteng	Supply Chain Implementation and Improvement Manager

4.1.1 Company A profile

Company A is a distributor of IT hardware, software, enterprise and security products. Its reach is the whole of Southern Africa. The company was established over 30 years ago and is one of the longest-established IT distributors in South Africa. The company's headquarters is in Gauteng with branches in Western Cape, Eastern Cape, KwaZulu-Natal, Mpumalanga and Free State. It has also extended its footprint into Africa with branches in Namibia, Botswana, Zambia and a focused sales team that services the other territories in Africa.

Company A had a decades-old warehousing system, outdated processes and practices and needed to plan for rapid change in their industry if they were to remain competitive. With the speed of innovation and change within the South African hardware reseller market, Company A needed a solution to make it adapt rapidly, embrace and leverage on this change. It recognised that the existing legacy software

solution and supply chain practices were a key inhibitor to this change and needed to be modernised thus in 2013 they embarked on implementing a modern, scalable WMS at their Johannesburg hub. The company has also begun providing third-party logistics services within its warehouse facility due to the capabilities unlocked by the implementation of the WMS.

4.1.2 Company B profile

Company B is a food retailer in South Africa. It started in the 1990s with only six stores but has now become a chain of more than sixty outlets operating in all nine provinces of South Africa. The company is also a subsidiary of a global food retailer. Company A offers a wide range of national brands plus goods sourced and packaged under its own brand label across all major categories of fresh and perishable products, groceries, general merchandise and appropriate services. Company B previously used a manually operated system, the success of which relied on human input alone. This generally worked well enough for a relatively low number of stores, but when the company undertook a huge expansion drive, the company needed to adopt a leading supply chain systems platform to provide more efficiency and an easier and quicker way to serve the fast-expanding chain of stores. Hence in 2011 they moved to a new warehouse facility and implementing a new WMS solution

4.1.3 Company C profile

Company C is a global leader in international transport & logistics and is a tier-one supply chain partner and one of the top 10 transport and logistics companies in the world with the largest integrated logistics network in Africa. It has its headquarters in Europe but has operations across the African continent including here in South African with a presence is all the major cities. Its global offer is built around its comprehensive and integrated expertise in five services, namely, multimodal transport, customs, logistics, global supply chain and industrial projects. Company C is a third-party logistics company that is involved in the following industries: aerospace, consumer goods & retail, fashion, food reefer, healthcare, high-tech and telecommunications, industry & engineering, mining, luxury goods, oil and gas, perfumes & cosmetics and soft commodities. The company also partnered with a WMS provider recognised the world over to provide a unique WMS solution to its clients where a WMS is needed.

4.2 Thematic Content Analysis

The results are presented below are in line with the seven major topics which were developed in the conceptual framework and were used as guidelines to develop questions that were posed to the participants during the interview processes. These sections are Enterprise, Technology, Partner collaboration, Project Management, Change Management, Go-live activities and Access to WMS experts. The results of each code are presented in tabular format with some quotations from the respondents that are pertinent to each topic. The emerging themes for each subcode are recorded at the bottom of each table.

4.2.1 Enterprise

Participants were asked to give their view on how the overall business environment in their organisations affected the implementation of WMS projects. The questions asked related to senior management involvement, budget allocation and alignment of such projects to the business strategy. Respondent 3, from the 3PL global company, indicated the complexities that come with being a global entity and some of the decisions that they have to adopt locally because they are a directive from the Head Office. The summary of the results is in Table 2 below.

Table 2: Results for Enterprise Thematic Content Analysis

	Enterprise		
	Corporate Support	**Budget Availability**	**Alignment to Corporate Strategy**
Company A	*"So most of the projects that we do, the process within the business, is to scope the project to get all your relevant costs and everything like that. Then I take that to my own EXCO, at a company level. We sign that off at our EXCO level. It then goes to the group EXCO level. Then*	*"So depending on the size of it, at the moment, if I give you an example, we put in conveyors last year, and I had to do that before financial year-end to make sure that we had a CAPEX allocation for the new year. So that is generally what we do. If something makes sense, and we agree on it, then the finance people find us that money. There is a budgeting process and then there is something where we put in robotic process*	*"The strategy at that point was to offset some of the fixed costs. So we are saying, okay, we have, we can reutilize another 40% of this warehouse and charge customers for that. Then we can offset the fixed costs against that. That was a simple strategy, but what we are finding is that this industry's moving very fast and the margins are becoming less and less and we have to*

	they do approval on that. Then it goes onto a project prioritization list."	*automation as well, as an example. That made sense in the expenditure was say R300K as opposed to two or three million. Three million becomes a different discussion to R300K. Often, R300K we can implement even if there is no budget for it especially when the ROI is good and everyone agrees"*	*consolidate more. That is driving a new strategy in terms of 3PL. In the past, strategy would purely offset fixed costs. Now it is saying what we want is to create a completely new strategy of actually trying to sew the whole industry in bringing some sort of central distribution."*
Company B	*"From a governance perspective, it's quite high up it's not like we just do it as an IT project. It is never an IT project... Actually. I have been in projects through it trying to implement… So I found that such a project you can go and do the pilot but when there's no buy-in from high up in the business and no one to drive behaviour within the people, then it doesn't take off."*	*"I think every Executives got a budget that they have to spend right, for example, budgets are already being done for next year, right. So if I am an IT director, I'm a supply chain executive, I already know next year what's coming and what I want to do whether to open a DC and put in a WMS, then I have to put it in my budget and capitalize it because big spend is not operational but is capital expenditure (CAPEX)…. There has been instances where we see that we are hitting the budget mark and internally within the IT budget and we have moved certain funds around to restructure and make sure that you still succeed."*	
Company C	*"There are so many aspects when you implement something new. WMS is just a small part of it but the scope is much bigger. It goes from cleaning, you know, right through to QHSE to HR to do everything and each part of that has a budget. So definitely, it gets a little bit more in depth involvement from senior management."*	***"****So that depends very much on us on what we do although we still need to report back to the likes of MD and HQ on what we are busy with. When it gets to your bigger projects where we actually have to go off site, then it is very heavily with the MD, because he obviously needs to approve the budget in terms of the cost. It goes to HQ, so, and that type of budget then it is managed and then they will tell us, okay; you have this amount or whatever to make it work and then you have to fit in everything. So yeah, it heavily involves on the type of project that we have to work with but if it is something small it remains here but if it goes*	*"Yeah. So obviously, your WMS is your heart and soul of the business here. It is what keeps your records. When we have global customers, it does get a little bit more complicated because then we have to kind of also do what they want us to do…. Then you also have some clients where they were not interested in using our system. So they use their own WMS worldwide and even though we work with them in many different countries, they use the system everywhere … So we are very flexible and we adapt quite easily to what the customer requires from us. HQ also has that*

		bigger and a little bit more out of our scope thing, that's when top management starts getting involved."	*flexibility to allow us to do that, but this is mostly our global clients."*
Theme	**Senior management involvement was highly important in the implementation of WMS projects for the companies surveyed.**	**Budgetary resources were available to ensure the successful implementation of projects for the surveyed companies. In addition, it emerged that project owners needed leeway to approve certain level of expenditures, without seeking senior management approval beforehand.**	**It emerged that corporate business strategy and vision had an influence on the implementation of WMS concerning the systems and processes to implement for the organisations surveyed.**

4.2.2 Technology

Each participant was asked a range of questions concerning the technology or software they implemented. The areas covered included, the selection process, the consideration between local versus international brands, the preferences between customisation or configuration, system functionalities and master data.

Two of the participants mentioned that, before going to market to find a software to implement, they would first look with their group of companies if there were any already- approved software that they could adopt. Both these respondents worked from global companies whose head office was out of South Africa.
All participants revealed that a configurable system was more preferred to a heavily customised option. The cost of customisation and the difficulty in upgrading a customised system were cited as the reasons for preferring configuration to customisation. However, participants emphasised that some degree of customisation was necessary to cater for other exceptional processes that could emerge in their operations.

On selecting local or international software suites, the emerging theme on this topic from all the participants was that there are not many local WMS software brands available, and if they are, they were not suitable for their requirements. What was key for all respondents is that when an international software brand is chosen, it still must have a local presence and footprint with South Africa, through a local implementing partner as well readily available support services.

One of the key drivers for implementing warehouse management systems is to capitalise on and exploit the benefits that come with such systems, which include e-commerce capability and electronic links along the supply chain through EDI functionalities (Ayers, 2001). Therefore, the participants were also asked on what considerations they made concerning how the system they choose integrates with other systems.

One of the points that emerged from the interviews that was not initially part of the conceptual framework is the ease of deployment as a key factor when implementing WMS in the 3PL environment. The reason is that, with the 3PL business, the client requires their stock to be visible on a system as soon as it arrives on site.

One of the three respondents from the 3PL environment underlined the importance of identifying software that addresses specific industry needs for the different clients that they deal with. Such capabilities need to be specified as part of the Request for Proposal (RFP) to ensure that they are at the forefront of consideration during the selection process of the preferred software choice.

According to Garg et'al., (2014), the success of ERP implementation and related systems is highly dependent on the success of data conversion and accuracy. The participants were, each, asked on the significance of the availability and quality of master data when implementing WMS. All participants unequivocally underscored the criticality of having accurate master data when implementing such a system. All narrated of the difficulties that they hand encountered in their respective implementations due to the non-availability or the inaccurate master. All participants also suggested that organisations should not depend on master data gathered elsewhere as it is often incorrect. Therefore, organisations need to invest in gathering and verifying their own master data. In some instances, the weight and dimensions are used for billing purposes hence these need to be accurate to avoid being over-charged by the transporters.
The results are summarised in tables Table 3 and Table 4 below.

Table 3: Results 1 for Technology Thematic Content Analysis

	Technology			
	Technology Selection	**Configurability versus Customisation**	**Local versus international brand**	**Integration capabilities**
Company A	*"…it was very prominent in the tech industry."*	*"I think you will remember that we selected a very vanilla approach to it. We did not want to make loads of customizations on it and we still have that view now, so we do not have customisation."*	*"I have only come across one local brand and that was very ERP specific… Therefore, that is the only one I know of and the rest of the ones that I have interacted with are all the international brands… but I think the lesson learned if I were to do this again is to make sure that we have a product where we have more than one implementation partner in the country."*	*"So again, that was one of the big changes that we had to make from a strategy perspective because we were moving more to the 3PL environment. What we actually did in the beginning, the implementation, I think was short sighted. It was a direct ERP to WMS integration. What we did in terms of going to our first 3PL is we created an integrated service platform… Yes, everything flows through the integration layer. So, what we've bolted on top of that is; we've obviously integrated with multiple ERP's including SAP."*
Company B	*"If there is nothing that is available in the group right now and there is nothing we can tap into from a group perspective, then we go out into the market and request for proposal... we are trying to get a single instance of SAP across the group*	*"No. So let us get something that is somewhat aligned to how a General DC should work, but if necessary can be changed… So in general we do not like customisation, right? Yeah. So we prefer something where we can configure because if you look at it down the line when you know want to upgrade all those customisations, you now have to factor them into the base product."*	*"From a WMS perspective there were not too many at the time. I do not think there are local providers that could support an enterprise as big as ours right… Look, I mean "local is lekker" is ideal if they can deliver right. Ultimately, it is really about whether they can deliver or not and at what cost.* *So, it's International software, but with a local footprint, so I*	

			think that's the best way to think about it."	
Company C	*"It comes from HQ. Nevertheless, we were pushed to do it. It was pushed on from HQ. And if we get that push, then our hands are kind of tired and we cannot do much. So we were pretty much forced to use that.* *It depends heavily on the customer. I mean we got three customers in this warehouse that work on their own WMS and have not even considered using our system. So firstly, you have to look at what the customer requires"*	*"It is going to increase your timeline definitely. I mean, it is going to increase your cost. It is going to increase the complexity of it because you know; it is new tests, new configuration and new training."*	*"Therefore, it does not really matter if it is global or local; it is the support that you have that would make the difference."*	*"Of course, and that would depend purely on the customer. Preferably we, I would say we want to implement EDI because it eliminates the manual work for the people on the floor, but it is also very costly. However, if the customer requests it and we can push back the costs or build it into our rates, then obviously we would push for it."*
Theme	**Companies surveyed first relied on already available software or technology options within their organisations. If they needed to go to market competition, the prominence of the software and whether it is fit for purpose were major factors.**	**Most organisations interviewed preferred a more configurable system with the flexibility of some customisation if required.**	**The local presence of a software brand, in both an implementing partner and support services were cited as critical for the organisations interviewed.**	**The capability of the system to easily integrate with other systems was raised important, especially in the 3PL environment where external partners are involved.**

One of the three respondents from the 3PL environment underlined the importance of identifying software that addresses specific industry needs for the different clients that they deal with. Such capabilities need to be specified as part of the Request for Proposal (RFP) to ensure that they are at the forefront of consideration during the selection process of the preferred software choice.

Table 4: Results 2 for Technology Thematic Content Analysis

	Technology		
	Ease of deployment	**Industry-specific capabilities**	**Master Data**
Company A			*"So, that is your oxygen, without correct master data everything is a stuff-up."* *"What we cannot rely on in this industry is vendor information because it is never correct"*
Company B			*"So this was a nightmare for us, I remember when we started and wanted to start receiving and the dimensions were wrong… We have a challenge of legacy data where some of the stores generate and print their own in-house item bar codes, so the challenge is purifying data. I do not think it will ever be solved in the retail space. It is a big challenge."* *"So we literally had a ruler and pen to measure each and every product to get the dimensions."*
Company C	*One of the points that emerged from the interviews that was not initially part of the conceptual framework is the ease of deployment as a key factor when implementing WMS in the 3PL environment. The reason is that, with the 3PL business, the client requires their stock to be visible on a system as soon as it arrives on site. Respondent 3 underscored these two points as expressed in the quotes below.*	*"Well, it plays a very big role what the system can do. If a system cannot manage a FEFO, we cannot implement it for our customer whose heart of the business is depends expiry dates because I mean if you sell an expired product to a customer and that customer has a reaction you can imagine the image damage to the customer. They might lose millions. Therefore, if the system cannot accommodate for that, you cannot implement it."*	*"We have customers, where they do not even work with item codes and they work with descriptions only. Then we have to try creating an item code of our own…."* *"But again, master data is not only about SKU and description, it goes to dimensions, weights and that information is 90% of the time it's wrong."*

	"As soon as the customer's stock arrives they want it in the system, as we cannot wait for weeks" *"To implement a customer, to give you an idea, on SPEED, the quickest was about three to four weeks that we could get a customer implemented. With Streamline, it takes one day. In fact, I could do it myself. So it made it very easier to implement these smaller customers onto Streamline and it was very user friendly, we had support"*		
Theme	**The ease of deployment was raised as an important consideration when implementing WMS in 3PL organisations for clients where the process is pretty much a standard with little exceptions.**	**The participants interviewed were cognisant of the specific industry and client requirements and they recognised that these need to be at the forefront of capabilities when selecting suitable software or technology for a client.**	**The availability and quality of master data were described as the "oxygen" of a WMS implementation. The organisations interviewed initially had challenges with cleaning and organising their master data until they had to institute internal processes and structures to ensure these two capabilities were achieved. It also emerged organisations must not entirely reliable on master data supplied by external stakeholders as such master data often does not meet their needs.**

4.2.3 Partner Collaboration

Participants were quizzed on how their interaction or lack of it, with other role-players outside of their organisation affected the implementation of WMS. The respondents that are in the 3PL arena mostly echoed a common thread of the importance of having working relations with such partners. Respondent 1 emphasised the importance of proper documentation and communication channels when dealing with multiple external partners. They mentioned that often, there could be interpretation differences of what the requirements are as well as who to contact when there is an issue hence proper, up to date, documentation of signed documents and contact lists need to be kept. The results are summarised in Table 5.

Table 5: Results for Partner Collaboration Thematic Content Analysis

	Partner Collaboration
Company A	*"So the first port of call, like I mentioned, is the documentation in the PMO office. The more organized you are and the more definite and defined you have your project, the easier it is for an implementation partner to get a right."*
Company B	*"So there is something called peer reviews. Okay. Before you go live, in the ESG in effect, there is someone from an external chain who does not have a stake in the project who comes and assesses and give an honest opinion of the project. That is another point from a partner collaboration perspective that happens within the within the group."*
Company C	*"So obviously, your customers plays a huge roll, but so does your suppliers. And, I mean, if your suppliers mess up, then it puts you in a bad light. It is your forklift, it is your reach trucks, it is your transporters, it is your stationary, and it is your people that supplies the boxes, your packaging material. If you run out of carton boxes and you cannot pack or label, it has a huge impact on operations and your relationship with the customer. Therefore, I would say yes, you have to keep your customer happy but in order to do that, you have to keep a very tight grip with on your suppliers as well."*
Theme	**For all the entities researched on, partner collaboration was significant to enable a successful implementation of a WMS and they needed adequate processes to ensure such collaboration is a reality.**

4.2.4 Project Management

Participants were also asked to give their view on aspects of project planning and how these, according to their knowledge and experience, have an impact of WMS implementation. The subjects that were touched are project planning, the project team, project documentation and risk management.

Regarding risk management, two respondents mentioned that risk identification and mitigation planning needs to happen from the beginning of the project and not be left only when the risks have materialised. Concerning the project team, the emerging thread was that a dedicated team that has the representation of all the stakeholders that are affected by the project or the solution needs to be set up and there must be synergy between the teams being spearheaded by the PMO office.

Two of the three participants mentioned the importance of maintaining an up to date repository of all project documentation, which include the Project Charter, specification documents, Standard Operating Procedures and all other related documents. It also emerged that such documents are key in case of disputes with implementation partners or for continuity in the event of turnover in the project team. Respondent 3, from the 3PL environment, underscored that many aspects that are not directly linked to the WMS itself are often in the ultimate solution in which the WMS is utilised. This is because, in a 3PL environment, a client often requires a full logistics solution hence the project planning entails more than just the WMS solution, which is often deemed an IT solution. Table 6 is a summary of what emerged from the various interviews.

Table 6: Results for Project Management Thematic Content Analysis

	Project Management			
	Project Planning	**Risk Management**	**Project Team**	**Project Documentation**
Company A	*"What we have done now, so we have a proper PMO structure, so they manage whether it is an outsourced or in-source person whose job is to manage all project actions and milestones as these are critical. By having an independent person who is*	*In a 3PL setting, it emerged that there are broader considerations in the project planning.*	*"So by having the project management team and everyone having the roles within the project management team, they are able to engage ……..and make sure that the costs are being managed properly because it's time and material."*	*"In terms of the business processes, we have already seen this where we have had staff turnover in that thing, you are able to still go and draw out those documents and double check according to the mapped*

	driving all of those players to meet those milestones, you actually start to achieve."			*process . Therefore, documentation is essential."*
Company B	*"There is also PMO, which is the Project Management Office. If the project is a supply chain project or a WMS implementation it would definitely need a project manager. The project manager drive all this organizing and not necessarily as functional as I am but just coordinating everything….."*		*"So if it is a WMS implementation. It just does not touch the DC. It touches everywhere from H.R. to stores to operations to finance…."*	*"It is very important, really. It is especially important for continuity…."*
Company C	*"Therefore, there is so many things that you have to take into consideration that is before you even get to your IT requirements. You know, your PC's, your a network, your RF, your printers, your WMS."*	*"So we must have round the table discussions on how we are going to mitigate risks and what are our risks. It is not just physical risks, but what is the risk if we do not reach our deadlines and if we have contingency plans in place."*	*"Yes, you have to. I mean, it is not possible to work alone."*	
Theme	**The importance of an independent Project Management Office (PMO) was underscored by most of the respondents.** **In a 3PL setting, it emerged that there are broader considerations in project planning.**	**Most organisations involved in this research conceded that they had to consider risk management in the early stages of the project. The areas covered for risk management were wider than the WMS project itself.**	**All studied organisations emphasised that a dedicated team that has representation of all the stakeholders, affected by the project or the solution, needs to be set up and there must be co-operation between the team as led by the PMO office.**	**All researched organisations had internal processes to manage all project documentation. It emerged that project documentation must be kept and updated always, as it is essential for continuity and future reference.**

4.2.5 Change Management

This topic generated the most discussion and interest amongst the respondents. The sub-topics covered under change management included communication, training, system testing and stakeholder involvement. All respondents spoke passionately on the topic as shown by some of the below sentiments.

In the area of communication, it emerged that there is a need for an effective communication platform between the implementation team and the rest of the stakeholders where all issues can be discussed without fear. Two of the respondents also cited fear of losing jobs as one of the reasons there is often resistance to change from the staff.

The common thread from the participants when it comes to stakeholder involvement was that all relevant stakeholders must be engaged as early as possible in the project as opposed to only involving them later. The delay in involving critical stakeholders was cited as one of the reasons for the resistance to change often experienced

The topic of training was also well articulated by all the respondents as they raised various points on how it affected their projects. It was evident from all respondents that they felt that, in some of their projects, little training was conducted before they went live as evident in their responses. The respondent from the 3PL company further mentioned the reality of thinly spread resources across different similar projects, which often run concurrently in her organisation, thus making conducting a full boutique of training programs not feasible. Two of the respondents highlighted that, whilst training will provide a good base to prepare users for the new system, they still expected some exceptions on the go-live day, which may not have been covered during training. They also emphasised the importance of practical training more than the desktop training to get users to become more familiar and conversant with the new system before the go-live day.

Respondents were also asked how they conducted systems testing in preparation for deployment and go-live of the system. Two of the respondents outlined a rigorous testing phase, through which various tests are conducted according to the initial system requirements specified on the BRS. Some of the different testing phases mentioned are external consultant testing, internal analyst testing and User Acceptance Testing (UAT). They also mentioned the need to involve all the relevant parties that must confirm and sign off that the system is giving the desired results and can be deployed into the production environment. A dry run is a

check or series of tests that are conducted on a system to measure its readiness for deployment into a production environment. All interviewees whether they conducted dry runs, who was involved and the perceived impact these had on their respective projects.

Table 7: Results 1 for Change Management Thematic Content Analysis

	Change Management		
	Change Management	**Communication**	**Stakeholder involvement**
Company A	*"I can write a thesis."* *"…that was my biggest issue when I got called in by the CEO to say what went wrong on our implementation. What I said to him is that the change management is almost non-existent and the culture was shocked by this whole implementation."*	*"One of the biggest fears for people, especially when you're going through mechanisation and new systems is there's a fear that is part of the reason you putting it in is to cut heads thus there is need of being very transparent in that communication…. People need to have the ability to ask a question and the platform to raise a concern…."*	*"What that told me was that those guys were not involved in that decision. So if you and I go on a journey together and we say; okay, the problem statement is this, and what can we do to fix this thing, we start to explore things together. By the time we find our solution you've already bought in, right? Because you know what the problem was and you have been on a journey to find the solution. That doesn't mean that you and I both sit in every meeting and we meet with different WMS vendors but it's more of creating the problem statement together and then looking for a solution that solves it."*
Company B	*"We didn't manage it very well …, to be honest. Our change management strategy was very bad…. We had strong management but we did not take the staff with on the journey."*	*"Generally, people think that because we are implementing a new system, people lose jobs, but what I saw from this from day one, it was clear we are implementing this and no one would lose their jobs. If there is anything that needs to change or your role needs to change, you will be trained on that."* *"But the best I've seen has been in the 3PL implementation. There was fun generated around the project…. There was posters created…. You know, there was a whole lot of hype that was generated and that helped the guys to calm down."*	

Company C	*"This is the most difficult part of my job"*	*"I think, most importantly, emails is not a good form of communication because firstly people do not read emails. Secondly, managers do not filter through information so the best thing for us is to get everybody involved around the table, which is what we normally do."*	*"If you involve them from the start, then they feel like they have got a say and they are much more receptive. If you just say to them, "You will do this because I say so" then it will never work."*
Theme	**For all the researched organisations, change management emerged as the biggest concern in implementing a WMS and that it was poorly handled in their respective implementations.**	**The surveyed organisations had varied examples of projects in which communication was either poorly or exceptionally handled. It emerged that there is a need for an effective communication platform between the implementation team and the rest of the stakeholders where all issues can be discussed without fear as such fear was cited as the reason for resistance to change.**	**The results show that stakeholders were not involved early enough in the projects. Early stakeholder involvement was raised as critical to achieve success and avoid resistance to change by most organisations researched.**

Table 8: Results 2 for Change Management Thematic Content Analysis

	Change Management		
	Training	**System Testing**	**Dry Run**
Company A	*"I mean, we had guys that were aisle champion on Friday and they were a Cycle Counter on Monday."* *"Well what you want is that the larger percentage of the processes that are running through that environment are running properly. There are going to be exceptions, but the exceptions are not the rule. So by doing the training in that, I think that you get to cover 99% of the possible issues so that in a production environment, especially a high volume production environment like this, you have the time to manage the 1%."*	*"The first port is your end-to-end testing, which is your system checks to make sure everything's working according to how it was planned. Then we do the user acceptance training and it is at that point, where all the key stakeholders are involved in actually working on the system in a test environment. …. there is a formal test plan that happens. It is called System Integration Testing. There is System Integration Testing that happens first, whose certain criteria must be achieved and then signed off by the Steering Committee…. All different parties will sign and then once I am happy and I have spoken to the people, I will then sign off. Then with end-to-end,*	*"No, I think it is more about the timing of when we go live. Okay, there are times where we understand the impact and the risk to the business."*

		testing there is criteria that has to be met which is pre-documented in the whole process."	
Company B	*"You cannot go live without training, even though there has been instances where we have go live without it."* *"The users are then examined for proficiency and one would not get user access to the DC if they have failed the system test exercises."*	*"System testing is actually analyst testing… the way it works is there has to be external consultant testing. When these consultants are done, then there is analyst testing by IT/BSP. After system testing then there is UAT."*	*"Yes, we actually do several dry-runs especially on elements that affect data and any integration…. Yes, without that sign-off you can do nothing."*
Company C	*"I mean, if we were in an ideal world and I had my ideal team and I had my trainer and my dedicated super user and all they do is WMS, then it would be very easy to say. However, that is not the ideal world. I mean, we have maybe 10% of our time that can go into something like that because we have so many other projects. So, for training from our side, it is very difficult and it is quite frustrating…This is because sitting in front of a computer doing a test versus being on the floor and physically doing that is two very different things…. So, it doesn't matter how much testing and stuff you've done until you go live and you've got your first stock in your hands and you're processing it that's when you're real training and testing actually begins."*	*"For me, I feel there's a little bit of a gap between the testing and the training… When you test the system again, it is in the ideal world, for example, you prepare your little document and prepare the system and when I testing, everything works perfectly. But the minute that stock arrives, it doesn't matter how many tests you've done, how many dry runs you've done and how much training you've got, It is like you've not done any of it."*	*"Therefore, it gives you a very good idea but again, it is in an ideal world."*
Theme	**Most respondents conceded that little training was conducted in their implementations and that, whilst training will provide a good foundation to prepare users for the new system, they still expected some exceptions on the go-live day, which may not have been covered during training.**	**All respondents carried out system testing and highlighted the importance of the various phases of system testing; namely analyst testing and user acceptance testing, with one respondent raising the shortcomings that often arise in these processes, which become a reality during the go-live.**	**Only one of the participants mentioned that they always executed dry runs before go-live. The other participants were not really for the idea as they mentioned that it did not cover all possible scenarios since it is done in a controlled environment.**

4.2.6 Go Live Activities

Respondents were also asked on several aspects related to the go-live activities that were identified in the conceptual framework to have a potential impact on the implementation of WMS.

What emerged from the participants is that they all faced many challenges on their respective go-lives as proved by their comments below. The reasons for their failure ranged from poor project planning regarding the cutover plans, inadequate training and insufficient change management.

Respondents were also asked on their understanding and execution of cutover and rollback plans. A cutover plan is a strategy on how the transition will be done from the old to the new system and processes, with the details of all activities performed and the responsible personnel. A rollback plan is a drafted process of the activities to be done, and the assigned responsible person, to roll back the system to the initial state before the attempted go-live, in the event that the go-live was not successful. This plan could be developed as part of the risk management plan to mitigate business stoppages when a deployment is not successful.

One of the respondents mentioned the impact of the availability of appropriate business intelligence tools at the start of go-live activities. They echoed the following from their go-live experience.

The participants were also asked on the stabilisation efforts to the new system and processes as well as how the system is handed over to the operational teams for daily use. The emergent thread from all of the participants is that a period, whose length depends on the size of the project, is needed to handhold the operations team and guide them up to a point where they can run the new system with reasonably minimum involvement from the project team. Once the new system is stabilised, it, any calls of help from the operations will have to be channelled through a formal support channel, through logging of calls. All the results are summarised in Table 9 and Table 10.

Table 9: Results 1 for Go Live Activities Thematic Content Analysis

	Go Live Activities		
	Go Live	**Cut Over Plan**	**Roll Back Plan**
Company A	*"Well, we had different reflector vests for different levels of people within the warehouse. There was a bunch of us walking around with those bright white vests written Super User on the back but there was not a single super user in this warehouse."*	*"Yes. So, we actually set times, especially on the bigger implementations. So, we would go live, we create WhatsApp groups and communication platforms for everyone to communicate. There is a hierarchy of events that it needs to happen…. and then there's also by certain timeframe if we haven't achieved X, Y and Z, then we are going to roll back and there is also the plan to do so."*	*"…if by certain timeframe we haven't achieved X, Y and Z, then we are going to roll back and there is also the plan to do so. We also have system backup because that is one of the requirements for going into production as that allows for rollbacks."*
Company B	*"The challenge then was that all the goods had been moved from the previous DC and it was now in [REDACTED] and was stacked everywhere on the warehouse floor. The pressure of stopping operations and the stores waiting to receive their stock was quite high. We had to put it to receive and put away and meanwhile, the inventory team was starting to the run waves and pick same time and this was just a nightmare."*	*"I think it was just project management disciplines that were not followed. There has to be a go-live checklist with the activities that are going to be done on the night of go-live, also mentioning the person who is going to do it. Every little detail that requires someone to do something and the sequencing thereof, is very important."*	
Company C	*"I mean we tested and trained many times for [REDACTED] and the minute we went live, the wheels came off because then the batches went working and being decoded. The systems was allocating different stock on different batches and then all of a sudden we got a surplus stock on a PO. It was a mess."*		
Theme	**All participants faced a lot of challenges in their respective implementation go-lives with the reasons including poor project planning, inadequate training and insufficient change management.**	**Some organisations did not have a cut over plan while others did have. A cutover plan is a plan with details of all the activities that will need to be done over the go-live period.**	**Only one respondent cited the importance of a rollback plan as a contingency measure in case of an unsuccessful go live attempt while the other two organisations did not have such a plan.**

Table 10: Results 2 for Go Live Activities Thematic Content Analysis

	Go Live Activities	
	Business Intelligence Availability	**Handover and Stabilisation**
Company A	*"If those people had all the Business Intelligence in place and the right knowledge, the result would have been better."*	*"Probably one week to two months depending on the size of the change. After this, any queries are handled through the support channels where operations have to log calls"* *"It becomes an operational thing at the point where it is signed off after the stabilisation period…"*
Company B		*"Our handovers are not instantaneous and soon after go-live. We do have post implementation support that I see provided. This is for a period of about 3 weeks until the implementation is stabilised and support will then transition into a formal process of logging calls via a dedicated support platform."* *"After the 3 week period there will be a final ESG meeting to formalise closure of the project."*
Company C		*"The second thing you need to be readily available and not insist on opening a ticket but available on Skype, on email for any queries. Only after maybe three months that the project is stabilised and all queries are logged via the ticketing system and this is often on the bigger projects."*
Theme	**One of the respondents mentioned the impact of the availability of appropriate business intelligence tools (reports and dashboards) at the start of go-live activities to capacitate the operational team to understand better the new systems and make decisions quicker.**	**All respondents stressed that a period of handover and stabilisation is necessary in order to handhold and ease the operational teams into the new system to a point where they can operate with minimal involvement from the project team. A formal evaluation and sign-off of the project was done at the end of such a period.**

4.2.7 Access to WMS Experts

The participants were also asked how they organisation had access to WMS subject matter experts, their relationship with them, how they went about with the knowledge transfer and sharing from the experts to their internal teams and how all this impacted on the outcome of their various projects. Respondent 1 also bemoaned the issue of knowledge transfer from the implementation partner to their internal teams as well as limited room to negotiate implementation fees as one partner in the region only implemented the software they had chosen. Concerning knowledge transfer, they suggested a formalised structure and process to document and measure knowledge transfer as part of the project scope. The summary of the responses is shown in Table 11 below.

Table 11: Results 2 for Access to WMS Experts Thematic Content Analysis

	Access to WMS Experts
Company A	*"You have no room to negotiate and you are bound by them and that is the biggest frustration I guess the Intellectual Property (IP) transfer still hasn't happened properly in three years … make sure that there is a proper documented IP transfer process within the project scope.".*
Company B	Respondent 2 emphasised that strong internal knowledge is required in order to reduce over-dependence on external consultants as well as to critically evaluate any suggestions that may come from them if they will add value to the business. They also have a system in place to ensure knowledge transfer. They also reiterated the need to have a genial working relationship with external consultants as a key to success. *"I would still challenge them if it is not going to add value to my business or it is going to open up other gaps. You always wanted the knowledge to sit in-house. You do not want to always rely on consultants as this often comes at a high cost. I found that when I had cordial professional working relationships with the external consultants, I ended getting more from them and that always worked to our advantage."*
Company C	Respondent 3 lamented the issue of the WMS experts in her organisation to be too much system oriented and lacking the operational knowledge, hence it was a challenge getting the appropriate assistance timeously. The respondent suggested that the project team be link between the operations and the experts in order for the communication to be effective *"…the people were so very much systems-orientated and not operationally orientated, they never understood our queries…. what I find sometimes these experts do not speak the operational language. So you need somebody that is like a middleman who can break it down for the guys on the floor."*
Theme	**All respondents attempted to transfer knowledge to their internal resources and some had challenges in getting the WMS experts transferring knowledge to their internal resources hence it is necessary to have a process in place to ensure that such knowledge transfer happens.**

4.2.8 Results of Interview with research subject matter expert

As part of the process to assure the validity and reliability of the research results, Leedy & Ormrod (2015) recommends that feedback be sought from other professionals or experts in the field. To this end, an interview was done with the same expert who reviewed the base questions that were used for the interviews. In the interview, the expert was taken through the initial themes that had been drafted comments and feedback was given for each theme. Below are the comments from the expert for each of the themes. The feedback was incorporated into the final themes in the report. The table below summaries all the feedback for each theme.

Table 12: Results of Interview with research subject matter expert

Code	**Sub Code**	**Initial Theme**	**Expert Comment**
Enterprise	Corporate Support	Senior management involvement is highly important in the implementation of WMS projects for the companies surveyed.	*"So from the interviews, if I have to read it that way, they say that senior management involvement is highly important in any implementation of a WMS project for the company? What I don't read the on the theme is if they were they involved?... From the survey, was this the reality? Okay. I am missing the reality."* **Action** The theme must be rephrased to state the actual results from the interviews by stating if corporate support was a reality.

	Budget Availability	Budgetary resources have to be availed to ensure the successful implementation of a project. In addition, those responsible for implementation need leeway on a certain level of expenditures, for which they necessarily do not have to seek senior management approval beforehand.	*"That is interesting to me because I also read I would like to just see that in your theme. We have struggled with that in some of our projects. The client knows it is critical to upgrade the process and be more efficient but they are just not prepared to give money. So yeah, I would say add that in the theme as I actually think is this like in my world an anomaly in terms of people are prepared to make it work."* **Action** The theme must be rephrased to state the actual results from the interviews by stating if the budget was made available or not.
	Alignment to Corporate Strategy	The corporate business strategy and vision have an influence on the implementation of WMS concerning the systems and processes to implement for the organisations surveyed.	*"So I was happy with that one. I think it is the corporate strategy alignment is quite clear that they do that first. They try to do alignment. They are trying to synergise with the rest of their global operations."*

			Action The theme must be rephrased to state the if there was alignment to corporate strategy or not
Technology	Technology Selection	Companies, often, have to rely on already available software or technology options within their organisations. If they need to go to market competition, the prominence of the software and whether it is fit for purpose are major factors.	*"I saw that and that is as theoretically expected according to their answers, which was good to see that people are at the adhering to it. Again, I am going to say I think it is because of operational importance that they are trying to do the base and not taking shortcuts. So I like the method."* **Action** The theme must be rephrased to state the actual results from the interviews.
	Configurability versus Customisation	Most organisations interviewed preferred a more configurable system with the flexibility of some customisation.	*"I enjoyed that. So I liked that one. I was kind of not surprised, but it was well yeah, that's nice to see. This indicates to me that in the WMS environment, the expectation of the robust processes is there."*

	Local versus international brand	The local presence of a software brand, in both an implementing partner and support services, is critical for the organisations interviewed.	*"So all I read there is that the requirements are mature enough that, you know, for community-based system, which is international. Locals are normally very specifically niche. So maybe that is a bit what you are saying that the requirement of niche WMS is really niche."* *"Well then that might be a good point to state, because this is now a contradiction to what we get… that the establishment of user groups around the community of users on the specific warehouse management system, is still not adopted in the WMS industry most probably because of the competitiveness of the actual work.*
	Integration capabilities	The capability of the system to easily integrate with other systems is important, especially where external partners are involved in the 3PL environment.	*"This is always a pain hey. You remember the previous comments I said you have to add and I think you have added that so I am happy with that."* **Action** Rephrase the theme to give the results

	Ease of deployment	The ease of deployment is an important consideration when implementing WMS in 3PL organisations.	The expert needed further clarification of what is meant by ease of deployment and he felt that ease of deployment is usually a wish list and most vendors use this as a selling point. Upon further clarification of the 3PL scenario where this was raised, he conceded that this could be a fair theme in that specific scenario. *"Because this talks to your interview, otherwise it is just a wish list. Yeah. If you ask me now and I have to quickly think about it, I would echo exactly what you say that the process stays the same and that reports can be easily added. That might be a fair request for ease of deployment."* **Action** Rephrase the theme to give the results

	Industry-specific capabilities	Industry and client-specific requirements need to be at the forefront of .capabilities to be considered when selecting suitable software or technology for a client.	*My comment here it is a nice theme but again I would have seen on the theme, from what you have experienced. Do the interviewees know what are the industry specific requirements or do they find it out afterwards? That would be the important topic for me."* **Action** Rephrase the theme to give the results
	Master Data	The availability and quality of master data were described as the "oxygen" of a WMS implementation and organisations need to have internal processes and structure to ensure these two capabilities are achieved and must not entirely reliable on master data supplied by external stakeholders.	*Yeah, this was a cool one. I saw that there were many strong opinions. And then, I mean you write whatever you want and I don't have all the background, but I am caught here between whether the question related to what they consider or was the question related to what they implemented? One question I would have is this interviewee company is whether they understand their master data… Okay. So you're saying they know it because your*

			language says "need to have"; should it not be they have or they do not have? I do not know. You see the difference there." **Action** Rephrase the theme to give the results
Partner Collaboration		For most of the entities researched on, partner collaboration is significant to enable a successful implementation of a WMS and an organisation needs to have adequate processes to ensure such collaboration is a reality.	*You need to change your "needs to have" to "had". It changes the meaning of the answer."* **Action** Rephrase the theme to give the results
Project Management	Project Planning	The importance of an independent Project Management Office (PMO) was underscored by most of the respondents. In a 3PL setting, it emerged that there are broader considerations in project planning.	*I was a bit surprised in terms of the maturity of the approach. I mean a lot of people talk about it. These guys, from the comments, are doing it and they put an emphasis on it… . So I'm already thinking Chapter 6, but one of the lines in chapter six should say that the WMS industry is a mature industry. So the community user groups is lacking, but in terms of understanding the*

			importance from operations, this is much higher than what you would you get from the TMS guys for example."
	Risk Management	Most organisations involved in this research conceded that risk management must be considered in the early stages of the project.	*"I would add something there. I think the 3PL guy was talking about how the risk is wider than just themselves. So I would add something like, if it's true, that the companies know the extent required in managing the risk the clients.* **Action** Incorporate comments into the theme
	Project Team	All studied organisations emphasised that a dedicated team that has representation of all the stakeholders, affected by the project or the solution, needs to be set up and there must be co-operation between the team as led by the PMO office.	*"And this is a headache. I went through that and linking that to change management… I was trying to make the link to say, but we always say we want to implement something with the guys on the ground, but they have to do their day job."* **Comment**

			The expert was satisfied that a dedicated team was suggested to running such a project but also raised the point that the shop floor personnel best understand the process and need to be involved both in the project team and as part of change management
	Project Documentation	It emerged that project documentation must be kept and updated always, as it is essential for continuity and future reference.	*"You should also give the result of the interviews instead of what they should be doing."* **Action** Rephrase the theme to give the results
Change Management	Change Management	For all the researched organisations, change management emerged as the biggest concern in implementing a WMS and that it was not handled well in their respective implementations.	*So I like this. The change management one was, at least what came out here, none of them were successful it seems. Or maybe it was clear in the content, not in the theme, so just make sure that it come out that change management was unsuccessful and what the reasons were.* **Action**

			Add that all organisations were not successful in change management and what the reasons were.
	Communication	It emerged that there is a need for an effective communication platform between the implementation team and the rest of the stakeholders where all issues can be discussed without fear as such fear was cited as the reason for resistance to change.	**Action** Rephrase the theme to give the results
	Stakeholder involvement	Early stakeholder involvement was raised as critical to achieve success and avoid resistance to change by most organisations researched.	**Action** Rephrase the theme to give the results
	Training	Most respondents conceded that little training was conducted in their implementations and that, whilst training will provide a good foundation to prepare users for the new system, they still expected some	*"You see your sentence is now correct."*

		exceptions on the go-live day, which may not have been covered during training.	
	System Testing	All respondents highlighted the importance of the various phases of system testing; namely analyst testing and user acceptance testing, with one respondent raising the shortcomings that often arise in these processes, which become a reality during the go-live.	The expert was asked on his opinion on how much testing should be conducted before go-live; *"So my opinion is you cannot test everything otherwise you are not going to go live. Okay. That is my opinion ... "you have to take it out of the lab". But we have a new saying now: "critical processes, functional completeness". Some call it the "happy path". That is the core process that must be tested and then you must make sure all the functionalities*
	Dry Run	Executing the dry run was identified as a step to ensure system readiness for go-live even though there were reservations from other participants that it did not cover all possible scenarios since it is done in a controlled environment.	*"I mean if you can practice it all the time then that is great. But I would just say just state the fact that some guys are actually doing dry runs and giving a benefit, but there is reservations from the participant."* **Action**

			Rephrase the theme to give the results
Go Live Activities	Go Live	All participants faced a great deal of challenges in their respective implementation go-lives with the reasons including poor project planning, inadequate training and insufficient change management.	
	Cut Over Plan	A cutover plan with details of all the activities that will need to be done over the go-live period must be complied and used a guideline for the switch over from the old to the new system and processes.	**Action** Rephrase the theme to give the results
	Roll Back Plan	Only one respondent cited the importance of a rollback plan as a contingency measure in case of an unsuccessful go live attempt.	*"In the software world, it is critical to have a rollback plan. So you can actually include this in your discussion and they are not complying. So, in my mind, which is cool actually, is we are sitting with a mature audience that understand the importance of a system where the process is not really changed but the tool is just*

			upgraded, but they still miss critical things like that roll back plan." **Action** Mention in the theme that most of the organisations are not practicing dry run which is such a critical step in systems implementation
	Business Intelligence	One of the respondents mentioned the impact of the availability of appropriate business intelligence tools (reports and dashboards) at the start of go-live activities to capacitate the operational team to understand better the new systems and make decisions quicker.	*I was struggling to understand what you are trying to do there. What was the question about BI?... I would call it BI availability, because now I have go live activities and BI availability. Okay, now it actually makes sense."* **Action** Rename the sub-code to "Business Intelligence Availability"
	Handover and Stabilisation	Most respondents stressed that a period of handover and stabilisation is necessary to handhold and ease the operational teams into the new system to a point	*"And I think the content you have at the top is quite good."*

		where they can operation with minimal involvement from the project team. A formal evaluation and sign-off of the project must be done at the end of such a period.	*So you can also include the ITIL process in your discussion. I am sure for all these guys, this was their best period; the handover and stabilisation.* **Action** Include the ITIL process in relation to stabilisation in your discussion chapter
Access to WMS Experts		All respondents underlined that they had challenges in getting the WMS experts transferring knowledge to their internal resources and that it is necessary to have a process in place to ensure that such knowledge transfer happens.	*"So what I read from this one, if I recall now, it was that they tried you know. They tried to get access to the experts and, but they were hampered. So in this case, I would also mention that all or some of the respondents made an effort to get the experts to help in transfer of IP as well as mentioning the reason they failed."* **Action**

			Mention that all or some of the respondents made an effort to get the experts to help in transfer of IP as well as mentioning the reason they failed.

4.2.9 Conclusion

The table below gives the summary of all the themes that emerged from the thematic content analysis broken down according to the seven major themes.

Table 13: Summary of themes

Enterprise	
Theme 1	Senior management involvement was highly important in the implementation of WMS projects for the companies surveyed.
Theme 2	Budgetary resources were available to ensure the successful implementation of projects for the surveyed companies. In addition, it emerged that project owners needed leeway to approve a certain level of expenditures, without seeking senior management approval beforehand.
Theme 3	It emerged that corporate business strategy and vision had an influence on the implementation of WMS concerning the systems and processes to implement for the organisations surveyed.
Technology	
Theme 4	Companies surveyed first relied on already available software or technology options within their organisations. If they needed to go to market competition, the prominence of the software and whether it is fit for purpose were major factors.
Theme 5	Most organisations interviewed preferred a more configurable system with the flexibility of some customisation if required.
Theme 6	The local presence of a software brand, in both an implementing partner and support services were cited as critical for the organisations interviewed.
Theme 7	The capability of the system to easily integrate with other systems was raised important, especially in the 3PL environment where external partners are involved
Theme 8	The ease of deployment was raised as an important consideration when implementing WMS in 3PL organisations for clients where the process is pretty much a standard with little exceptions.
Theme 9	The participants interviewed were cognisant of the specific industry and client requirements and they recognised that these need to be at the forefront of capabilities when selecting a suitable software or technology for a client.
Theme 10	The availability and quality of master data were described as the “oxygen” of a WMS implementation. The organisations interviewed initially had challenges with cleaning and organising their master data until they had to institute internal processes and structures to ensure

	these two capabilities were achieved. It also emerged organisations must not entirely reliable on master data supplied by external stakeholders as such master data often does not meet their needs.
Partner Collaboration	
Theme 11	For all the entities researched on, partner collaboration was significant to enable a successful implementation of a WMS and they needed adequate processes to ensure such collaboration is a reality.
Project Management	
Theme 12	The importance of an independent Project Management Office (PMO) was underscored by most of the respondents.
Theme 13	In a 3PL setting, it emerged that there are broader considerations in project planning.
Theme 14	Most organisations involved in this research conceded that they had to consider risk management in the early stages of the project. The areas covered for risk management were wider than the WMS project itself.
Theme 15	All studied organisations emphasised that a dedicated team that has representation of all the stakeholders, affected by the project or the solution, needs to be set up and there must be co-operation between the team as led by the PMO office.
Theme 16	All researched organisations had internal processes to manage all project documentation. It emerged that project documentation must be kept and updated always, as it is essential for continuity and future reference.
Change Management	
Theme 17	For all the researched organisations, change management emerged as the biggest concern in implementing a WMS and that it was poorly handled in their respective implementations.
Theme 18	The surveyed organisations had varied examples of projects in which communication was either poorly or exceptionally handled. It emerged that there is a need for an effective communication platform between the implementation team and the rest of the stakeholders where all issues can be discussed without fear as such fear was cited as the reason for resistance to change.
Theme 19	The results show that stakeholders were not involved early enough in the projects. Early stakeholder involvement was raised as critical to achieve success and avoid resistance to change by most organisations researched.

Theme 20	Most respondents conceded that little training was conducted in their implementations and that, whilst training will provide a good foundation to prepare users for the new system, they still expected some exceptions on the go-live day, which may not have been covered during training.
Theme 21	All respondents carried out system testing and highlighted the importance of the various phases of system testing; namely analyst testing and user acceptance testing, with one respondent raising the shortcomings that often arise in these processes, which become a reality during the go-live.
Theme 22	Only one of the participants mentioned that they always executed dry runs before go-live. The other participants were not really for the idea as they mentioned that it did not cover all possible scenarios since it is done in a controlled environment.
Go Live Activities	
Theme 23	All participants faced a great deal of challenges in their respective implementation go-lives with the reasons including poor project planning, inadequate training and insufficient change management.
Theme 24	Some organisations did not have a cutover plan while others did have. A cutover plan is a plan with details of all the activities that will need to be done over the go-live period.
Theme 25	Only one respondent cited the importance of a rollback plan as a contingency measure in case of an unsuccessful go live attempt while the other two organisations did not have such a plan.
Theme 26	One of the respondents mentioned the impact of the availability of appropriate business intelligence tools (reports and dashboards) at the start of go-live activities to capacitate the operational team to understand better the new systems and make decisions quicker.
Theme 27	All respondents stressed that a period of handover and stabilisation is necessary to handhold and ease the operational teams into the new system to a point where they can operate with minimal involvement from the project team. A formal evaluation and sign-off of the project was done at the end of such a period.
Access to WMS Experts	
Theme 28	All respondents attempted to transfer knowledge to their internal resources and some had challenges in getting the WMS experts transferring knowledge to their internal resources hence it is necessary to have a process in place to ensure that such knowledge transfer happens.

Table 14: Summary of themes from thematic content analysis

5. CHAPTER FIVE: DISCUSSION

This chapter reviews the research objectives and critical research question. Section 5.1 discusses the conceptual framework while in section 5.2 the final key factors determined through this research are discussed in the context of the literature.

5.1 The development of a Conceptual Framework (Research Objective 1)

The conceptual framework was developed through a thorough study and review of existing literature about on WMS, ERP and systems implementations in general. In the literature review, various factors that have been previously identified to influence WMS implementations were analysed and grouped into seven main areas namely Enterprise, Technology, Partner collaboration, Project management, Change Management, Go-live activities and Access to WMS expertise. Once the initial framework was developed, interview questions were formulated based on the main codes given above. The interview questions were shared with the industry expert for validation and, under the Technology pillar, two new subcodes were added to the framework based on the expert's feedback. The added sub-codes were "Industry-specific requirements" and "Integration capabilities". Further to that, new sub-codes were discovered from the responses of the interview participants as they shed more insights into the factors that affected WMS implementations in their field of work. The aspects that emanated from these interviews were further added to the conceptual framework. The added sub-codes are "Ease of deployment" under Technology, "Business Intelligence" under Go-live activities. After analysis of the respondents' answers to the interview questions, another feedback session was done with the industry experts to further validate the results. This resulted in the further amendment of the "Business Intelligence" subcode to "Business Intelligence availability".

5.2 Key factors that contribute to the effective implementation of WMS in SA organisations.

This section is dedicated to the discussion of the results of this research as well as comparing and contrasting the results with what other research shows and the feedback from the industry expert. The discussion also seeks to address the research question on what the factors that affect WMS implementations in some South African organisations are.

5.2.1 Enterprise

The findings on the enterprise showed a consensus amongst the interviewees that the corporate structure must lay a conducive environment within the organisation for a WMS implementation to succeed. Such support includes the availability of resources and financial backing since such

implementations often need a lot of capital expenditure. The research also found that the availability of funds was not an issue because such funds would have been allocated for beforehand as such projects are planned for due to the CAPEX required. To facilitate and link the Executives to the project, Patton & Coombs (2009) suggest a role of a project champion who will need to influence the executives to continue to support the project and simultaneously encouraging "self-ownership" by all the other stakeholders in the project.

The aspect of the impact of the corporate strategy was also raised as a key characteristic of how a WMS was implemented. This was further evidenced by one organisation changing their WMS approach they had initially implemented when the organisation moved to become a third-party logistics business. The same also came out from the global third-party organisation whose approach is grossly influenced by the global strategy from the global offshore head office.

5.2.2 Technology

There were several findings on the topic of the technology and its impact on the success of a WMS implementation.

The choice of technology was found to be mostly influenced by the business where a preferred software is chosen across all the businesses. Implementing and choosing a business application should be all about solving business problems improving business processes (BASDA, 2020) and should never be an IT project. This was evident throughout the research where respondents stressed the importance of putting business or operations at the forefront and the IT becoming an enabling department. There was also a varied finding from the third-party environment where the client dictates the organisation which software to use, thus an organisation is forced to implement systems in their premises to accommodate their different client. This means that the organisation must be technically equipped on these various systems as well as the support expertise. At the same time, by running multiple systems, the organisation will face challenges in trying to standardise processes, in collaboration between teams and business functions and the costs that come with hosting and maintaining such systems as it may not always be possible to pass these costs to the customer and remain competitive.

It also emerged that there were not many South African developed warehouse management systems and organisations end up using international brands. However, there was overwhelming agreement amongst that the international brand must have a strong local presence, in the form of an

implementation partner, to ensure readily available support when it is needed as opposed to relying on support from offshore organisations. Since most of the technologies are imported, it appears there is a missing gap in the availability of a community of users as opposed to other developed regions. The concept of user groups has been widely adopted in other continents where users from different organisations meet, either in conferences or online, and share experiences on how they are using technologies from vendors and also to benchmark on how they are performing amongst each other as well as against industry best practices. Only a handful of such meetings seem to have been done in South Africa, mainly by the software resellers trying to be visible and hopefully make a sale. It is important that South African organisations consider such communities in order to share expertise and cooperate with each other.

In terms of configurability or customisability of a system, it emerged that a configurable system is mostly preferred, while some degree of customisability is required in instances where exceptions arise. This point to the likelihood of a mature WMS market that can be catered for through WMS software offerings that can often be bought off the shelf. A configurable system is ideal because there is less development required to set it up and it is easier to deploy system upgrades, as there is no previous diversions from the base system from the vendor. Gartner also confirms this notion that available WMS's generally offer similar functionalities, even though they can differ in usability, adaptability, intelligence, scalability and life cycle costs (Klappich & Tunstall, 2019). Therefore, it is understandable that South African organisations would prefer a more configurable off-the-shelf system but with a leeway of customisation when needed. On the other hand, it can be a necessity for an organisation to look for a bespoke solution, which is designed and developed specifically for them. However, such a solution results in a potential loss in the industry best-practices that come with the vendors' off-the-shelf software suites (BASDA, 2020).

The research also revealed the following to be critical factors in WMS implementation

- The system must facilitate easy integration with other systems. This was more evident in the third-party business where organisations need to interface with other customers' systems or other internal systems like Transport Management Systems (TMS). Labour Management Systems and ERP systems.
- The system must be easy to deploy to allow easier reproducibility especially in the third-party business where the lead-time to onboard a client is critical in getting and retaining business.

This however seems to be a specific factor in the case, where the process between the different clients is standard and simple. In a typical WMS implementation, exceptions will always happen and these must be catered for. This often requires more time to document and understand the process before taking the system into production hence ease of deployment is not always be a guarantee.

- The availability of quality master data is a critical factor in the implementation of a WMS and organisations must build capacity within to ensure that their master data is cleaned up instead of relying on data from external stakeholders.
- When selecting which technology or software, the specific industry or customer needs must be prioritised. While the benefits of selecting an off-the-shelf software have been outlined above, there are instances where a bespoke software must be chosen or multiple systems must be used. This was also apparent in the 3PL participants who often have to use the system dictated by the customer even if they have their own internal system. This, typically, can present complications for organisations where they have to build capacity, in terms of trained users, support and infrastructure to manage multiple systems.

5.2.3 Partner Collaboration

The relationships between the implementing organisation and all stakeholders, such as suppliers, customers and implementation partners were flagged to have an impact on the success of an implementation. Through collaboration, partners work as if they belong to one enterprise, to increase competitive advantage and achieve mutually benefits (Cao & Zhang, 2010). Similar research has been done in South African organisations and results show that collaboration can enhance response customer needs and streamlining distribution and operating costs (Mathu & Phetla, 2018). The relationships must be nurtured and maintained through formal communication channels and documentation that can be referred to in cases of conflict of divergent views. The organisation needs to also develop a closer and better working relationship with the implementation partner as these are the experts leading the project. Their buy-in and cooperation can yield positive results. However, the organisations need to have proper systems in place to ensure formal knowledge transfer from the implementing partners to in-house consultants as the use of external consultants comes at a high cost.

5.2.4 Project Management

A designated Project Management Office (PMO) was cited by most of the interviewees. Therefore, it can be concluded that the existence and involvement of such an office is a critical success factor in a WMS implementation.

The project management must be organisation-wide and the project should not be considered only as an IT project. The IT department must be a support department for the business to implement the project as opposed to them leading the implementation (Lientz & Rea, 2004). The same must be reflected in the composition of the project team. A dedicated team that has the representation of all the stakeholders, affected by the project or the solution, needs to be set up and there must be co-operation between the team as led by the PMO office.

Respondents recognised the need to consult widely with all role players, at the possible time, to come up with a comprehensive project plan that covers the scope of work, likely issues that could be encountered as well as the business impact in case of failure. The institution of a robust risk management program can there be identified a critical success factor and must be reflected in the project management activities. Organisations must look out for any risks from the earliest stages of the project through the various engagement they will have with the stakeholders.

The aspect of proper project documentation also came out as important in successfully implementing a WMS. This documentation was considered handy for continuity purposes where project team members are no longer there as well as when there are disagreements with stakeholders on what was signed off and agreed upon during project initiation. This is a reinforcement of the importance of project documentation as stated by Lientz & Rea (2004), who also underline that business or operations people must formulate the bulk of documentation of the project and only leave the IT team to work on the technical documents. This is to ensure that the language of the documents is relevant to operations unlike when they are prepared by an IT-oriented person. The documentation will also be a basis to measure the success of the project once it is completed.

5.2.5 Change Management

All the participants remarked that they had not executed well enough the change management in all their respective projects and this negatively affected the success of their projects. It can be concluded from the responses of the interviewees that change management is one of the major critical success factors in the implementation of WMS in the organisations that participated. The other aspects that were identified as important in achieving successful change management included

- An effective communication platform or forum must be set up where all stakeholders can raise any issues related to the implementation without fear of victimisation.
- All stakeholders must be involved as early as possible in the project to avoid resistance to change at the advanced stages.

- Instituting an effective communication platform or forum where all stakeholders can raise any issues related to the implementation without fear of victimisation.

The following are some other actions, as suggested by Lientz & Rea (2004), that South African organisations can implement to succeed in their change management efforts;

- Limiting the involvement of top management.
- Making effort to market the change management continuously through the project.
- Planning for resistance to change and proactively identifying and managing issues as they arise.
- Involving operations people to train and re-orient the warehouse staff to the new ways of working as opposed to solely using IT personnel who in most cases do not understand the business process.
-

Training

The aspect of training was also, overwhelmingly, identified as a key factor in such an implementation. Two points can be concluded from the research;

- All system users must be adequately trained before the go-live date.
- Whilst training is important, it will not cover all aspects that will be encountered during the actual use of the system, therefore, proper handholding must be planned for once the project has gone live.

Some of the hindrances to organisations implementing proper training programs are the cost of a practical, well-equipped training facility that resembles the actual working environment after the new system is implemented as well as the use of experienced personnel to conduct the training, which often also comes at a high cost. All the organisations studied still carried out their training through traditional methods of theoretical training, desktop training and in exceptional cases practical hands-on training. Organisations should now consider using new technologies such as Virtual Reality (VR) to conduct their training. Several organisations in developed countries have already adopted this method of training (VIAR, 2017). The benefits of using such technology include no need to set up a physical training space since the training is virtual thus training will not disrupt the current warehouse operations and little involvement of experienced personnel, mostly, external consultants which come at a high cost.

System Testing and Go-live readiness

Any system must satisfy certain criteria before deployment into the production environment. The system must be checked against the specifications determined at the beginning of the project as well as the business rules within which it is going to function. This is achieved through system testing and dry run. All participants highlighted the importance of conducting several iterations and levels of such testing as an important factor in achieving a successful go-live.

Organisations could also consider using automation-testing methods to do all tests. This would be even more beneficial for third party logistics companies where they often have to take on several clients within short periods as highlighted by one of the respondents interviewed. Automation testing helps to reduce the regression testing effort and improves the test coverage consequently improving the quality of the software as well as reducing the time-to-go-live as noted by Rafi et al., (2012). However, the cost of developing such a system and training their staff may be a deterrent in some organisations. However, automated testing should not completely replace manual testing but must be used as a complementary tool, especially for those processes that are relatively difficult to test through automation.

5.2.6 Go Live Activities

All the respondents from the interviews conducted encountered major issues during the go-live period of their respective implementations. The critical factors pertaining to go-live activities that influence the success of WMS implementations that emerged from the experiences of the studied organisations and were confirmed by the interviewed industry expert are:

- Preparation for the go-live day must begin from the day the project is initiated. In other words, all project activities should culminate in the go-live date. Preparation should not happen close to the day as some detail is often missed. A go-live readiness checklist must be formulated with all milestones that must be met before a go-ahead is granted by the project owner. The checklist should be the basis for any go or no-go decision.
- A detailed cutover plan must be drawn up and be used as the guide to all go-live activities. The plan must also have all actions assigned to specific people and mention the timeframe within which each action must be started and completed. The plan must also include the ramp-up plan on how operational throughput will be adjusted upwards to return or better to surpass, the levels before the system was implemented. Often, this plan must be drawn up in conjunction with the customers as part of the stakeholder engagement.

- Relevant business intelligence tools, including reports and dashboards, must be provided in order to assist the organisation in the go-live transition. When taking on the stock onto the new WMS, the teams need readily available reports to measure progress as well to compare with stock levels from the system or report before the switchover to the new system.
- A lot of handholding and on-site support will be required during the go-live period until the system is stably implemented. Therefore, suitably trained super users and the project team must be readily available so assist the users with any queries and issues they may encounter. As expected, many users may be anxious during this period, hence the super users must be at hand to calm and remind them of how to operate the system. A criterion must also be formulated to determine the length of the handholding period when the project team can officially handover the project to the operations teams. There must be sign-off to officially handover the project to the operations after which any queries and requests will be done through the agreed support channel.
- Only one participant mentioned that a rollback plan was a requirement when implementing a WMS. This is at odds with the best practice specified in the ITIL deployment management practice, which encourages detailed planning, isolating and endeavouring to mitigate any potential risks or disruptions, and specifying the order of how each component of the release will be deployed and rolled back in the event of undesired results (Kaiser, 2018). The industry expert also raised this as a concern that two of the organisations seemed not to regard a rollback plan as a definite requirement as this can result in damaging consequences for the business if the go-live attempt is not a failure. A detailed rollback plan must be in place as a contingency in the event that go-live is not successful. The plan must be a point to all aspects to return the business to its state before the attempt to switch over to the new system. The plan should also detail all IT requirements with regards to database backups and servers to be restored where applicable.

5.2.7 Access to WMS Experts

The research revealed that there is limited local WMS software and organisations often have to implement international brands that are usually brought into the country through implementation partners or through the consultants in the case of organisations with headquarters that are outside of South Africa. To have a successful implementation, organisations need to build internal capacity to both implement and support their implementations. In order to achieve this, they need to ensure that

there is formal knowledge transfer from the external consultants to their internal teams. This is also confirmed by Somers & Nelson (2001) who emphasises that, while the experts are important, organisations should not delegate key project aspects to them and should be used as partners and not drivers of the project. External consultants often come at a high cost and usually even after go-live, there will still be more phases and continuous improvement initiatives that will need expert knowledge; hence, it is cost-effective to use more of internal resources for future work.

6. CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions

This research was conducted to answer the critical question: *"What are the factors that influence the implementation of Warehouse Management Systems for warehouse operating organisations in South Africa?"* In an attempt to answer this question, a conceptual framework was developed, through literature review, which then was a basis for conducting qualitative research on three participants that were selected. Semi-structured interview questions were posed to the participants. Their responses were analysed through thematic content analysis. The results portray a mature South African environment when it comes to WMS implementation, as the respondents were conversant with the factors that were identified through literature review and the inputs to the conceptual framework from the industry expert. The themes that emerged from the research are explained in detail in Chapter 4 and further discussed in Chapter 5. The research shows that the factors that affect WMS implementation in South Africa are quite comparable to other research already done as was outlined in Chapter 5 and the factors that were identified for WMS are similar for other business enterprise systems such as ERP. It also emerged that there are specific areas that South African organisations were struggling with and hence they need to focus on These include executing effective change management, embracing technology for training, adhering to IT-related best practices such as implementing roll back plans as part of the go-live processes. All respondents had challenges at go-live and all felt that the training of users was not adequate. Therefore, there is a need for further research on how organisations can take advantage of emerging technologies such as Virtual Reality in the training of users to become effective and ensure implementation success.

6.2 Limitations

This research was only limited to three organisations in the Gauteng province of South Africa that the researcher had access to. While the results showed converging themes, as well as some divergent views amongst the participants, more participants would have reinforced the findings that emerged from the research. Given that only organisations within Gauteng, the economic hub of the country, were part of the research, perhaps other factors would have emerged had other organisations in other localities were involved.

6.3 Recommendations for future work

Below are some of the recommendations for future work that can be conducted to further understand the subject that was under study.

- Increasing the size of the participants in the study to capture as many views as possible.
- Extending the study to other organisations in other provinces as they may be other factors that could emerge, for example, the impact of infrastructure availability as well as access to labour.
- Carrying out a quantitative study to determine the criticality of each of the factors based on data gathered.
- Understanding the impact of technology absorption in the South African context and its impact on warehousing and supply chain in general.

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APPENDIX A: INTERVIEW QUESTIONS

Introduction

i. Explanation of interview process and signing of Consent form
ii. Please give some detail on your organisation and what business it is involved in
iii. What is your current role in the organisation?
iv. Can you outline your involvement in WMS implementations

Enterprise

i. What kind and level of project support do you receive from the senior management of the organisation concerning WMS implementation projects?
    a. What effect does this level of support have on the success of the project?
    b. How often is senior management involved in such projects and how does this affect the project?
ii. How did you allocate the project budget for a WMS implementation?
    a. What impact did the budget allocation have on the success of the project?
iii. How was the WMS implementation project linked overall business strategy and vision?
    a. How are the two related and how do they affect each other?

Technology

i. How was the software system/technology selected?
    a. How did the choice of the technology affect its implementation?
    b. Was there a consideration between locally developed systems VS systems from other countries?
    c. Does the origin (local vs International) of the system have a bearing on its implementation?
ii. What strategy between Customisation and Configuration was preferred? Customisation refers to changing the system to fit in the current business process and Configuration refers to sourcing an off-the-shelf system that is most aligned to the current business process such that most of the process is catered for through configuration rather than customisation.
    a. How does each of the above options affect the implementation of the system?
iii. How were you involved in determining which strategy to choose and subsequently the choice of the WMS?

iv. How was the WMS technology evaluated against company objective and your industry specific requirements? e.g., FIFO/FEFO for Perishables products or Batch Tracking for chain-of-command scenarios.

v. Were there any considerations on how the WMS is able to integrate with other systems?
    a. What were such considerations?
    b. How does integration considerations affect the success of a WMS project?

vi. Did Master data availability have a bearing in WMS Implementation?

vii. Did Master data quality have a bearing in WMS Implementation?

viii. Was there any other aspect related to the technology that had an impact on its implementation?

Project Management

Project Plan

i. How was the project planned?

ii. Who was involved in the planning of the project?

iii. Was there a project schedule for the project implementation?

iv. Were they any specific objective for the project and how were these measured, implemented and followed up?

v. How often was the schedule reviewed and updated

vi. What impact did the project schedule have on the outcome of the implementation?

Risk Management

i. How were project risks identified during the implementation phase?

ii. What measures and methodologies were in place to mitigate the identified risks?

iii. How did this process affect the project success?

Project Team

i. How was the project team formulated? Were team members selected from different departments or there was a team independent of existing departments in the organisation?

ii. Who was part of the project team? Were all levels in the company part of the project team?

iii. Were external consultants' part of the project team?
    a. Does the composition of the project team have any bearing on the success of the implementation?

Project Documentation

i. What project documentation was maintained during project implementation?
ii. How often were the documents shared with the broader stakeholders?
iii. How did project documentation affect the implementation?

Partner Collaboration

i. Were there any external supply chain partners, such as suppliers, customers or 3PL/4PL partners involved in your WMS implementation?
ii. What was the extent of their involvement with regards with the WMS implementation?
iii. How did their involvement affect the overall success of the implementation?

Change Management

i. How was change management implemented for the project?
ii. At what point of the project was change management started?
iii. Was there a communication plan to adequately and timeously inform stakeholders of the status, progress and risks of the project?
    a. How did the communication plan affect the success of the project?
iv. At what point were the system users involved in the project? Design? Operational Flow Mapping? Testing? Training?
    a. How did the stage of end-user involvement in the project affect the success of the project?

Training

i. How was Super and End user training conducted?
ii. Was the training theoretical, practical or both?
iii. How was the success of the training intervention measured?
iv. How did the training interventions affect the project success?

System Testing

i. How was system testing conducted to ensure functionality is according to specifications?
ii. Who was involved in the testing?
iii. How did the system testing affect the project success?

Dry Run

iv. Was dry run conducted? If so, how was dry run activities conducted to ensure system readiness for go-live?
v. Who was involved in the dry run?

vi. How did the dry run affect the project success?

Go Live Activities

i. Was the actual go live date activities achieved as per schedule?
ii. If there were go live date postponements, what were the reasons for these postponements?
iii. Was there a go live ramp up plan? Was the plan adhered to?
iv. For how long did the project team have to provide onsite support and handholding after the go live date?
v. Was a handover plan available to fully delivery the system to the Operations teams? Were the Operations teams capable to fully operate the system within the expected timeframes?

Access to WMS Subject Matter Experts

i. Did the organisation have internal WMS expertise or it had to source externally?
ii. How was knowledge transfer facilitated between internal teams and external consultants?
iii. What was the working relationship between the internal teams and the external consultants?
iv. How did the access and relationship with SME's have an effect on the success of the project?

APPENDIX B: SUMMARY OF THEMATIC CONTENT ANALYSIS

CODE	Sub code	COMPANY A	THEME	COMPANY B	THEME	COMPANY C	THEME
ENTERPRISE	Project prioritization and Corporate support	2 levels of Approval of each project. Company EXCO and then Group EXCO There is project prioritisation on a company wide basis Before, only influential people's projects were getting priority. Introduction of a PMO office now used to manage prioritisation of projects so that all projects have the attention it deserves	Senior management need to be tightly involved in decisions relating to such implementations. PMO office key to managing and prioritising all projects equally.	Projects that require a certain amount of Capex with certain amount of budget always require an ESG (Executive Steering Group). Project Sponsor usually Supply Chain Director. From a governance perspective, it's	Project is regarded highly at Executive label A WMS Implementation must never be regarded purely as an IT project. It has to involve all departments with the business leading it and IT enabling it.	Management Involvement: Depends on the project.	Lack of Management support on some projects results in failure WMS implementation must not be just about the software or technology. It must be about the whole business.

				quite high up its higher there is no it's not like we just do it as an IT project. It's never an IT project.			
	Budget availability		CAPEX needs to be approved by EXCO. If projects are smaller, then available OPEX can be utilised	Budget Availability: CAPEX must be approved for such projects. When we see that we are hitting the budget mark and internally within the IT budget and we have moved certain funds around to restructure and	Flexibility within the company to move or reallocate funds to accommodate budget overruns	WMS is just a small part of it but the scope is much bigger	

				make sure that you still succeed and you get the product done			
	In terms of Strategy:	In terms of Strategy: "we are finding is that this industry's moving very fast and the margins are becoming less and less and we are having to consolidate more"	Check the impact of SA Economy on Logistics/Suppy Chain Industry			So [REDACTED] locally reports to [REDACTED] globally who then reports to our HQ. Therefore, you can understand if something is not working here, then it is very quickly that our HQ is aware. Then you also have, for instance, your Decathlon where they were not	In terms of Strategy: The effect of global agreements for global companies affects the direction of how local companies operate to accommodate those agreements.

						interested in using our system. So they use their own WMS worldwide and even though we work with them in many different countries, they use the system everywhere	
TECHNOLOGY	Technology Selection	It was prominent in the Tech industry.	Software needs to be a reputable software.	If there is nothing that is available in the Walmart streets right now and there is nothing we can tap into from a Walmart perspective, then we go out into the market	Adoption of technologies from parent companies overseas. Standardisation of systems across the group for global companies.	I mean we got three customers in this warehouse that work on their own WMS and have not even considered using our system. So firstly, you have	In 3PL environment, customer determines which WMS will be implemented. Other clients require their own system as per their global strategy.

						to look at what the customer requires	Adoption of technologies from parent companies overseas. Standardisation of systems across the group for global companies.
	Configurability vs Customisation	Vanilla Approach	Product needs to be more configurable. “Vanilla product” with little customisation	So let us get something that s somewhat aligned to how a General DC should work, but if necessary can be changed	Companies require a technology that generally fits their process but if necessary can be customised to meet specific business needs	Configuration is preferred. Customisation increases project Cost, Complexity and Timelines. Link to costs of upgrades etc.	

	Local brand vs International brand	Local brand vs International brand	Limited local WMS brands resulting in companies choosing of international brands. You need a brand that has more that one implementation partner in the country. One partner results in less leverage and options on how to implement in terms of cost and negotiations leverage.	From a WMS perspective there were not too many at the time. I do not think there are local providers that could support an enterprise as big as [REDACTED]. So it's getting an International software, but with a local footprint, so I think that's the best way to think about it	Local presence of implementation partner is critical. Good relationship with the partner also allows for opportunities for product enhancements from the software supplier who often is overseas	Therefore, it does not really matter if it is global or local; it is the support that you have that would make the difference.	Local systems are critical for better support
	Integration		Ability to integrate and collaborate with the rest of the supply chain is key.		System must easily integrate with other systems.		Cost of EDI development hampers going into full EDI

			In 3PL environment. A robust integration platform is necessary in order to easily integrate with various clients that are often using various systems themselves				implementations ?
	Ease of deployment					To implement a customer, to give you an idea, on SPEED, the quickest was about three to four weeks that we could get a customer implemented. With Streamline, it takes one day.	In a 3PL environment, the easy and speed to get a customer implemented is a significant factor. Clients want their inventory managed on a systems as soon as it arrives in your facility.

						In fact, I could do it myself	
	Industry Specific Functionalities					FEFO. Bond warehousing	If a system cannot accommodate specific functionalities, you cannot implement it.
	Master Data		So, that is your oxygen, without correct master data everything is a stuff-up. In 3PL, it has an effect on how much couriers will bill as they bill on volume and weight. It has an impact of go-live activities. You need to measure your	So this was a nightmare for us, I remember when we started and wanted to start receiving and the dimensions were wrong. Do we take the dimensions	Client dimensions can not be trusted. You need to measure your own dimensions. Centralising of master data capture within the group will	Item Codes and barcodes. Some clients don't have such data but expect a WMS	

			own dimensions as often customer data is wrong or not updated.	from the vendor, which is not always correct, or measure each product as I receive if for the first time.	assist in having one version of master data. Adoption of EAN barcodes across industries. Maser data quality is also key for reporting purposes, especially across different businesses		
PROJECT MANAGEMENT	Project Planning	I think that it was a very loose structure. I do not think that there was any project management involvement. It was the Supply Chain	Project Management Team (PMO) office needs to be involved from the start. Office must be independent from other departments	There is also PMO, which is the Project Management Office.	Importance of having a PMO office		

		Executive and the Warehouse Manager trying to drive this thing on their own with the implementation partner and I think that was tricky	so that their role is as objective as possible				
	Risk Management		It is not possible to identify all risks beforehand?		Internal Audit to be part of the project team to ensure that all company, statutory and legislative obligations are met. Classification of risks (RAG matrix)		

	Project Documentation	Business Requirement Specification is critical for gathering all the requirements of the project before commencing	Inadequate gathering of specific requirements that leads to major changes once the project is at advanced stages. Hence documentation with a trail is critical to project success. Sign off of all documentation is critical as these become a referral for future	Important documents are project charter, functional specifications, reporting specifications, technical specifications and configuration documents There is a team of administrators looking after the documentation and maintenance of all SOP's	Documentation is very important, really. It is especially important for continuity	Flash reports to update all parties frequently	Constant communication of the status of the projects. Flash reports

	Project Team	Project team has PMO office, Process analysts and Industrial engineers. Implementation partners/consultants are engaged after BRS is formulated and business knows their requirements.	A dedicated team is needed. Having people with other responsibilities may result in them slacking on project deliverables due to "divided attention"	So if it is a WMS implementation . It just does not touch the DC. It touches everywhere from H.R. to stores to operations to finance so within the ESG there will be a representation for everyone but obviously these people are the ESG	Project team needs to be representative of all the parties affected by the changes to be done.	Therefore, there is so, many things that you have to take into consideration that that is before you even get to your IT requirements. We work closely with other teams like MIS, IT, QHSE, HR so it is not just us doing everything, we also ordinate	Synergy between stakeholders to achieve project success/

PARTNER COLLABORATION			Documentation is key in defining and maintaining a collaborative relationship with partners. There is need to manage and coordinate several partners, e.g., conveyor suppliers and WMS providers. Roles need to be clearly defined and point of contact for each partner must be documented and known.			So obviously, your customers plays a huge roll, but so does your suppliers. Therefore, I would say yes, you have to keep your customer happy but in order to do that, you have to keep a very tight grip with on your suppliers as well.	In a 3PL environment, the suppliers need to be tightly managed so that they honour their obligations in order for an implementation to be successful. Suppliers could be for other things like MHE, packaging material and stationery

CHANGE MANAGEMENT		**I can write a thesis.** If we got back to the original WMS project, that was my biggest issue when I got called in by the CEO to say what went wrong on our implementation. What I said to him is that the **change management is almost non-existent and the culture was shocked by this whole implementation.** The change management should start at the EXCO level moving down. During our implementation, if you asked sales	Change management is key. Engage any affected department as earliest as possible. Involve the operational people as early as possible as they will also help to identify risks and opportunities during the implementation.	We didn't manage it very well at Cambridge, to be honest. Our change management strategy was very bad. We knew we are implementing a DC. We had strong management but we did not take the staff with on the journey. So we as IT just put ourselves in a room, we did what we had to	Change management strategy is required to take all affected stakeholders along the journey from the beginning of the project. Activities outside work can help to put the workforce at ease and to create a hype and make them at ease. Project is never an IT project.	**This is the most difficult part of my job**. I am not going to lie to you because it is not just actually making the change like changing from Streamline to SQUARE, which in itself has its issues and problems that come with it. However, it is also changing people's perspective and minds and to make them understand that we are doing	Change management is the most difficult part of the project for all the interviewees involved in this research.

		people, they would actually say they did not even know this was happening and are then expected to manage the customers. That's why it is important that the whole business is bought into the change management as well. If there is a portion of the operation that is affected, we start to engage them at the BRS level so that they are able to bring in any concerns. The operational guys and your people on the floor are the ones who	Make the operations own the solution by making them suggest solutions and then guiding and adopting their solution within the provisions of what the new WMS' functionalities.	do and when it was ready we gave it to top management and there was a bit of training. Then we deployed.		this for the good of the business.	

		are going to raise all the risks.					
	Communication	One of the biggest fears for people, especially when you're going through mechanisation and new systems is there's a fear that is part of	Have a platform to get the operations people to air their concerns without fear of intimidation and fear of losing their jobs.			Project team meets with the departmental managers to brief them on the implementation	Expecting the immediate manager to only handle the change management and communication

		the reason you putting it in is to cut heads thus there is need of being very transparent in that communication.				. **You kind of expect him to relay the message to his people.** Meetings are also held with end users in design sessions	to the people is not sufficient. It must be a project team effort
	Stakeholder involvement					I will do it just to see what challenges they face. If you involve them from the start, then they feel like they have got a say and they are much more receptive	All stakeholders need to be involved as early as possible in the project so that they have ownership of all that happens in the project.

	Training	I mean, we had guys that were aisle champion on Friday and they were a Cycle Counter on Monday. There was no vision so what we ended up with is staff too demoralised because they were actually walking around not knowing what their job was. Well, what you want is that you always know that there is going to be small issues post go-live. Right? Well what you want is that the larger percentage of the processes that	Inadequate training results in not only poor performance but also a demoralised stuff which then leads to resistance to change. Training may not cover all the exceptions but the bulk of the process must be covered in the training and users must show competence for such. Exceptions will be handled as part of the handholding	Generally, people think that because we are implementing a new system, people lose jobs, but what I saw from this from day one, it was clear we are implementing this and no one would lose their jobs. If there is anything that needs to change or your role needs to change, you will be trained on that.	Re-training and empowering of employees is required where new skills are now a requirement due to the implementation. People resist if they feel insecure about their jobs. **Training assessment** is key to ensure that the trainees understand and	I mean, if we were in an ideal world and I had my ideal team and I had my trainer and my dedicated super user and all they do is WMS, then it would be very easy to say. However, that is not the ideal world. I mean, we have maybe 10% of our time that can go into something like that because we have so many other projects.	3PL Environment: Key resources can be spread across multiple projects that are running concurrently because clients require their stock to be on a WMS as soon as possible. **LINK IT BACK TO PROJECT PLANNING AND SCHEDULING** Desktop training is not enough. Practical lessons are needed. Making an actual training environment with

		are running through that environment are running properly. There are going to be exceptions, but the exceptions are not the rule.	process during the stabilisation period	Training components: Process training, SOP training and then practical training. You cannot go live without training, even though there has been instances where we have go live without it.	are competent of what is required of them Training is key. Some go-lives are forced through without the proper training		actual scenarios where users have to execute must be done

	Systems Testing	The first port is your end-to-end testing, which is your system checks to make sure everything's working according to how it was planned. Yes, there is a formal test plan that happens. It is called System Integration Testing. There is System Integration Testing that happens first, whose certain criteria must be achieved and then signed off by the Steering Committee.	Formal test plans needs to be in place that cover all the requirements as defined in the specification document. Test results must be signed off and must be a determinant for a go-live or a no-go	Testing is broken in these steps - External Consultant testing - Internal Analyst testing - User Acceptance testing		When you test the system again, it is in the ideal world, for example, you prepare your little document and prepare the system and when I testing, everything works perfectly. But the minute that stock arrives, it doesn't matter how many tests you've done, how many dry runs you've done and how much training you've got, It is	There seems to be a disconnect between training/system testing scenarios and what actually happens on the ground at the point of go-live. **But systems testing is to ensure that all the requirements have been met as per the solution specification. Talk about automated testing and how technology can be used to enhance this.**

						like you've not done any of it. This is because sitting in front of a computer doing a test versus being on the floor and physically doing that is two very different things	
GO-LIVE ACTIVITIES	Dry Run	No, I think it is more about the timing of when we go live. Okay, there are times where we understand the impact and the risk to the business. If it is major, we would generally want to go live on a Friday evening so that we can use Saturday and	Go live to be planned at the time where there will be limited impact to operations. Ramp up!	Yes, without that sign-off you can do nothing.	Dry run needs to be executed and signed off to ensure system and people readiness for golive.	How many times have you really had issues with dry run like big issues we have been facing? It does not really happen. All of a sudden, you get a message that you have never	Dry runs are good to have but they do not cover all scenarios that will be faced in the actual go live because they are done in a controlled environment.

		Sunday to actually run some work in production.				seen before because when you were doing your testing, training and your dry run, it was all nicely prepaid.	
	Go Live Date (As Intro)			The warehouse people didn't know what to do, how to do it. That first night we stopped. We decided on a No-Go.	How is it possible that the warehouse people did not know what to do?		Why do go live always go wrong despite all the training you go through? Check other research!

	Cut over plan	So we actually set times, especially on the bigger implementations. So we would go live, we create WhatsApp groups and communication platforms for everyone to communicate. There is a hierarchy of events that it needs to happen. Maybe it is about closing off the work in the warehouse. Then the systems guys have to now shut off systems. Then they migrate systems, then they do the development they import the development, et	Go-live action plan to ensure that all critical steps are achieved within planned times so as to invoke the rollback plan if required.	The pressure of stopping operations and the stores waiting to receive their stock was quite high. We had to put it to receive and put away and meanwhile, the inventory team was starting to the run waves and pick same time and this was just a nightmare. I think it was just project management	Coordination of the go-live process is required. Scenario planning and execution of go live plan. There was no proper golive structure that was communicated to all parties and followed as the guide to golive activities.		

		cetera. Then it is a slow turn-on process with everyone confirming their finished step to the greater team.		disciplines that were not followed . There has to be a go-live checklist with the activities that are going to be done on the night of go-live, also mentioning the person who is going to do it. Every little detail that requires someone to do something and the sequencing thereof, is very important.			

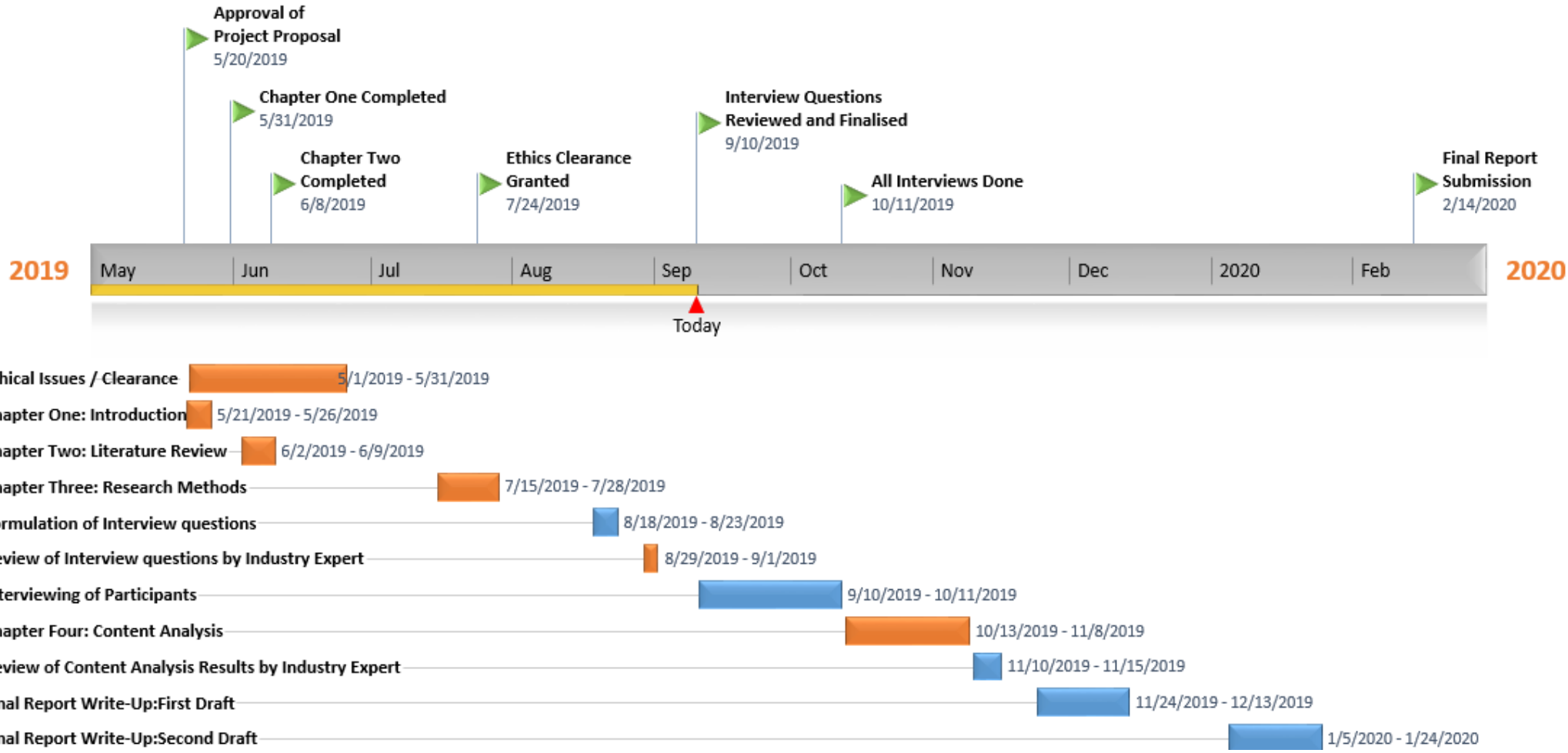
	Rollback plan	Yes, we use downtown to actually run production because you can always roll back at that point and every single one of those things, if it is a big implementation there is always a rollback plan.	Risk management: There is need for a roll back plan which must be defined in terms of the point and reason when such a plan will be activated and set into motion. There is need of a process and decision support tool to assist in determining when to roll back.				
	Business Intelligence	If those people had all the Business Intelligence in place and the right knowledge, the result would have been better.	Availability of adequate tools at go-live to empower key people to make informed decisions. (Reports/Dashboard s				

	Handover and Stabilisation	It becomes an operational thing at the point where it is signed off after the stabilisation period. Then post go-live, we usually have a one or two weeks stabilisation period. We analyse that time and then at the end of that time, we then sign off a project closure report, which also has all of the criteria we expected.	Minimum requirements for handover sign off need to be established, achieved and signed off before system is handed over to Operations	After the 3 week period there will be a final ESG meeting to formalise closure of the project. Further support is then handed over to the support teams and Operation teams have to channel all queries through this process and not directly to the project team.	Formal sign off is required based in a pre-defined criteria. A good measure of a successful project is when it is fully handed over to Operations and the Support team with little involvement from the implementation team. A support structure must be established to handle operational		

					queries going forward as well as managing of any change requests that will arise. **Mention ITIL process**		

APPENDIX C: PROJECT SCHEDULE

Below are the estimated project timelines for the project.



APPENDIX D: INTERVIEW CONSENT FORM



Dear Participant,

Thank you for accepting to participate in this study. Please complete this consent form as you see appropriate. By signing this consent form, you are indicating that you have read and understood the description of this study and that you agree to the terms as described below:

	Mark with X	
	YES	NO
I confirm that I have read and understood the information about this study as provided in the participant's information sheet.		
I understand that my participation is voluntary and that I am free to withdraw at any time without any penalties or negative consequences against me.		
I grant permission for the interview to be audio recorded.		
I agree that the information I provide may be treated as strictly confidential and anonymous and only the research team will have access to the interview data.		
I understand that the information acquired from the interview will not be recorded in excess of what is required for this study.		
I agree that the results of this study may be recorded in academic journals and at conferences.		
I have had the opportunity to ask any questions related to this study and I have had all my questions answered to my satisfaction.		
I may request a report summary, which will come as a result of this study.		

With full knowledge of all above-mentioned terms, I agree to participate in this study.

Participant		Consent taken by (Researcher)	
Name		Name	
Signature		Signature	
Date		Date	

APPENDIX E: PARTICIPATION INFORMATION SHEET

10 July 2019

Dear Manager,

RE: PARTICIPATION IN RESEARCH ON FACTORS THAT INFLUENCE THE IMPLEMENTATION OF WAREHOUSE MANAGEMENT SYSTEMS IN SELECTED SOUTH AFRICAN COMPANIES

Thank you for offering to participate in interviews regarding the abovementioned.

I am a part-time MSc student in the School of Mechanical, Industrial and Aeronautical Engineering at the University of the Witwatersrand, under the supervision of Bernadette Sunjka. My MSc title is; *Factors That Influence The Implementation Of Warehouse Management Systems In Selected South African Companies.*

I would like to formally invite you to participate in this study. As a key figure in the implementation of WMS solutions for one of the well-established logistics organisation in South Africa, your knowledge and experience would contribute significantly.

The study will be conducted between July and November 2019. Involvement in the study would entail two (2) or three (3) face-to-face interviews with you, at your convenience. During these interviews I would like to understand what strategies your company put in place to achieve successful WMS implementations as well as other learnings that your have encountered in your career and organisations regarding this topic. The interviews would be conducted at your company. A short walk-through tour of your facility would be interesting, if you have the time and are willing to do so.

Participation in the study is voluntary, and you may withdraw at any time. Anonymity (regarding company name and any owner/manager/employee names) and confidentiality of information provided will be assured and respected. I would like to record the interviews, so I can later transcribe them. Your consent at the time of the interview will be requested. If you do not wish the interviews to be recorded this will be respected. The results of the study will form part of my MSc dissertation report, and may also be reported in academic papers and at conferences. A summary of the results of the research will be made available to you on request.

Please contact me if you have any questions regarding the research and participation in the study.

I look forward to hearing from you.

Yours faithfully

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APPENDIX F: INTERVIEW TRANSCRIPTS

Company A , Interview 1

[TM] Thank you for accepting to do this interview. I have already taken you through the nature of the interview and my research so, we'll go right straight into it. Feel free to ask for clarification of what do you need more explanation on. The structure of the interviews is in semi-structured questions. It is not as if you have to answer specific questions rather more of an interaction, but there will be key points that I would like to get from you. What I have done is obviously literature research; there are certain aspects that are identified as key. Mine, is to get the context from the companies that I will be interviewing or researching on. There are certain key areas that I have identified already and we will go through each one of them. For example, the business or enterprise point of view, technology, change management, project management and external consultants. So the first one is enterprise. In many cases, any business will have strategic goals. You were mentioning now before we started that you have embarked on some strategic goals you want to achieve. What kind of level of project support from a senior management point of view in your business do you have for such WMS projects?

[TP] So most of the projects that we do, the process within the business, is to scope the project to get all your relevant costs and everything like that. Then I take that to my own EXCO, at a [REDACTED] Distribution level. We sign that off at our EXCO level. It then goes to the greater company EXCO level. Then they do approval on that. Then it goes onto a project prioritization list. So all the projects that are being run in the business, we have to motivate it through a one-page format. And on that format it talks to the different people that are needed, whether it's IT and infrastructure, whether it's design, whether it's external consultants, all of that. However, we have a dedicated PMO now that is quite bolstered and they run according to how the businesses prioritize the projects.

[TM] So, you initiate the project, you go with, you say, okay, this is what I think should be the strategy of your operations, then you motivate going upwards where it's approved? You say there are two levels of approval?

[TP] Yes there's the first EXCO level, which is our business within the greater business. Then it goes to the group two level, and then they approve and then it goes onto prioritization.

[TM] So it seems there are quite high levels of senior management involvement?

[TP] Yes there has to be. So I think in the past it used to be quite loose. I think when you probably first came here with [REDACTED] and then it was very loose but now we have had to tighten the process.

[TM] Any lessons that made you to change to that kind of approach. The question is what impact does the involvement of senior management have on such an implementation?

[TP] So there are a few things, one of the lessons that we learned was that we were running out of capacity, especially in an IT environment. We were running out of capacity because everybody had stuff and it became that the more senior you were in the business, the more your job got prioritised. So you had more junior to middle management, their projects started getting pushed out because a more senior person would bring another little project into the scheme. So by doing this, the project management office then has a view of every project, what the involvement is from external consultants, what is the involvement from our IT teams, Database administrators to the Development teams and Infrastructure teams. The new approach helps to manage all of that and has probably been this way for the last 2 years or so.

[TM] The next point is on the budget. I suppose these are CAPEX projects with lots of money involved. How do you allocate resources for such projects?

[TP] So depending on the size of it, at the moment, if I give you an example, we put in conveyors last year, and I had to do that before financial year end to make sure that we had a CAPEX allocation for the new year. So that's generally what we do. If something makes sense, and we agree on it, then the finance people find us that money. There is a budgeting process and then there is something where we put in robotic process automation as well, as an example. That made sense in the expenditure, was say R300K as opposed to two or three million. Three million becomes a different discussion to R300K. Often, R300K we can implement even if there is no budget for it especially when the ROI is good and everyone agrees.

[TM] So there are levels of how much expenditure you can use on your own?

[TP] It is not documented, but we have just rather felt that out and as soon as we start approaching the million rand mark, then it becomes a bigger discussion.

[TM] So have you ever had any experiences where you were short of money and you could not implement your plans?

[TP] Look, I think it gets weighed up and that's why it goes to our EXCO first. If our EXCO agree that its part of the strategy and that is where the business wants to go, then it will be approved. Then the group EXCO will also do that same evaluation. Once it's approved there, then it's assumed that the money is available.

[TM] Ok, thank you. You spoke about the strategy. How is the strategy formulated? Is it top down or bottom-up?

[TP] It has been a little bit organic, so you will remember the implementation in the beginning. I mean it was pretty much a [REDACTED] implementation but the next year after the implementation, we

then helped our biggest retail customer to develop an e-commerce platform because they had hurt themselves on the previous black Friday. Then that just became organic. We brought on [REDACTED] and then we started doing central distribution to all their stores. You will remember well in the initial implementation, we were only utilising about 45% of this warehouse. The strategy at that point was to offset some of the fixed costs. So we are saying, okay, we have, we can reutilise another 40% of this warehouse and charge customers for that. Then we can offset the fixed costs against that. That was a simple strategy, but what we are finding is that this industry's moving very fast and the margins are becoming less and less and we are having to consolidate more. That is driving a new strategy in terms of 3PL. In the past, strategy would purely offset fixed costs. Now it is saying what we want is to create a completely new strategy of actually trying to sew the whole industry in bringing some sort of central distribution. Therefore, it has been organic and it is a little bit top-down. We have also been taking the staff in the warehouse and that has been a long process to try to get them to a strategic thinking perspective because what I found is that not everybody is a strategic thinker. Therefore, you have to try to take someone on that journey.

[TM] Thank you. I want to move to the next aspect, which is the technology itself. I know you use [REDACTED] and I know we spoke about what you have developed for other clients, not only the warehouses but related to it. The question would be; how do you select, or how was the technology selected?

[TP] Yeah. So what I know, obviously I wasn't part of the decision making in terms of selecting [REDACTED], is that it was very prominent in the tech industry. Many of the vendors were using [REDACTED] products. Probably there was also a competitor portion to it since our competitor is also using the same technology. The Gartner quadrant was also a consideration and [REDACTED] is consistently top, right. I think with all of that said, this was probably the selection criteria. Then in terms of the product, I think you will remember that we selected a very vanilla approach to it. We did not want to make loads of customizations on it and we still have that view now, so we do not have customisation. We prefer to identify and create a problem statement and then from the problem statement, we would meet with our implementation partners to say what is best in class in terms of our requirements and check with them how their product fits our requirements.

[TM] I know this question could be a bit of a tricky one and it is related to the vendors or the software that you chose. I know you are using an international brand. Do you know of any local brands that you could have chosen?

[TP] Look, from my history, I have only come across one local brand and that was very ERP specific. In that environment, we were operating on SYSPRO and there was a specific product written locally

for it. Therefore, that is the only one I know of and the rest of the ones that I have interacted with are all the international brands.

[TM] Okay. I think this is much clearer. So you look for the best in class software that mostly links to your strategies? You want to configure more than customise?

[TP] That is right but I think the lesson learned if I were to do this again is to make sure that we have a product where we have more than one implementation partner in the country. I don't know if you have that question coming up or not?

[TM] I suppose that then speaks to external consultants and the relationship you have with them. How would you have chosen your experts? I suppose it is tied to the product that you choose and what consultants are available. Is that the case?

[TP] Yeah. So, I think we chose it at a product level and not at an implementation level. Okay. From there, I think that there has been a sort of a tumultuous relationship over the past three or four years where if we were able to move to another implementation partner, we probably would have tried. But the product we chose has a single implementation partner country in the which we've raised internationally and those guys have told us that their strategy around the world is to have single implementation partner per country.

[TM] So was your concern from an exposure point of view from your side or it was in terms of knowledge transfer. I had a question here on how do you facilitate knowledge transfer? I suppose, when you do not have the knowledge or the capacity to do it yourself, you will always be stuck with external consultants.

[TP] Yeah but where it is a single implementation partner, any fee increases are often not negotiable. You have no room to negotiate and you are bound by them and that is the biggest frustration I guess the Intellectual Property (IP) transfer still hasn't happened properly in three years. So that there is also a big concern. First-line support is there, but the second and third support has to be outsourced.

[TM] What efforts, if any, were there in order to in-source IP? To what extent were these efforts successful?

[TP] Yeah. I think the challenge for us is that we have been so organic, like I said, so we have constantly evolved and that has driven us to have consultants on site for a much longer time. If you take people, our neighbours who went onto [REDACTED], the guys were in and out pretty quickly because they stabilised and that was the business they were operating in. With us, it was about bringing on new stuff, looking at new BI and the optimisation journey. So as you brought in more people, as you've got fuller, it would raise different questions. And I also think that I have also taken my staff on a journey, like from an inventory perspective and from a warehouse management perspective, for them to think differently. They are not just there to achieve A, B and C every single day but they need to

achieve ABC, but also be thinking about how to improve and identify bottlenecks. So unfortunately, we have created monsters. I think that if you have a warehouse that is going to run as a standard and your strategy is to just optimise that way as I think that you should formalize in the document as to when people should leave. Then you should, from the beginning, identify whom your people are who should be taking on first, second and possibly third line support and make sure that there is a proper documented IP transfer process within the project scope. I think that is probably the one thing we have never really, as a project say, okay, now we are doing IP transfer. It is more ad hoc, which is problematic.

[TM] Okay. Thank you very much. Just to swing back to the technology, but I think we have touched the other subject which is linked to this. So the integration, from a technology point of view, are the consideration of the system being able to integrate with other systems a factor? We always want him to speak to other clients. To what extent from a technology point of view is integration a consideration? How the system integrates well with other systems?

[TP] So again, that was one of the big changes that we had to make from a strategy perspective because we were moving more to the 3PL environment. What we actually did in the beginning, the implementation, I think was short sighted. It was a direct ERP to WMS integration. What we did in terms of going to our first 3PL is we created an integrated service platform. We called a [REDACTED] service and every integration now runs on it until today. So, we integrated WMS to that and then separated our ERP away from WMS to flow solutions.

[TM] So [REDACTED] doesn't integrate directly to your ERP now?

[TP] Yes, everything flows through the integration layer. So, what we've bolted on top of that is; we've obviously integrated with multiple ERP's including SAP, and Accumatica which is a local one. Then we have integrated with multiple Couriers and Freight forwarders, which includes the back stamping, messaging to and from creation of consignments, all of that kind of thing. So, that integration layer is all encompassing and this was as part of the strategy move to that.

[TM] Okay. Perfect. Uh, just two more points on master data; from your point of view, how does the availability and the quality affect the implementation of a WMS?

[TP] So, that is your oxygen, without correct master data everything is a stuff-up. So I think what we did 18 months prior to implementation, the guys had started doing cubi-scanning but I'm not sure that the change management was correct in terms of that because by the time we did go live, there were a lot of issues in terms of master data. We have had to refine that over three years, especially with the implementation of conveyors in line with weight scales. We are also, at the point of wave, pushing the proactive message to Couriers to expect certain theoretical weight, theoretical volume and then that is updated again off the inline scale. So that has to be accurate and then we found a few problems with

that when we went live. So we've got a very rich set of master data now. So when we are on-board a new 3PL, first prize while development is happening, we start to take them on the education road of master data. What we cannot rely on in this industry is vendor information because it is never correct. In fact, we had a strategy session yesterday talking about optimizing inbound because my view is to double the volume in the next three to five years. Okay. So I am saying how do we cope with it? How do we also keep; how do you get even more accurate master data? So at this point we cubi-scan on first pass of a new product. Thereafter it is assumed that we have the data. I am saying that it is not good enough. We need to now do it on every new receipt of a product in case a vendor has changed packaging, dimensions or the product is now manufactured the different part of the world. The same vendor can send you notebooks from four different parts of the world and they will all have different properties. So master data is oxygen. I mean that tells you how to put it away, where you put it, how it is going, whether it is going on a conveyor through pallets and which Courier.

[TM] How does the courier charge you? Is it volume or weight?

[TP] It is the greater of the two. If you have weight of 5 and volumetric of 4 then you get charged on weight. If it is the other way around, you get charged on volumetric. So it has to be accurate because we pushing it to them. They had to audit our process.

[TM] Let us touch on project management. So how is the project planned or how do you roll out the planning? That is the first point. The second point is who is involved in the project planning?

[TP] Is this from an implementation or what we do now?

[TM] It would be both implementation and what you do now. So I suppose now you are on a growth pathway and you are taking on new players so it is still an implementation, though it is not a like a typical project, but I suspect there are still aspects of project management involved.

[TP] So, in the beginning for the implementation, I think that it was a very loose structure. I do not think that there was any project management involvement. It was the Supply Chain Executive and the Warehouse Manager trying to drive this thing on their own with the implementation partner and I think that was tricky. In the end, at the 11th hour a PMO top person gets involved, which at that point I think it was a little bit too late.

[TM] What would that typically do to your project when you plan it this way?

[TP] I think that you overlook many things. I do not think that you document everything properly and you probably do not "dot every *i* and cross every t". What we have done now, so we have a proper PMO structure, so they manage whether it is an outsourced or in-source person whose job is to manage all project actions and milestones as these are critical. By having an independent person who is driving all of those players to meet those milestones, you actually start to achieve. Through sitting in a room with all the role players, they begin by developing the problem statement and then a BRS (Business

Requirements Spec). That document talks to everything that we need and all the role-players, whether it's operational people, IT or the greater business. Once you have created all of that, we start to agree and then from the BRS, we then go into design and then from design into development. Then we enter into quite a severe testing phase and then User Acceptance Training. Okay. And then it's go-live and then there's a stabilisation period which always needs to be factored in as well.

[TM] Okay. Perfect. Still on the project management, let us talk about risk management. So you spoke now of a dedicated project management office, take me through the process of how risks are identified, managed and mitigated.

[TP] So, as you go through the different processes in your BRS and as you start to deep dive each one of those little components of the proposed project, you get a section that identifies the risks. Okay. So all risks are then put on the table and then we look for risk mitigation factors. Bigger projects like the conveyors are problematic or challenging in that you've got transition plans because a system can happen in the background as you know and can be turned on with a flick of a switch to not be, go home and tomorrow we have a new system but operationally it doesn't happen like that. So the conveyors as an example, there was a three months transition plan, starting to move people to different locations, set up network points, infrastructure, get them working in that fashion. Then the next month you were moving another portion of people as they were putting hardware onto floor.

[TM] Was that to try to reduce the impact of failure?

[TP] 100%. You see, that was identified as a risk right in the beginning to say the transition is our biggest risk because what we cannot afford not to do with the volume of movement that we are doing on a day; you cannot afford to miss 10%. One of the first issues that we had to resolve was that full serial tracking. And again, that came from an understanding of terminology. So, when this business said to the implementation partner, we want full serial tracking. Full serial checking means something different to this business and our vendors, than it did to the implementation partners. With the implementation partner, full serial checking means if I am moving from a reserve location to a pick face, I will scan it, if I do the put away, I have I put the right serials in the right location. The change that we made, I am not sure if you will remember, it was to say, do we really need full serial tracking? What do we really need? We then went back to vendors to say what is it you really need? Some of them said they want in and out scanning and some just said they want scanning out. Therefore, then we changed that and we had to re-flag our master data system to identify those that needed in and out scanning, those that needed out and those that needed none. That was probably one of our biggest transformations but again it was a terminology issue and just a loss in translation during the design phase.

[TM] Thanks. Just to go back to the project team, who forms part of that project team?

[TP] So the project team is headed up by one person, an ex CIO of [REDACTED]. She runs it and she then has project managers that work under her. We have business process analysts under her and Industrial Engineers as well. The way that the team works is, your project managers are literally managing the project, according to milestones like I mentioned earlier. Your process analysts are literally going through every process required. Does it need change? Does it need review? And your industrial engineers are actually now helping more in terms of strategy in saying what does this look like in a year's time, two years time, three years time. So, they were giving them some challenges to go and deal with and then they're coming back with simulations and all that kind of thing. So if I give you an example, as we wanting to continue our conveyor now onto the courier floor now but then at the same time, the strategy is to double the volume three year so we can take and current data. We have run this; we created the simulation from the first drawing that was done for us. We ran that at its current volumes and at 1.5 times and it was perfect. As soon as you doubled the volume, we then got bottlenecks. And so then we changed the simulation and layout a few times. We have asked a few questions, I think we have done about five or six iterations of that simulation now to get to a point where we can double the volume. Therefore, the engineers are playing that role.

[TM] Okay, nice. Then obviously the external consultants, how do you integrate them into the project team?

[TP] So only at the point where we have done the BRS and we get to a point where we say, okay, this is the problem statement for the business. This is what the business requires to resolve, this or two to implement this project. Okay, whom do we need and what do we need? And so we would then go and interview the implementation partner and then you make your decision from there. Then you start engaging with them more in the design workshops.

[TM] Okay. So, from your experience, how does the structure of the team have a bearing on the success or failure of a project?

[TP] I think if people in my position or in my management team are trying to run this project, they also have a day job to do. And so your focus is not completely on it. Okay. So if you have an outsource or a consulting firm, uh, an implementation partner, you actually do not have the time to manage them and what they are actually achieving. So by having the project management team and everyone having the roles within the project management team, they are able to engage with external consultants when they need them and also do it and make sure that the costs are being managed properly because it's time and material. Same as for us is that they would draw as in when they need us. So, I would not have a warehouse manager sitting every day, eight hours a day in meetings.

[TM] Okay. Thank you. I think that is well answered. Another aspect is the project documentation. Maybe you could start by outlining the kind of documents you keep because I suppose, there is

documentation that is critical for continuity if somebody leaves, then you've got the trail of what has happened. How critical was that?

[TP] Yeah, so critical. So the BRS is the first one. So once you go into the design in the implementation, if there's a problem, you can always refer back to their business requirements specification to confirm what the business had required and what was defined in the design process and if it hasn't been developed like that. In terms of the business processes, we have already seen this where we have had staff turnover in that thing, you are able to still go and draw out those documents and double check according to the mapped process. Therefore, documentation is essential.

[TM] Is there a department who manages the data?

[TP] Yes, the PMO manages all of that. Because the process analysts sits under PMO, they manage all of that and we have made it available to the business on an internal portal.

[TM] I think we touched a bit on partner collaboration that you obviously need to collaborate with your partners because you are growing and involving many external partners. How is that working for you and how does that affect, especially coming from a WMS point of view?

[TP] So the first port of call, like I mentioned, is the documentation in the PMO office. The more organized you are and the more definite and defined you have your project, the easier it is for an implementation partner to get a right. Okay. When it is loose, you're going to have interpretation. You are going to have lost in translation and you are going to have issues. And so as I say, the more documented, the more those documents are signed off by role players, the more that requirements turns into a proper, design and development and the more accurate that is and the less issues you have. I think the biggest challenge that I have faced so far with externals now is now starting to bring multiple external companies together. Okay. So now we have WMS and the conveyor belts which is a different supplier and now you have to manage both because now there is systems that all talk to each other. So our integration layers talking to WMS, which is talking to a PLC, which is talking to SCADAs, which is talking to rejection shoots and talking to the couriers and relying on all of their back stamping, messaging. When something goes wrong, you know those roles definitely have to be defined and it is about taking extra time to make sure that that is where you cover risks and risk mitigation and downtime. And what are we looking at in terms of first line support and trying to identify issues. Unfortunately, we also have to imagine what could go wrong because we have never worked on conveyors yet you are putting one in. You do not know what could go wrong so you almost need to have an imagination of what could go wrong and to know who to contact.

[TM] Okay, perfect. Let us move on to change management. I know this is always a big subject,

[TP] I can write a thesis.

[TM] So how have you implemented change management? Also, at what point do you initiate change management in the project phase?

[TP] If we got back to the original WMS project, that was my biggest issue when I got called in by the CEO to say what went wrong on our implementation. What I said to him is that the change management is almost non-existent and the culture was shocked by this whole implementation. So I think that the decision was top-down and I think that not all of the pertinent people who were in those meetings were involved in any decisions made. If I have a lesson that we learned out of that, what we do in the implementation of a project, if there is a portion of the operation that is affected, we start to engage them at the BRS level so that they are able to bring in any concerns. The operational guys and your people on the floor are the ones who are going to raise all the risks. They are going to tell you all of the exceptions and they are going to tell you one of the anomalies. If I expect that I am going to go and have all the answers for those people and simply have a discussion between the implementation partner and myself and expect them to just follow suit or can they happen because these guys will say I have good ideas. I do not know if you were here when we did the PND's. You remember we had 17 forklifts driving around. I had a fight with one of my senior managers who had been here a long time. He kept saying to me, he wanted his aisle champions back. You remember we used to have people that ran every single aisle and they would direct people to the stock they needed to pick. He wanted that back because he said that if I had that back then everything would be okay again. Then I started working with him on it and tried to make sure that the idea came across as his. So, but what we did is, we then zoned this whole warehouse by the number of movements that were happening per aisle. Then we zoned it all off and we made nine zones. Then what we did is we created PND's at the end of each row and we created a staging area from Receiving. The whole idea was to take him along the journey that we operated on the old system he wanted but running it on a new system. Therefore, we went on a journey to work things out together and then we got to what we got. We reduced from seventeen to nine forklifts and that is a savings of about three hundred thousand rand a month. By making the idea his and listening to his concept and turning it saying to him, "We are in a new world. Here is your old concept, I hear what you're saying but how do we bring the two together to get the same results that you want?" That was one of my biggest wins concerning change management.

[TM] Okay, great. Next aspect is communication. Obviously when you do change management, you need to be constantly engaging with the people. From your experience, how do you go through the communication plan and the impact of having or not having one?

[TP] If you do not have what we had on our implementation then that's clear. I mean, we had guys that were aisle champion on Friday and they were a Cycle Counter on Monday. There was no vision so what we ended up with is staff too demoralised because they were actually walking around not

knowing what their job was. My view is that a lot of the staff that we have here are excellent and that all are here with the desire to work, but then if you don't know what to do in a day then it starts to give you anxiety then you start to feel like you need to hide away from supervisors and managers because you are going to get caught short. The big questions I got then were; "Why did we go with this thing?" "Why did we turn on this thing?" "We should've just left it as it was. It was fine how it was." What that told me was that those guys were not involved in that decision. So if you and I go on a journey together and we say; okay, the problem statement is this, and what can we do to fix this thing, we start to explore things together. By the time we find our solution you've already bought in, right? Because you know what the problem was and you've been on a journey to find the solution. That doesn't mean that you and I both sit in every meeting and we meet with different WMS vendors but it's more of creating the problem statement together and then looking for a solution that solves it. Once I have identified the correct implementation partner, then I can bring them in again to meet. And it doesn't mean everyone. I have to take the supervisor and management layer on that journey so that they are then constantly communicating that because what you do not want in the processes is to break your reporting lines. This was also one of the things I saw; that you had people reporting to different people and then your discussions were starting to have happened from senior management down to a picker instead of senior management to management to supervisors to the pickers,

[TM] Great. You started mentioning about training one person who was an aisle champion and the next day was a cycle counter? How was training conducted in terms of super user training and end user training? Take me through the process of training.

[TP] The first port is your end-to-end testing, which is your system checks to make sure everything's working according to how it was planned. Then we do the user acceptance training and it is at that point, where all the key stakeholders are involved in actually working on the system in a test environment. They get to ask all of their questions. They get to pull the system apart and say, yeah, but try this kind of orders, maybe you pushing through all the nice easy orders. Can you try one of these orders, which are the problematic ones? We tried to identify those problematic ones. I think it has probably been my biggest lesson learned even in change management where made many assumptions like in putting robotic process automation. One of the biggest fears for people, especially when you're going through mechanisation and new systems is there's a fear that is part of the reason you putting it in is to cut heads thus there is need of being very transparent in that communication. I think when people are aware of what their role is, what the outcome is supposed to be, what problem it is solving. People need to have the ability to ask a question and the platform to raise a concern and if you can get all of that right, and I don't think anyone ever gets that a hundred percent, but you've got to try and you've got to take people down that journey.

[TM] Okay. Nice. So you got your supervisor training, which is your key people like your analysts and industrial engineers. Who does the training? Is it the implementation partner?

[TP] It is a project management office. They will take the more senior business process analysts and industrial designers and they would then be part of the end-to-end testing making sure they understand the whole system. You mentioned [REDACTED] earlier. He had the most knowledge more than anyone did on everything about the WMS. So then, they would go and actually do the user acceptance training with the affected staff.

[TM] Okay. From your perspective, how is the training critical in terms of making sure you have a successful implementation, especially for the end users?

[TP] Well, what you want is that you always know that there is going to be small issues post go-live. Right? Well what you want is that the larger percentage of the processes that are running through that environment are running properly. There are going to be exceptions, but the exceptions are not the rule. So by doing the training in that, I think that you get to cover 99% of the possible issues so that in a production environment, especially a high volume production environment like this, you have the time to manage the 1%. But then what you need to do as well as all the stakeholders who helped you to develop the systems who were involved in end-to-end testing and UAT, at that post go live stabilisation period, they have to be available on that day to deal with the exceptions. So whether it's the IT teams, Infrastructure teams, Database teams, Integration teams or the Implementation partner, they must be aware.

[TM] Okay. In terms of the system, once it is tested, how do you formalise that the system is ready to take it into production?

[TP] Yes, there is a formal test plan that happens. It is called System Integration Testing. There is System Integration Testing that happens first, whose certain criteria must be achieved and then signed off by the Steering Committee. So I'm generally the project owner on a lot of these things. All different parties will sign and then once I am happy and I have spoken to the people, I will then sign off. Then with end-to-end testing there is a criteria that has to be met which is pre-documented in the whole process. All of those things have to be met, signed off by all the key stakeholders and then eventually signed off by me as the project owner. User acceptance testing is the same. Then post go-live, we usually have a one or two weeks stabilisation period. We analyse that time and then at the end of that time, we then sign off a project closure report, which also has all of the criteria we expected. Therefore, by the time you are getting to a stabilised new system, you have been through four different sign off processes.

[TM] Awesome. Did you ever do dry run? So dry run is testing the system in a production environment and see if works as expected. Do you ever do that?

[TP] No, I think it is more about the timing of when we go live. Okay, there are times where we understand the impact and the risk to the business. If it is major, we would generally want to go live on a Friday evening so that we can use Saturday and Sunday to actually run some work in production. We will hold some work back on a Friday afternoon so we can run it on Saturday and Sunday. This depends on the size of the change, some of the changes we will make on a Monday or Tuesday, Wednesday night without fear. It is literally just about the risk.

[TM] Okay. So basically you use the quiet periods to test in production?

[TP] Yes, we use downtown to actually run production because you can always roll back at that point and every single one of those things, if it is a big implementation there is always a rollback plan.

[TM] Okay. Give me a little more information on the rollback plan. Is it part of the risk management plan?

[TP] Yes. So we actually set times, especially on the bigger implementations. So we would go live, we create WhatsApp groups and communication platforms for everyone to communicate. There is a hierarchy of events that it needs to happen. Maybe it is about closing off the work in the warehouse. Then the systems guys have to now shut off systems. Then they migrate systems, then they do the development they import the development, et cetera. Then it is a slow turn-on process with everyone confirming their finished step to the greater team. So that is the process of going live and then there's also by certain timeframe if we haven't achieved X, Y and Z, then we are going to roll back and there is also the plan to do so. We also have system backup because that is one of the requirements for going into production as that allows for rollbacks. The process is more technical than that but I could not give you the technical stuff.

[TM] I think it is quite clear. I am more interested in the process and how everything unfolds. On the day of go live day, do you have a go-live checklist? How do you quantify a go-live success?

[TP] So again, in end-to-end testing we would have already defined the requirements. So for example, a good industrial engineer who's been here a while understands the processes so that when we put together the end-to-end test plan, there is a lot of different scenarios and they ask business to help them also to do a scenario plan. So once, you have all of your scenario plans and you understand all of your different aspects of the business, that becomes part of the end-to-end testing and UAT. So when you go live again, they will actually form part of the checklist even though, you can't always do all of those scenarios but you hope to achieve a lot of those scenarios. For example, if we are going to leave some work on a Friday afternoon to execute on a Saturday to promote to production on Friday night, we will try to make sure that we have as many of the different scenarios available to us as possible. Then if we did not have one or two, we will try to check within the next week. These will then become part of the sign-off for the project.

[TM] Okay. Um, did you ever have any go-live postponements where you needed to roll back?

[TP] Yes, we have had to make those choices before. I mean to take risks into consideration and that's where someone like myself, if I'm the project owner, I know I've got to make that decision. So, you have to create your SteerCo as where people need to have that platform to air their concerns. We have made many of those calls, but you have to make those calls based on risk assessment and listening to your team.

[TM] Okay, perfect. Let us talk about ramping up. So now you are live, how do you ramp up because you need to manage the expectations of your customers as well. How do you manage that relationship in ramping up to the point where the service level is back to normal?

[TP] Sorry. So just going back to the change management, I think people will automatically say, okay, this is a warehouse management implementation, therefore we engage only with warehouse management or staff but this has to actually be a great business decision. And so you were asking earlier about how the decisions are made in terms of what projects we do, that's where it's important as well for the whole business to get a view of what's actually happening in the business. The change management should start at the EXCO level moving down. During our implementation, if you asked sales people, they would actually say they did not even know this was happening and are then expected to manage the customers. That's why it is important that the whole business is bought into the change management as well. Your question in terms of ramping up, ramping up in terms of what?

[TM] Ok. I know you were doing 1,200 orders a day, if I remember correctly. When you go live, I do not think on the first day you would have met that target. So how do you then try and get back to that or even better, given that you have new processes and the staff still getting used to the new way of working. Do you have a plan to say; we tell our customers you might not get your order today but you may get fifty percent and we will try it and get to a hundred percent in the next week or something like that?

[TP] I mean for us as operational people, I think that makes a lot of sense but if you asked that of a sales person or the CEO, they're going to say, "give me hundred percent and how do you make sure that we get hundred percent". For me, I think that it is possible and without being idealistic, I think it is possible. One of my biggest bugbears because I was new, it was my first week and just an observation that I had is that I felt like the wrong people were moved into wrong positions. It was the first thing. The second thing is that I had identified four major portions to the warehouse where I thought that those people could have been trained better and being given more tools. That was the inbound management, inventory manager, wave master and the outbound manager. If those people had all the Business Intelligence in place and the right knowledge, the result would have been better.

And when I say right knowledge I mean maybe even going and working at another customer. Whatever that solution is, this should be an out of the box thought process.

[TM] Okay. so what you're saying is that you realised that there were some gaps that had not been addressed prior, that are now manifesting on the day of go-live?

[TP] Well, we had different reflector vests for different levels of people within the warehouse. There was a bunch of us walking around with those bright white vests written Super User on the back but there was not a single super user in this warehouse

[TM] Let us discuss handover plan to operations. So I suppose when you go live, you are typically still in project mode, what is the transition to handover the system to operations?

[TP] Obviously, operations is involved from the get-go, right. It becomes an operational thing at the point where it is signed off after the stabilisation period.

[TM] Typically, how long is the stabilisation period?

[TP] Probably one week to two months depending on the size of the change. After this any queries are handled through the support channels where operations have to log calls.

[TM] All right. At that point, what is the involvement of the implementation partner?

[TP] As part of the quotation in a project, there is different portions to it. So it is the helping of the design, the development that has to happen, the end-to-end testing, UAT, deployment to production and part of the costing is at stabilisation period. After that, then it is generally a time and materials on an agreed service level agreement.

[TM] Okay. That is good. I think we have already touched on access and the relationship with your WMS experts. That is all I had from my side. I do not know if there is anything else that you think is critical for a successful implementation that we have not touched on.

[TP] I think we have touched on it all. To summarise; you need everybody's buying; people with real knowledge of how the system works and then good a PMO structure.

[TM] We have come to the end of the interview. Thank you very much for the time and agreeing to participate in this interview.

Company B, Interview 2

[TM] Thank you for accepting to do this interview. So the format of the interview its semi structured. I have segregated the big topics into like seven chunks, we can just go through each of them, and you give you a response. Feel free to ask questions where you do not understand or need clarity. I also do the same. Okay, so maybe just as a start, in terms of the business that your organization is involved in and what you guys do, how are you involved with Warehouse Management Systems?

[NM] My scope is mostly [REDACTED]. Under the [REDACTED] brand, there is [REDACTED] and [REDACTED]. Therefore, I have been involved from a warehouse implementation and support in the [REDACTED] environment and recently I have started looking after at the 3PL portion of it, which is [REDACTED] food or [REDACTED] stores getting stock from other [REDACTED] Distribution Centres. So I think this is part of the group's initiatives to try and centralise.

[TM] Okay. Is it a [REDACTED] DC and [REDACTED] now keeps some of its stock there and is managed and run by [REDACTED] supply chain team? So are you buying for yourself or you procure and they handle your distribution?

[NM] Therefore, this is merely from a distribution perspective. So we buy our own stock and it is kept in a distribution centre that's managed and run by the centre. Therefore, if you think about the cost of having your own distribution centre, it does not sit with us but it sits with someone else but obviously, we pay for the services that they provide

[TM] Probably have more capacity to maybe space and all that. Do you get that at a discount?

[NM] 100%. Okay, that is what is currently happening. Okay, so but it is not very extensive. Out of two facilities, one in [REDACTED] and one in [REDACTED], but the one in [REDACTED] also does commodities like maize meal and sugar.

[TM] Okay. Interesting.

[**NM]** At least they have a Warehouse Management Systems. You know historically [REDACTED] was just the warehouse. There were just a shed with racking, you just pumped stock to it, and you drew as you as you please.

[TM] For interest sake, what system are they using as a WMS?

[NM] The warehouse management system is Triceps.

[TM] Thank you very much. The aim of this interview is to get your view of what factors you have found to affect such implementations, but I would like to get the South African context.

[NM] My view is always going to be an IT view right. Okay, of course, with a tinge of business because of the experience, I have had, okay, but I am biased towards the IT methodologies and how we do things in an IT space to get a WMS implemented.

[TM] Yeah, that is sure, but from how I know. I am sure what I have here you will be able to articulate from the projects that we have done together and other you have done here.

Like I said, they're like different broad topics that we want to touch on the first one being the Enterprise or you could call it the business. So from a business perspective as in at a strategic level, what could be affecting implementations, for example level of project support? From your experience how did that or how does that affect and implementation either the success of the failure of it?

[NM] Ok, I think from a [REDACTED] perspective that part I will call it Governance. Projects that require a certain amount of Capex with certain amount of budget always require an ESG (Executive Steering Group). All right. So then, it is the only way you can implement a project like a new WMS. Because there is big money to be spent, generally the project sponsor becomes your Supply Chain Executive or Director. On the ESG there has to be an IT director, finance representation, HR representation in the event that people have to move from certain sites to come to the new DC and in the event of getting labour brokers involved for employment of new employees. When you start the project, there has to be an ESG outlining what will be done, the project plan with certain key milestones. Obviously, they report back usually on a monthly or so basis on what is happening, whether we are on budget and are on track and the challenges we are having with our service providers etc., right?

From a governance perspective, it's quite high up its higher there is no it's not like we just do it as an IT project. It is never an IT project. That is how we are trying to drive it such that it is IT doing it but it is a business thing. I think that is a very important part about it. Actually. I have been in projects through it trying to implement workforce scheduling with Red Pairie.

[TM] I remember that one.

[NM] Yeah, the business wanted it but the business was not really involved. So I found that such project you can go and do the pilot but when there's no buy-in from high up in the business and no one to drive behaviour within the people, then it doesn't take off.

[TM] Okay. Interesting so it ends at a pilot stage.

[NM] Basically. Yeah,

[TM] And the business questions if there is real need for this exactly because they were not be involved from the start

[NM] Correct.

[TM] Okay. So senior management is quite involved in do you say they meet quite often?

[NM] Yes regularly, say on a monthly basis there is an ESG.

[TM] And budget-wise, how is it done? I am asking from a strategic perspective in terms of the vision and strategy of the company. Where does the budget come from? Is it top-down or bottom-up?

[NM] I think every Executives got a budget that they have to spend right, for example, budgets are already being done for next year, right. So if I am an IT director, I'm a supply chain executive, I already know next year what's coming and what I want to do whether to open a DC and put in a WMS, then I have to put it in my budget and capitalize it because big spend is not operational but is capital expenditure (CAPEX). So because I have to capitalise it and depreciated over five years, whatever method of depreciation is used there. It's budgeted for. The budget is top down but the requirements come from the bottom.

We obviously try to hit the number because the exact kind of says well, this is what it cost me to implement [REDACTED] in 2012 ,factor in maybe hardware and other costs that could have changed the and we get an RFP from the vendor then obviously we get quotes and subject to that we will build a budget and we the get it signed off but it has to be signed off. Currently everything CAPEX budget has to be signed by the CEO.

[TM] Is there any particular scenarios that you can think of where the allocation of the budget affected the project or either ways or in your experience you are always well capitalised?

[NM] The budget is always a factor in that if you are tracking okay, and you are within budget during the project then everything's okay. There has been instances where we see that we are hitting the budget mark and internally within the IT budget and we have moved certain funds around to restructure and make sure that you still succeed and you get the product done. So there is not been a project that I have been involved in that stopped because there is no budgets.

[TM] Okay, that is fine. So the next area will be Technology. I am sure this one where you are most interested. Okay. So now, we come to the software itself. On the selection of the software, how do you go about it?

[NM] It is through a request for proposal (RFP) right. If there is nothing that is available in the group right now and there is nothing we can tap into from a group perspective, then we go out into the market and request for proposal like back then when we did the Manhattan SCALE implementation, we did not have Walmart. Okay, great. Therefore, we went and did the RFP and the front-runners were Manhattan SCALE, RetailX and SAP EWM. I think SAP EWM was already a non-starter and we were not going to consider them because Builders had just implemented it and they're doing their projects like R30 Million and they was just too much drama, so as [REDACTED] at the time we didn't have that USD2 Million to just throw into a WMS implementation.

Our director at the time [REDACTED] was the person who liked small and agile vendors who could deliver the project and adapt within a reasonable budget. So if you look at somewhat Supply Chain Junction or Arch was at that time they were similar type of companies that can bring together resources

and work on the project plan without really waiting on someone to come from Germany or waiting for someone to come from wherever.

[TM] You mentioned that some if you do not have anything within your organization, there are instances where you actually adapt something that is what is being done elsewhere.

[NM] Yes, there is scenarios like that. So for instance SAP, so right now, we as [REDACTED] we are trying to get a single instance of SAP across the group. This obviously allows for scalability and then and again which I think is where everything is going to try and centralize and there is opportunities for us to work together. Currently we are building these silos like you will find that there's a me here who's responsible for a WMS, and there someone else who is like me at [REDACTED] there and someone else at [REDACTED] and we've got this silos of people doing stuff whereas if we are one we could be working together.

[TM] Okay, that is fine. I think this also touches on the issue of in your RFP's and the consideration between local systems and systems from elsewhere. So I suppose if Walmart suggests something, for example, SAP, you would be more inclined to go with it.

Have you ever considered local systems?

[NM] From a WMS perspective there were not too many at the time. I do not think there are local providers that could support an enterprise as big as [REDACTED] right.

[TM] So, “local is lekker” is not applicable here?

[NM] Look, I mean “local is lekker” is ideal if they can deliver right. Ultimately, it is really about whether they can deliver or not and at what cost? Because you might have a local company that can do ABC but can will they last the journey, right? And will they manage to have the skills always available? It is always a big challenge. I mean you all know the challenges that are happening with [REDACTED]. Therefore, it is a nightmare.

[TM] So now that you mostly inclined to international software brands, how does that affect your projects in terms of support, etc.?

[NM] So it's International software, but with a local footprint, so I think that's the best way to think about it. So it's not like when we went to Manhattan SCALE, there was no one here. Okay. Yes, if [REDACTED] and crew did not know what they have to do then we go and talk to Manhattan directly, but it is very seldom that it happened.

[TM] Okay. So you always consider something where there is a local presence and I suppose you would also want to see where it is already working?

[NM] 100% this is one of the RFP requirements

[TM] Okay something on the functionality of the software itself. I am sure you know that you customize or your config. You know, they say you can either customize or configure a system that is

almost fits your process or you say okay, this is how I want my process to work so I need a software that fits.

[NM] So when we started this implementation, we had a lot of strong people that came from [REDACTED] right now and they had a view of how a DC should operate. Okay, right. I think if you just look at it, a WMS generally does the same thing. It must be able to receive, put away, replenish and dispatch. So in terms of fitting business process to a WMS, I think because many WMS' already through the basics, it now becomes about what other things can you do to make me efficient and the type of reporting with quality and consistency of data. I think that is what really stands out.

[TM] So was the attitude to say, "Let's get something that fits what you want or we going to change it?

[NM] No. So let us get something that is somewhat aligned to how a General DC should work, but if necessary can be changed.

[TM] Okay, So it's more lot of config a little bit of customization if needed?

[NM] So in general we do not like customisation, right? Yeah. So we prefer something where we can configure because if you look at it down the line when you know want to upgrade all those customisations, you now have to factor them into the base product. We were fortunate that when we started the SCALE . Yeah, so functionality like Audit functionality was not in the product, it was something we requested, and they started building into the base product. Therefore, I think it is a good thing when you meet a vendor that can also listen and put in some suggestions into the product.

[TM] Do you still have modifications currently at [REDACTED]

[NM] No, we do not have any. Everything has been catered for by an exit Point.

[TM] Another area is integration. I think that is a big factor in especially in this day with a business you want to be able to collaborate as much as you can with your other systems and clients. What considerations would you use or used in such a scenario?

[NM] Manhattan SCALE, SAP and most of our core systems have standard interfaces and the only part we have to change in our lives is the point of sale or Arch, which is our ERP. In that instance because of our relationship our ERP provider, they were able to take whatever we give them and they will take whatever core system is producing and work around it. So like we have built interfaces to handle everything from SCALE perspective and we have got an integration tool called [REDACTED] right and if it was SAP it would be like SAP PO, which is what we use in the in the 3PL world. Therefore, I think because of that we have generally had very simple interfaces and have not had to ask the [REDACTED]or [REDACTED]to build anything fancy.

[TM] Thanks. I just want to discuss more on Master data. I know this is a biggie also when project start. It is the availability and the quality of it and how it effects an implementation.

[NM] So this was a nightmare for us, I remember when we started and wanted to start receiving and the dimensions were wrong. It was one afternoon Bonnie said to Dumisani and I "What are you doing on the weekend?" So we literally had a ruler and pen to measure each and every product to get the dimensions. But understand it's a nightmare answer then you have to capture the dimensions into the WMS. The company had not yet procured a cubiscan machine. Even after acquiring the cubiscan, it was not automatically integrated into the WMS since Arch does not need dimensions.

So now that was trying to go with SAP F&R which does need some sort of dimensions to build a cube equal to a certain trucks as well hence we have started to integrate dimensions into SAP. The way I see the journey going is that like you're talking Master data will be managed in the centre and in SAP. Dimensions should also be captured in SAP but they still open questions as to when do I put in those dimensions? Right? Do we take the dimensions from the vendor, which is not always correct, or measure each product as I receive if for the first time. So currently, what is happening with dimensions is that they are managed as they receive. So initially, there is a listing document with everything, because the product needs dimensions to be to be listed in SAP. I have to capture in something but on first receipt, just as we do in [REDACTED], then where we have to input the correct dimension.

However, master data is not just dimensions, right? There is the correctness of barcodes. Right now, we are building capacity at the centre. There is a team of Master data people now responsible for master data, okay within the group but there has to be coordination across the whole group, so that one product has the same data everywhere across the group. We have a challenge of legacy data where some of the stores generate and print their own in-house item bar-codes, So the challenge is purifying data. I do not think it will ever be solved in the retail space. It is a big challenge.

Right now, you can imagine in the case of base codes for instance if this product has a family of an Each, a Shrink and a Case. They have a parent base code that belongs to all these things. Now at [REDACTED] base code might be 123, but at [REDACTED] it might be 456. So from a reporting perspective you can imagine I want to report on 123 across the group and that becomes a nightmare for people to make decisions even monetary decisions because if I say how much for Valpre water are we selling or how much do we have it's just a nightmare to get this data across the group. Therefore, this data alignment thing is its happening but it is a complex process.

[TM] Okay. Thanks so much. I want to move to Project Management. I think I have touched a bit here and then we will focus on how the project is planned and implemented. You spoke of the ESG but how does that work going forward?

[NM] Subject to the size of project, a project manager is assigned. So now, our I.T. team comprises of the CEO then the IT Director and then the Applications Lead whom I report into. There is also PMO, which is the Project Management Office. If the project is a supply chain project or a WMS

implementation it would definitely need a project manager. The project manager drive all this organizing and not necessarily as functional as I am but just coordinating everything else including resourcing, setting up meetings, setting up ESG, prepping for the ESG and updating the schedules. However, the supply chain analysts always do the actual work.

[TM] Okay. I will come to the team composition in a few minutes or so. I suppose they will also do the risk management.

[NM] No, they do not. For a big project like a WMS implementation, we also have internal audit.

[TM] Okay. So is this another department?

[NM] It is the company's internal auditors to look from a governance perspective. They know if there is any data migration to be done from any other systems. We have to make sure that the data that was there and the data that is moved is still the same. Any conversions that have to happen they do all those type of checks and they keep us honest. They assess the risk in terms of our timelines and how the project will affect trade on how our stores be affected.

[TM] At what point are they involved?

[NM] They are involved from the start and are also part of the ESG

[TM] Okay. Yeah, that makes sense. Therefore, these are like auditors independent of the implementation, but are keeping an eye on the project. I am sure they can also say No-Go?

[NM] Yeah. So there is findings and at every ESG. There is a RAG matrix, red amber green type of matrix that is put up and internal audit has their say on everything. You will find most issues from internal audit are on permissions and what users can do on the system, for example, I cannot be a GRV clerk and invoicing clerk at the same time. You know that type of governance issues that should not violate employment policies.

[TM] So project team is it across the board or it depends on who leads the project or the magnitude of the project or how is it composed for it?

[NM] So if it is a WMS implementation. It just does not touch the DC. It touches everywhere from H.R. to stores to operations to finance so within the ESG there will be a representation for everyone but obviously these people are the ESG. Therefore are part of the of the project team but the people were actively driving the project are the IT or BSP (Business System Process) people working closely together with the PMO the project managers

The project managers are not generally technical or functional people so there is also another department for standard operating procedures that are different. However, okay, so way back BSP used to do it. We are still responsible for the process but there is a team of administrators looking after the documentation and maintenance of all SOP's

[TM] Okay. Do you involve external consultants in the project team itself? How are they involved with the context of the project team? Do you tell them what to do or they have an input across the project spectrum and duration?

[NM] For the project to be successful, they have to be on board from day one, especially if it is a new implementation. If it is an upgrade, it is different since we already we know what we are doing and we would not need extensive external support unless for the actual technical work that is only the software side.

But from a processes and operations perspective, if it's not a new implementation but an upgrade then we can handle.

If it is an implementation definitely, we need them to hold our hands because functionally we do not understand the software from a testing perspective. The methodologies for a new implementation are different.

So we do the config. Then there has to be consultant testing to ensure that the product being delivered is as per your requirements. After consultant testing, then there is analyst testing which is done by my team. When my team is happy or there is issues then there is communication with the consultants until all issues are addressed. Then after BSP testing, there is user acceptance testing and final sign-off before deploying to production.

[TM] You touched a bit on the project documentation. I suppose this will be handled by the PMO team?

[NM] Yes, it's handled by the PMO team, but obviously it has to be a project charter, functional specifications, reporting specifications, technical specifications and configuration documents.

[TM] What is your take in terms of importance of documentation?

[NM] It is very very important, really. It is especially important for continuity, though. All right. So in situations like me who has been here since the first implementation. If I was to leave, all the knowledge that I have gained during that time goes with me whereas if everything is documented then it makes it easier to handover to the next person.

[TM] Thank you so much. Okay. I think you touched a bit here on partner collaboration. You spoke about how it affects your stores, your external consultants. Tell me more

[NM] So there is something called peer reviews. Okay. Before you go live, in the ESG in effect, there is someone from an external chain who does not have a stake in the project who comes and assesses and give an honest opinion of the project. That is another point from a partner collaboration perspective that happens within the within the group.

[TM] Okay. Thanks. Let us move to Change management, communication plan, training and all that. I know this is always a biggie. How is this managed and what impact does it have from your experience?

[NM] We didn't manage it very well at [REDACTED], to be honest. Our change management strategy was very bad. We knew we are implementing a DC. We had strong management but we did not take the staff with on the journey. They knew that something was coming, but we did not have constant feedback sessions on what was happening, you know. So we as IT just put ourselves in a room, we did what we had to do and when it was ready we gave it to top management and there was a bit of training. Then we deployed.

But the best I've seen has been in the 3PL implementation. There was fun generated around the project. Generally, people think that because we are implementing a new system, people lose jobs, but what I saw from this from day one, it was clear we are implementing this and no one would lose their jobs. If there is anything that needs to change or your role needs to change, you will be trained on that. Everyone was on the journey. Everyone was excited about it. It was never seen as an impediment to people's careers and stuff like that. There was posters created. There was Black Friday fun days where the team came to our buildings to take photos with the people. You know, there was a whole lot of hype that was generated and that helped the guys to calm down

[TM] You spoke about the taking the users along the journey. At what point do you think this must be initiated, because it is always difficult to involve everyone from the start? At what point do you think you can start saying, OK, let us involve the users?

[NM] For me I think it is at UAT level. UAT in our lives is ideally is for super users. In some businesses, they are called super users or people who know the system and have worked with it extensively such as departmental heads. We have done it in such a way that usually IT drive UAT. Right. I sit and you are my customer and I am doing the clicking and whatever. However, I saw it work very well in the 3PL world where the user themselves were doing their own process and conducting the tests themselves. It might take longer but it works well in order to get that buy-in as well as to ensure familiarity of the system to the users.

[TM] How is the training mixed between the theoretical and the practical training?

[NM] From our side, we first do process training where we put up the process and show the users the process they should be doing. The next step is the SOP training where the users are taken through the Standard Operating Procedures and the steps they need to follow to execute their role. Then after that, you have a system training where they users are taken through the system and get the opportunity to do their own practical exercises. The users are then examined for proficiency and one would not get user access to the DC if they have failed the system test exercises.

[TM] Who does system testing and how do you go about this testing?

[NM] System testing is actually .analyst testing. I am not sure how it is broken down in the questionnaire, but from my side, the way it works is there has to be external consultant testing. When these consultants are done, then there is analyst testing by IT/BSP. After system testing then there is UAT. However, coupled with all this is also reporting where we have to validate all reports that the data that is coming. Therefore, this testing is not just functional but is also to validate the output of what functions have been tested.

[TM] So is everyone involved? Does the User Acceptance testing also work as training?

[NM] But there is still training, right? Training has to come after UAT because UAT is not with everyone I have to train people like the pickers on the Reach-truck drivers. In UAT I show the manager or the inventory manager but in training now I have to go and train the users who will be executing the actual work.

[TM] Okay. What is your take on the importance of training?

[NM] You cannot go live without training, even though there has been instances where we have go live without it.

[TM] That is interesting. Was that because of the pressure of the project or you could not miss the go-live date?

[NM] We had too many issues going on. The project team ended up doing picking, receiving and helping everywhere. I remember the first night we tried going live; it was a big, big mess. There was like three or four analysts on the floor and we tried our best. The warehouse people didn't know what to do, how to do it. We had a very strong DC manager, right? By strong I mean, not system strong but operationally and he was a bully. He would just make noise, make noise and force people to do things. But then when you leave people to their own vices it becomes a big nightmare. That first night we stopped. We decided on a No-Go.

The challenge then was that all the goods had been moved from the previous DC and it was now in [REDACTED] and was stacked everywhere on the warehouse floor. The pressure of stopping operations and the stores waiting to receive their stock was quite high. We had to put it to receive and put away and meanwhile, the inventory team was starting to the run waves and pick same time and this was just a nightmare.

[TM] Was this caused by a lack of project management or just the pressure of the first go live day?

[NM] Back then, we did not have a solid structure as we have now. I mean, our project manager was an external person from the software consultant and was one of those project managers who was not close to any of the detail. She was just there pushing to tick the boxes, to be exact.

[TM] In preparation for go-live, do you do any dry-runs?

[NM] Yes, we actually do several dry-runs especially on elements that affect data and any integration. For example, when we converted our ERP from Reacts to Arch, which involved moving data from one database to another database with a mapping table in the middle. So for every data conversion, these numerous dry runs, because you have your first dry run, and then the Audit Department come and sign-off on the results of the dry-run if it worked. If there was a hundred thousand products with a stock value of 25 million in Reacts then they must be hundred thousand products with the stock value of 25 million in the new system. There was several dry runs before this was signed-off

[TM] And who was involved in all this?

[NM] There were external consultants from the software providers. These are people that are strong in the technical requirements of the go live.

[TM] Okay. So you confirm that you cannot go live without the sign-off of the dry-run process?

[NM] Yes, without that sign-off you can do nothing.

[TM] Okay. We are almost done yet. We move on to Go-live activities now. You mentioned briefly about the go-live that didn't go well as well as another that went quite well.

[NM] I will talk about the one that went well

[TM] Well I would also like to know why the other ones did not go so well.

[NM] I think it was just project management disciplines that were not followed. There has to be a go-live checklist with the activities that are going to be done on the night of go-live, also mentioning the person who is going to do it. Every little detail that requires someone to do something and the sequencing thereof, is very important.

[TM] We will talk about handover to operations. So obviously, you guys, as a project team, at how point do you hand over to Operations and what is the process you follow?

[NM] Our handover are not instantaneous and soon after go-live. We do have post implementation support that I see provided. Right. In each functional area, an analyst is assigned to attend to the day-to-day questions or requests. This is for a period of about 3 weeks until the implementation is stabilised and support will then transition into a formal process of logging calls via a dedicated support platform After the 3 week period there will be a final ESG meeting to formalise closure of the project. Further support is then handed over to the support teams and Operation teams have to channel all queries through this process and not directly to the project team.

[TM] The last section that I just want to speak about is the access to WMS experts or consultants. Do you as an organization, do you always look out to use them or do you try to build that knowledge in-house?

[NM] I think it is a bit of both. So obviously, for the technical topics like the config building of scripts we definitely need the consultants because that is their expertise. However, I think for operational or

functional knowledge of how system should work and the output thereof, I think that has to be an in-house competency. For example at [REDACTED], I would sit with the external consultants to define the requirements of the business. Then they would do whatever they need to do to meet the requirement. I would still challenge them if it is not going to add value to my business or it is going to open up other gaps.

You always wanted the knowledge to sit in-house. You do not want to always rely on consultants as this often comes at a high cost.

[TM] How do you guarantee knowledge transfer from the consultants to the business?

[NM] We have a system in place to ensure this happens because I know the consultants who always want to come to us to bill us.

[TM] How important is the relationship with the external consultants to the success of the implementation?

[NM] I think this is very important. Even on my personal reviews, I am always rated on the type of relationships I have with our external consultants. I found that when I had cordial professional working relationships with the external consultants, I ended getting more from them and that always worked to our advantage.

[TM] Thank you very much for agreeing to this interview. This is all I had. Do you have any further comments or questions you may want to ask?

[NM] No thanks. It is my pleasure.

Company C , Interview 3

[TM] Okay. So firstly, thanks for accepting to do the interview. So like I said, this is a semi structured interview with questions where we discuss the key points and you also free to ask questions where you don't understand, but the idea is to understand the factors that affect, warehouse management system implementations in your area and based on your experience, what you have come across and how you've managed to implement warehouse management systems. Like I said, the interview is anonymous, so, in terms of you individually as well as the company. I have a consent form to confirm that you understand what the study is about, your participation is voluntary and you have agreed to be recorded. As I said, you will not be recorded in excess of what is required so if there's anything that you are not comfortable with, you don't have to answer that question.

Ok. Let us begin. As I said, we will look at these major topics. We will go through each one of them and then we might overlap between the seven of them, but its fine. So the first one is enterprise. What I mean by enterprise is the organisation itself, the structure of the big corporate organization; factors like the input of senior management or the terms of budget. So, we can start with a level of support or involvement of senior management because I can imagine such projects you almost need the top management.

[SG] So that it depends heavily on the type of project that we busy with. I mean. If it is something that we do and it already exists in warehouse, then it is pretty much up to us. And I mean like [REDACTED], you know as senior management. So that depends very much on us on what we do although we still need to report back to the likes of MD and HQ on what we are busy with. So I have just recently actually sent them like a whole layout of what we have done this year. So all the projects that we have done, new customers that type of thing. This is just so that they are aware and can understand what is happening. When it gets to your bigger projects where we actually have to go off site, then it is very heavily with the MD, because he obviously needs to approve the budget in terms of the cost. It goes to HQ, so, and that type of budget then it is managed and then they will tell us, okay; you have this amount or whatever to make it work and then you have to fit in everything. So yeah, it heavily involves on the type of project that we have to work with but if it is something small it remains here but if it goes bigger and a little bit more out of our scope thing, that's when top management starts getting involved

[TM] Maybe you could give an example of where or an indication of the level of support.

[SG] Obviously, you can imagine it is quite significant. I mean if you do not have the support, if I may use examples that we have had here last year, we implemented [REDACTED] and I mean it is very big financial risk for us because it is a bonded facility, so everything has to go through SARS. It is a high-risk product with theft and that type of thing is quite a high. The transport, you know, when we

moved product the transport costs were very high because it had to have escorts and all of that. Therefore, the risk was very high with that customer from beginning the project was in risk. And with that specific one, there was no management at all or top management at all, not from any of the managers. And to get something like that off the ground with no support, it is crazy, absolutely crazy. With our other projects, like with the [REDACTED] that we have done, it was huge. I mean the likes the MD and Warehouse Manager were always at the facility checking what was going on.

[SG] So it's improved a lot in the last while. Then we have been receiving visits from the Paris office that has been supporting us in with [REDACTED] project. Therefore, in that aspect, when we ask help, we get immediate, almost immediate support, especially from HQ. If a customer is at risk, like [REDACTED], especially if it is a customer that we manage on a global level or at least on HQ level, then they will jump in very quickly.

[TM] Okay. So you said in terms of budgets and if I understand correctly, you have more of operational projects where you are doing smaller clients improvements you almost use an operational budget?

[SG] Yes, that is correct but the bigger projects, it is a separate budget because remember you have to take into consideration if we have to get a new facility. We have to first see what it's going to cost us and then we have to determine what are we going to charge them. And depending on that we know, what budget we have to play with. You know, because you have to. There are so many aspects when you implement something new. WMS is just a small part of it but the scope is much bigger. It goes from cleaning, you know, right through to QHSE to HR to do everything and each part of that has a budget. So definitely, it gets a little bit more in depth involvement from senior management.

[TM] Interesting. Thanks for that. Just one area on the strategy of the business or the vision of the business and how that comes together with your implementation. So you know, you spoke about the global partner, so I suppose there is the bigger picture, for example, how does the implementation of [REDACTED] WMS link from your understanding, to the corporate strategy.

[SG] Are you asking just on WMS or the implementation of the customer in full?

[TM] Mostly on WMS, but just to qualify that; WMS is a tool to manage stock so they might not be entirely separate.

[SG] Yeah. So obviously, your WMS is your heart and soul of the business here. It is what keeps your records. When we've got a global customer like [REDACTED], [REDACTED] or [REDACTED], It does get a little bit more complicated because then we have to kind of also do what they want us to do. So just to give an example, with [REDACTED], we have full EDI, as you are aware. So they have their system, we have our system, and at all times they need to be aligned 100%. Okay. That is a requirement not just from us but from HQ as well. So [REDACTED] locally reports to [REDACTED] globally who then reports to our HQ. Therefore, you can understand if something is not working here,

then it is very quickly that our HQ is aware. Then you also have, for instance, your [REDACTED] where they were not interested in using our system. So they use their own WMS worldwide and even though we work with them in many different countries, they use the system everywhere. So we're very flexible and we adapt quite easily to what the customer requires from us. HQ also has that flexibility to allow us to do that, but this is mostly our global clients.

[TM] Because I suppose also because you are a 3PL, you want to be able to accommodate customer needs.

[SG] Yeah, we have to be flexible because if you are not, you are going to lose the customer. If you want to move with the times, if you have a vision where you want to be in five years, you have to be flexible. I mean, it is one of your biggest things that you have to be in an industry like this. If you keep back, you are going to fall out. Other companies are going to come up and take these customers right from you.

[TM] Okay, cool. Thanks. I want to move on to technology. So, when I say technology here I mean the system itself. So how is always the technology chosen or which WMS to use?

[SG] Okay, so it is quite an interesting question because we have just actually spoken about it. It depends heavily on the customer. I mean we got three customers in this warehouse that work on their own WMS and have not even considered using our system. So firstly, you have to look at what the customer requires. You have to look at EDI capability if that is what the customer requires. Certain customers require EDI and then you have your normal ones. and in those cases where it is just the general customer, we just put them straight onto our [REDACTED] WMS. So it depends on the size of the customer, the requirements the customer. And then if there's nothing specific, if it's standard, then we'll go with our normal one. Then it depends on the type of business. So here, specifically we use [REDACTED] standard as a generic one. But for instance, if you go to [REDACTED] where they work with Transit stock, they use another WMS because that is in pallet in-out, box in, box out and there's no pick and packing. Therefore, that type of business also would influence the type of system that you use. You do not want to put the on a complicated or complex system where it is just literally pallet in out.

[TM] All right, thanks. Next point is locally developed systems in South Africa versus international systems

[SG] Yeah. So, you have your global ones and, or your company approved ones. So just to give you an example, years ago, we were using [REDACTED]. And up until now actually we will be using [REDACTED], but it's not a very user friendly system. It is not very flexible, as you know; you have to configure it really to the way you wanted. It is very strict. It is not local. It comes from HQ. Nevertheless, we were pushed to do it. It was pushed on from HQ. And if we get that push, then our

hands are kind of tied and we can't do much. So we were pretty much forced to use that. And at one stage we were struggling quite heavily. We did not have a lot of support. I mean, there was like one, maybe two people locally who could help us, but they could not configure. So it was literally support or the configuration or the changes and everything had to go to HQ which took weeks or even months. It was very difficult. We eventually pushed back and we were like, if we don't have the support locally, then we're going to go with a local system, which is why we introduced [REDACTED]. That is where [REDACTED] came on because it is a local system. It has local support. I mean these people, I phone them now and they are here in two hours, or the sort out almost immediately. So that is why went with [REDACTED], because we had that almost immediate support. To implement a customer, to give you an idea, on [REDACTED], the quickest was about three to four weeks that we could get a customer implemented. With [REDACTED], it takes one day. In fact, I could do it myself. So it made it very easier to implement these smaller customers onto [REDACTED] and it was very user friendly, we had support. If there were a new customer they would come, they would give training even if it were the same they will always onsite. Then we were now forced again to start using [REDACTED], which is again global system. What makes it better now is that we have gotten local support team, which we did not have in the past. Therefore, it does not really matter if it is global or local; it is the support that you have that would make the difference.

[TM] I suppose as you mentioned before, critical for you is you should be able to set up a client quite quickly because it is a 3PL environment?

[SG] Exactly, As soon as the customer's stock arrives they want it in the system, as we cannot wait for weeks. As it is, we already have four clients that are pending.

[TM] Okay, so this one I will give a bit of explanation; configuration versus customisation. So, some people want to get a system where they look at their process and then they say, okay, this is how I want my process to work, I'm going to get a software that works like how I work. Alternatively, I will get a system that does not work according to my process. I will break it and make it the way I want it to work and obviously, that comes with its costs.

[SG] So for me, configuration, I mean for each single customer that you implement, there will be some element of configuration. I mean, you have to do it. It is your standard; item master, locations, and reporting. So that is standard configuration will always be there. Most of the time it does not come with an additional cost. The thing is, with many of our customers, especially the bigger ones, they do require customisation. I mean if they want to report say, with this and this and this and this, we have to be able to provide them with that and that and that. I mean, we cannot just say to them, I am sorry Mr Customer, you can have that but you cannot have that because immediately you are annoying them and the last thing we want is to kick off a project on a bad note because our system is not able to do

something. Many of the times, the requests are a little bit like almost far-fetched. In that case, we will push back and say to them, “Look, we can do this, but it will come at a cost. So it's not our standard so please understand that if you want this, then you're going to have to pay for it." Normally they would then drop the request so you can see when something is really needed and when it is just a nice-to-have. I also think that comes with experience. I mean, you also kind of know when it is really needed.

[TM] Okay. So how does it affect the implementation of a project?

[SG] It is going to increase your timeline definitely. I mean, it is going to increase your cost. It is going to increase the complexity of it because you know; it is new tests, new configuration and new training. It is so all of that, those aspects you will have to build in additional time, you know, because you cannot just try to do something new without testing, without going through your UATs and dry runs and all of that.

[SG] That is something that you always need to take into consideration as well. When we get a smaller client, I do not think UAT is always needed, you know. I do not feel, from my side, it is necessary. I do not see why we have to do a UAT with the same, the same processes, the same system, just a different customer. And you should treat the two differently as well, which I don't think is always the case from a Systems Department because and I'm sorry, like I don't need to step on toes now, but you get your, your standard and you get your customisation projects. Customisation. I agree 100%. You have to follow the processes you have to do your dry run, UATs and sign off of the operational flows. However, if we have a customer that brings in 10 pallets and tomorrow we are going to dispatch the same, I do not see that entire project plan is needed. You understand?

[TM] Okay. So, still on the technology, now focusing on the industry or client specific requirements such as First In First Out (FIFO) and expiry of products. So what I am asking there is; the choice of your technology and the requirements of the industry, how do those come into play and affect the implementation?

[SG] Well, it plays a very big role what the system can do. If a system cannot manage a FEFO, we cannot implement it for our customer whose heart of the business is depends expiry dates because I mean if you sell an expired product to a customer and that customer has a reaction you can imagine the image damage to the customer. They might lose millions. Therefore, if the system cannot accommodate for that, you cannot implement it. Another example for instance is our bond warehouse; it works on the FIFO principle, but not on date of receipt but on bill of entry date. So you know, the system needs to be able to, to pull back to that date. So again, it gets very complicated with each customer doing their own thing and if a system cannot provide for that and you're forced to use it then it makes life a little bit difficult for us.

[TM] Does that then force you to probably consider using different systems?

[SG] Yeah, it will definitely. That is one of the reasons why we also went with [REDACTED] for [REDACTED] because it has a full on bonded section on the system. It captures your bill entry date. It creates a bond register for you. You do not even have to do it manually. That was one of the big reasons why we went with [REDACTED] for [REDACTED] because, at that stage, [REDACTED] could not do it, we were not using [REDACTED] standard, and [REDACTED] classic was not an option because it is too expensive. It affects our day-to-day business as well and the customer's day-to-day basis if we do not use the right system in there. If we don't have the right system and we have to start doing things manually then what's the point of having a system.

[TM] Thanks. The consideration to integrate with other systems. Is that also a factor?

[SG] Of course, and that would depend purely on the customer. Preferably we, I would say we want to implement EDI because it eliminates the manual work for the people on the floor, but it is also very costly. Therefore, if the costs are going to fall on us as operations, then we are not going to do it. However, if the customer requests it and we can push back the costs or build it into our rates, then obviously we would push for it. Then again, it would depend on which system you use because some systems are not very customizable. So definitely, integration is dependent on the customer. Okay. If a customer is not willing to pay for it, we cannot absorb those costs, especially if it is low volume.

[TM] Okay. Cool. Master data availability.

[SG] Oh! That really depends on the customer as well. We have had some customers who have been very good with it such that even weeks before we have the first stock in the warehouse we already have their Item master, but then we've got other customers where the stock is here but we don't have an item master. Okay. We have customers, where they do not even work with item codes and they work with descriptions only. Then we have to try creating an item code of our own. But again, master data is not only about SKU and description, it goes to dimensions, weights and that information is 90% of the time it's wrong. It always affects us for example now [REDACTED], because they do not work with item codes and they go on descriptions. If you use an underscore today and you look for it with a dash tomorrow and you don't find it, you're going to create a new one. So I've already picked up so many duplicates because of that. It affects the time because now for each upload you have to now go search, do we have an item for this description? If you have to put it in precisely the way it was uploaded. If you cannot find it, you are going to create a new one. It is just time consuming. It dirties up the system, if I can call it that, because you are sitting now with duplicates.

[TM] Let us move on to project management, which is around the project plan, risk management and the composition of the project team. In terms of the planning of the project, just a few minutes ago, you mentioned that the smaller projects you do not really want to go through the rigour of a full project

plan because it is not necessary. However, obviously, for that you need to have defined the process in terms of what needs to happen. Talk to me about the projects that need project planning.

[SG] So project planning. So if I can use [REDACTED] as an example because we just did the full new warehouse for them this year. I mean there is so much that goes into that. You first have to find a facility. I mean, you first have to find a warehouse and without a warehouse, you can do nothing because you do not know what rate they are going to charge you. You do not know what the [REDACTED] metres are. So, you need to find a warehouse that can accommodate the volumes that the customer request. Okay. From there, you need to negotiate the rates that you want to pay. And then from there, you need to look at all your other costs. So you need to take into consideration staff costs. So depending on volumes, you are going to determine how much staff you need, how much MHE you need? It is all of that that you need to take into consideration. It is the cleaning, it is the health, it is the little things like best control, which if you just implemented WMS, and it is not the things that you think about. I mean, you have to look at pest control. You have to look at temperature control. You have to look at dangerous goods compliance, for instance, all the aerosols needs to be fenced off because if one of those bottles explodes then it is going to have a ripple effect and you have to contain that explosion. Therefore, there is so, many things that you have to take into consideration that that is before you even get to your IT requirements. You know, your PC's, your a network, your RF, your printers, your WMS. We have a big project plan which gives you from contracts signed, your lease agreements, everything that needs to be done, we have a full list of that. Then once the project starts, then you can populate your dates and then you allocate certain amount of time to each one that needs to be done so that you reach our implementation as well.

[TM] And who is doing this, do you have like a team that's doing this or it is certain people or its you?

[SG] From a project management point, it is I. I am the implementation manager, so that is part of what I do. So obviously, we work as a team. We have obviously the warehouse manager from a management perspective. Everything that I do, I pretty much have to run through him. I have my budget and as long as I am within the budget, I just go to him ask him to sign off. I have to keep track of the budget. He oversees the project and then reports to the MD but I also do my flash reports and my feedback to all other parties. Obviously, we have a very small team here, as you said so sometimes our resources are a bit split. We have got Peter here now who is also helping quite a bit. He has also been to helping with these little implementations but ideally, you should have probably two or three people implementing something like that.

We work closely with other teams like MIS, IT, QHSE, HR so it is not just us doing everything, we also ordinate, but obviously they each have their own section that they have to manage.

[TM] Okay. So you drive the project, manage all the objectives, what needs to be achieved and you review that the implementation is on schedule?

[SG] That is correct

[TM] Okay. Tied to that is the risk management. So obviously I supposed in your project plan, you identify certain things as risks. Talk to me about identification and mitigation of such risks.

[SG] I think for risk it also comes with experience in terms of lessons learned because many of the times you do not think of everything. So when we do a project we always cater, unforeseen things like a truck maybe breaking down on the highway with a truckload of alcohol on it, it's a risk but it's unforeseen. Therefore, you put it on the plan and maybe find ways to mitigate the risk from happening. Like you could put an armed guard on the truck for example. The risk goes with a lot of experience, but also goes with customer discussions on our previous experiences and the typical risks previously encountered. So we must have round the table discussions on how we are going to mitigate risks and what are our risks. It is not just physical risks, but what is the risk if we do not reach our deadlines and if we have contingency plans in place.

[TM] Okay, thanks. I think we touched on project team already. So you said you have got like a team, but you also involved with people from different departments?

[SG] Yes, you have to. I mean, it is not possible to work alone. For example, I cannot implement a Dangerous Goods warehouse without the help of QHSE because they have the knowledge. I cannot employ people without the help of HR. I cannot procure IT equipment without our IT department; I cannot set up the system without the help of the MIS team. So definitely, you do need all of those people involved in a big project like this for it to be successful.

[TM] Okay. Perfect. Let us move on to project documentation. So as you mentioned there is so much happening with different people involved on the project, what documentation do you keep? How often do you update those? With whom do you share these with and what is the impact of documentation on the success of the project?

[SG] Okay. So just as an example, with [REDACTED], we have our business plan which speaks to the budgets and costs of the project and if we are actually keeping to it and sticking to it. We also got what we call a project plan. If you look at the project plan, these are the different role players. This is what I was trying to explain to you. You have security; you have finance, warehouse implementation and IT. For everybody that is involved, it will tell you the status. So first you need to sign a contract, you have to get the leases and then what do you need to do. This is like a template. However, all of the different topics will depend on what the customer requires. This plan is updated weekly and then sent to everybody that is involved so that they can see the project and follow up on their actions. When we

say work in progress, for instance, to get the signing of contracts sometimes it takes a year to get a contract signed. but in the meanwhile we work on a MOU or something like that.

[TM] Okay, so is it updated weekly?

[SG] Yeah, look, if it is in the middle of an implementation, then it is like daily, you know. If it is full blown then every day I will send out, this is what's been done and this is what spending, but as it gets towards the end, you know, then it is like weekly meeting until it's closed off.

[TM] Perfect. Let us move on to partner collaboration. You are in a 3PL environment. Talk to me about your interactions with external clients because you got so many clients here. How many clients do you have again?

[SG] We are going to about 10 clients right now. To be honest with you, I said to [REDACTED] at one stage that I see more clients than her team does because I was seeing customers like every second day. So obviously, your customers plays a huge roll, but so does your suppliers. And I mean, if your suppliers mess up, then it puts you in a bad light. It is your forklift, it is your reach trucks, it is your transporters, it is your stationary, and it is your people that supplies the boxes, your packaging material. If you run out of carton boxes and you cannot pack or label, it has a huge impact on operations and your relationship with the customer. Therefore, I would say yes, you have to keep your customer happy but in order to do that, you have to keep a very tight grip with on your suppliers as well.

[TM] Let us move on to change management.

[SG] This is the most difficult part of my job. I am not going to lie to you because it is not just actually making the change like changing from [REDACTED] to [REDACTED], which in itself has its issues and problems that come with it. However, it is also changing people's perspective and minds and to make them understand that we are doing this for the good of the business. People are always set in their ways and to get them to actually accept that something is changing is probably the most difficult part.

Because the first thing people are comfortable, *"I know what I'm doing, so leave me to do what I'm doing. Now you are coming in, tell me what you have been doing. It is not going to happen anymore. You're not going to do this."* It throws them out of their comfort zone and immediately, you are met with resistance and negativity. It is not going to work. Why is it not going to work? I can give you 10,000 reasons why it is not going to work. We have seen it many times.

[TM] So coupled to that, there is two points I want to discuss here. Firstly, it is the communication. How have you gone about the communicating to say, okay, this thing is coming and to prepare the people? The second thing is the involvement of all the stakeholders, especially the people that I would call the end-users, and how these affect the success of the project.

[SG] If I can use [REDACTED] again as an example because this is our most recent one. I mean from the start, we first had a meeting because we've got a morning meeting all the managers. So the warehouse managers at all times know what's going to happen and customer is going to be next because it's been communicated to everybody that all customers are going to be moved to [REDACTED] Standard. It has been communicated already a while ago and we have done our first ones in like February and March so it has been a long time coming so they very well aware. Then we will tell the manager of the department on what is going to happen. You kind of expect him to relay the message to his people. On a separate note, I will also draft a mail. So we've had our meetings which include MIS, Management and the end users. We also do workshops. We've had many workshops with the different people gather requirements to make this work. We also have a separate meeting with the customer. We first get internal requirements and then we include the customer from a customer point. From there we try and then put everything together and then go from there. I think, most importantly, emails is not a good form of communication because firstly people do not read emails. Secondly, managers do not filter through information so the best thing for us is to get everybody involved around the table, which is what we normally do. And then take it from there and get the inputs. It is very important. You cannot implement the system. You are not on the floor. I am not on the floor. I do not know what they do every day. I do not know what challenges they face. Therefore, for me it is very important to get the feedback. Even if I have to spend a day with them on the floor, I will do it just to see what challenges they face. If you involve them from the start, then they feel like they have got a say and they are much more receptive. If you just say to them, "You will do this because I say so" then it will never work.

[TM] Training. So how do you go about the training? Whom does the training because I suppose you have what I would call your end-users as well as super users?

[SG] Well, you know, that is a little bit of a difficult situation. I mean, if we were in an ideal world and I had my ideal team and I had my trainer and my dedicated super user and all they do is WMS, then it would be very easy to say. However, that is not the ideal world. I mean, we have maybe 10% of our time that can go into something like that because we have so many other projects. So, for training from our side, it's very difficult and it's quite frustrating if you ask for assistance and you are met with resistance immediately. We have two people in the full supply chain team and we run multiple projects at the same time in conjunction with improvement projects, you know, so it is not just implementations. So for us to try and get everybody trained, support them on the floor at all times, do root cause analysis and investigate why things are happening, it's pretty much impossible. So in an ideal world, yes, you would have your one person that's almost dedicated to WMS, who does first level support, who supports the users on the floor, who gives training for every single customer that comes on board, this

would be brilliant. But, that's not always reality. And I think we just need to be very candid about it is that, you know, you've got your ideal and you've got the normal, and it depends on your resources.

[TM] Okay. Systems testing. So, the system has been configured, people have been trained. I don't know which happens first in your case but how do you test the system in preparation for go-live?

[SG] For me, systems testing I feel there's a little bit of a gap between the testing and the training. The reason I say this is, I mean I have gone through many implementations and the biggest one that I have probably done end to end is [REDACTED]. When you test the system again, it is in the ideal world, for example, you prepare your little document and prepare the system and when I testing, everything works perfectly. But the minute that stock arrives, it doesn't matter how many tests you've done, how many dry runs you've done and how much training you've got, It is like you've not done any of it. This is because sitting in front of a computer doing a test versus being on the floor and physically doing that is two very different things. Your dry run gives you a better idea about what to expect but it is still not ideal because you still on a testing basis. I mean we tested and trained many times for [REDACTED] and the minute we went live, the wheels came off because then the batches went working and being decoded. The systems was allocating different stock on different batches and then all of a sudden we got a surplus stock on a PO. It was a mess. So, it doesn't matter how much testing and stuff you've done until you go live and you've got your first stock in your hands and you're processing it that's when you're real training and testing actually begins. So system testing just gives you an idea on how to do it, but until you actually physically start doing, it is still very grey

[TM] So the desktop training gives you a rough picture but it is not true picture of what to expect?

[SG] Yes, it is not reality. You learn better when you do it and that is why with these implementations I like to be on the floor and doing it myself because then you can actually experience what the end users are experiencing. So yes, it is necessary do not get me wrong, it is very necessary to have training, to have systems testing. I am not saying we should scratch it because it does prepare you for what you need, but real test is when you go live.

[TM] Tell me more about your concept about a dry run. Is it the users going through the actual system on the floor with a scanner?

[SG] Again, your dry run is based on an ideal situation because when you do your dry run, 90% of the time it's prepaid, like you've already got your inbound or your outbound or you've made sure that your location exist, you've made sure that your item exists and all of that has been prepared. So again, it gives you a good idea because then you know the process when you run through it but the errors and stuff only really starts with go-live. Therefore, it gives you a very good idea but again, it is in an ideal world.

[TM] Okay. So does it not really give a good measure of how successful your go-live will be?

[SG] How many times have you really had issues with dry run like big issues we have been facing? It does not really happen. All of a sudden, you get a message that you have never seen before because when you were doing your testing, training and your dry run, it was all nicely prepaid.

[TM] Okay. Does that not also then give you an idea that you have not done the project well because we are meeting all of these new things on the day of go-live?

[SG] Partly yes, but I think it also comes with experience. Again, lessons learned because when you go live. [REDACTED] was our first customer that we went live with the [REDACTED] and before that we had never even seen it and we didn't even get draining. Our first training was with the UAT and I am not kidding you. They sent us Excel documents and we had to go through it and do it like that so there was no proper training.

[TM] Was this because it was coming from HQ?

[SG] Yah. So, on that point for instance, they were a lot of things that we didn't know needed to happen. And that's why now when we have a session and we sit around at the table that I get so passionate and I mention all the things to be done. And everyone laughs at me and tells me that I'm being like pedantic, but it's because I've been through it, I've seen it and I've lived it, you know. In order not to have those same mistakes, you have to bring it up. You have to work on experience. You have to work on lessons learned. So it gets better with time as compared to when it is a new project.

[TM] Okay. Let us talk about the go-live itself. Firstly, do you meet your go-live dates?

[SG] You know what? It depends. Okay, let me put it this way. If it's a new customer and we've done the project well and it is been like a couple of months like with [REDACTED] or with [REDACTED] that's coming now where it is been prepared and it's a lot of work that's going into it generally then we meet our targets. What makes it difficult is if you have an existing customer, like with the [REDACTED] and [REDACTED]. When you get stock from other customers, you receive as you get it. The stock is delivered, you receive it, and you put it away. Now you have been running with this customer for three years. They have not had a decent system. So, they've not really kept record of the inventory and it is up to crap. Now you need to do a full stock stake, a full stock take on and they give you five days or whatever. With that, that is when it starts getting difficult because then the customer is like, you know, and it is business as usual. So we will dispatch, we will receive, it doesn't matter if you guys are finished or not. So it really, the things on the customer.

[TM] Okay. So, that also speaks to the ramp-up. You speaking about new clients that you are bringing in where say you will receive the stock in batches.

[SG] Exactly. So you track that and everything's on time and everything is on track and you know. The thing is also when you have been working with a customer for that long, people develop bad habits and it comes back to the change management. People are used to doing things this way and now we

are telling them you are going to do it that way and immediately they tell you why things will not work.

[TM] That seems to suggest that there is also change management on the customer side as well.

[SG] Yes. You need to take them on the journey as well. It makes it difficult when you have to go to this extreme when you change a system. I mean we have seen it twice with [REDACTED]. In addition, the team on the floor, if they are not fully invested in it there is going to be time delays and so we have to constantly push. What also makes it difficult even in terms of system implementation and change management is the variety of scope of work that we have for each customer. Each customer wants their own thing, for example, I got a customer who got two pallets in the warehouse and he has been driving me insane requiring having their stock in a WMS system.

[TM] Okay. Let us quickly finish up. Let us talk about on-site support. How is support and handholding conducted?

[SG] This is a big thing. We have a super user who has been here two or three months. I mean he has literally had super user training probably about a month ago. Now he is expected to know everything. He is expected to be on the floor with people. He is expected to sort all the issues. The support has not been fully provided by the MIS project team.

[TM] What is your expectation in terms of the time required for a handover after go-live?

[SG] I would expect right to have a systems person on the floor maybe for at least a week or two, I'm not saying permanently but maybe to be there every two hours or whatever to listen to the guys and offer help. Because not only do people not think to tell you about issues but also they tend to push issues to one side and only when they see you do they show you such issues. If you go to the floor now, you will find out many things that they have not mentioned to us on email or phone. In addition, they can see that we are there to support and it already gives them more confidence in the system. The second thing you need to be readily available and not insist on opening a ticket but available on Skype, on email for any queries. Only after maybe three months that the project is stabilised and all queries are logged via the ticketing system and this is often on the bigger projects.

[TM] The last section I have discussed is access to WMS experts or consultants if you like. So you mentioned a lot about HQ team coming in. So depending on the system that you using and where it is coming from, how does the access to such resources affect the implementation of WMS?

[SG] So let me give you an example for [REDACTED]. At one stage, we were waiting probably about a week or two to get a query resolved all because the support was not local. Then because the people were so very much systems orientated and not operationally orientated, they never understood our queries. We would say to them, when we pick, we get this error, can you please advise? The first response from them would be "what steps did you take?" They could not put together that if we said

picking that we were actually like picking. Then we would say we scan the carton number or the SKU, we scan this when we put the quantity, and we get this error. But, because they had never been on the floor they could not picture the process. The same would happen with implementing new customers. It took them three weeks to implement a customer. That is why we went [REDACTED] because I pick up a phone and are helped immediately. It does not matter if it is a query. They could help you while on the phone. I mean even we had a query with the software provider we had to pay thousands of Rands to get a query resolved. It is much better having a local support team now. Even though they are not onsite but at least they can get in their car, come in, and see what is happening? It makes a world of difference.

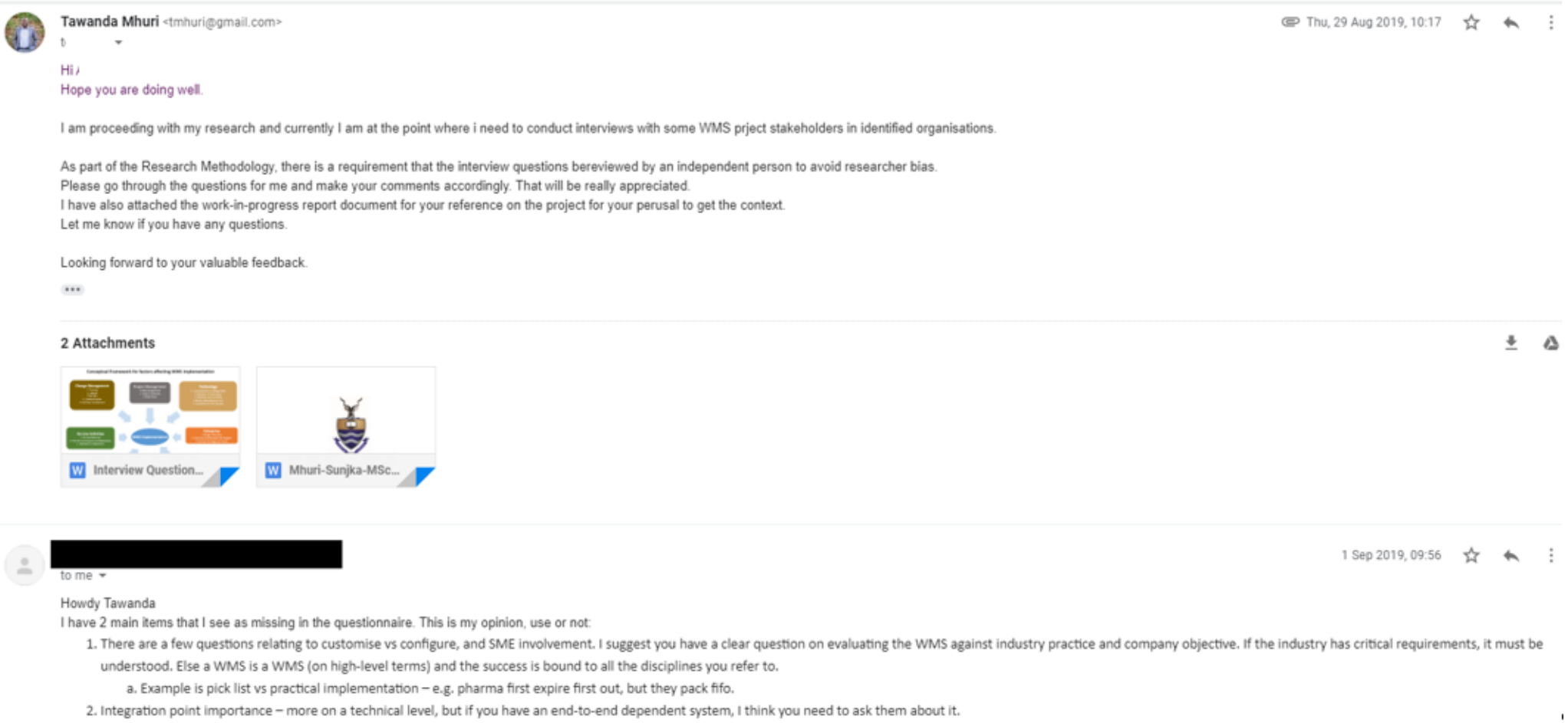
[TM] And it terms of knowledge transfer between your experts and your super users?

[SG] Again, you have to have somebody to act as a buffer because what I find sometimes these experts do not speak the operational language. So, when they come and they speak these very high systems language, it goes right over people's heads and do not understand it. So you need somebody that is like a middleman who can break it down for the guys on the floor.

[TM] Okay. Interesting. That is actually all I had for this interview. Thank you very much for your valued inputs into my research.

APPENDIX G: INDUSTRY EXPERT FEEDBACK

Email conversation with Industry Expert on the validation of interview questions



Tawanda Mhuri <tmhuri@gmail.com>
to

Thu, 29 Aug 2019, 10:17

Hi /
Hope you are doing well.

I am proceeding with my research and currently I am at the point where i need to conduct interviews with some WMS prject stakeholders in identified organisations.

As part of the Research Methodology, there is a requirement that the interview questions bereviewed by an independent person to avoid researcher bias.
Please go through the questions for me and make your comments accordingly. That will be really appreciated.
I have also attached the work-in-progress report document for your reference on the project for your perusal to get the context.
Let me know if you have any questions.

Looking forward to your valuable feedback.

•••

2 Attachments

Interview Question...

Mhuri-Sunjka-MSc...

[redacted]
to me

1 Sep 2019, 09:56

Howdy Tawanda
I have 2 main items that I see as missing in the questionnaire. This is my opinion, use or not:

1. There are a few questions relating to customise vs configure, and SME involvement. I suggest you have a clear question on evaluating the WMS against industry practice and company objective. If the industry has critical requirements, it must be understood. Else a WMS is a WMS (on high-level terms) and the success is bound to all the disciplines you refer to.
    a. Example is pick list vs practical implementation – e.g. pharma first expire first out, but they pack fifo.
2. Integration point importance – more on a technical level, but if you have an end-to-end dependent system, I think you need to ask them about it.

Interview Transcript with Industry Export to discuss the thematic content analysis results

TM: Thank you very much for accepting to do this interview. So just to give a background, so we will go through the themes and you from your experience, you will say whether make sense or if they confirm what you know or you have what other thoughts around them.

AM: Okay. Let us go through them one by one and then you can guide because I have already given my view and you have got that covered. So you start with the company profile that's probably sufficient... You start; I like the break down into the different segments. So if you start the first one that says enterprise. So I like to breakdown that you got enterprise and then discuss what was the corporate support, the budget availability and the alignment to corporate strategy. So I think we safe in terms of that your topics and your breakdown on the topic is fine. I am happy with that. Because I liked that, it was actually quite interesting.

TM: We are just discussing the themes. We do not need to go into the detailed quotes and all that. Let us start on the issue of senior management involvement think it is a no-brainer in terms of its significance?

AM: Top of my head. Obviously change management training, PMO office and you can go more general IT. That is what I would do. Let me start on a Tech side because it might be quicker but we can go through them one by one. But what I would have done reading this; I would say, okay here is what I got out of three interviews, this is what I got from research regarding change management in software implementation. So generalize that, not WMS ; in software implementation, Gartner or whoever say that change management that is impacted that so it support what this guys are saying that that WMS is similar . I do not know how much time you have before you hand in but I would go back and say; let me link this result to a recent results. Okay so let us say change management; then you can find and say that the results of WMS correlates to know research and this is what you can learn from it. Okay. Something like that. Okay. But then you might get to something interesting like the technology selection. I like this technology selection criteria and as the guys say they actually follow a process and you can compare there I think might be a difference.

TM: Okay.

AM: So it would be interesting to see out of your themes. Yeah. If you compare it, I went to the technology trend or if it is a domain specific thing, you know, you talk about capabilities and

what a WMS can do. What is it you got from these three and how does that compare to Tech, in general? That is my opinion. I am just a fourth guy in your research and that's exactly what I'm talking about. Remember, I'm just giving my opinion but what i am saying, for your thesis, go into the Web, get the articles or the stats and this theme that I picked up with the interviews, I can now confirm or dispute what is in the literature. So I would move back because if I read this I would be nice to say; yes, I can. I have done three interviews. I have made the conclusion that for this specific theme it correlates to this standard theory and for this specifically, it does not. And here's why. Now suddenly your analysis becomes a bit more, because if I recall for Masters, you just have to be the master instead of generating new knowledge. So currently, what you have on the theme is just a summary of the opinion. It is not a comparison of what is coming out and from the interviews against what is out there. That's the part that I missed.

TM: So that is who will be in chapter five, which I did not put here.

AM: What is chapter five?

TM: It is discussion. So, okay. Yeah. So discussion is you look at your results then you look at how they either confirm known theory or they against known theory or what are they new aspects that you are picking up. So in that chapter five, unfortunately I've not put it yet, but I have done parts of it but I still need to refine it.

AM: Before you go, what are your chapters?

TM: First one, chapter one is like introduction and your objectives. Chapter 2 is Literature review. Chapter 3 is your methodology then chapter four is your results to analyse the data that you gather pick up the themes. Chapter 5 is now you look at your results against what is most probably in chapter two or other information that you get like your known research that is out there. Now you almost compare and contrast what you have gathered agonist what is known, whether you are picking something that's new maybe or confirming what is already out there. Then chapter six is conclusion.

AM: So four and five is the main parts, correct?

TM: Yeah. Okay.

AM: All right. So when I actually explained to is fine. All right, so I am on the right track.

AM: Okay. So we are going to we will spend some time on this topic because I just want to understand what you saying. Is the theme what you have extracted from the interviews? So from the interviews, if I have to read it that way, they say that senior management involvement is highly important in any implementation of a WMS project for the company? What I don't read the on the theme is if they were they involved? Was the senior management involvement okay? Should this be there or not?

TM: I think. I think it should be.

AM: From the survey, was this the reality? Okay. I am missing the reality. This is like a vague statement; you know what I am saying? I would have loved you to say you interviewed those guys so tell us; were they serious about it?

TM: I will put that in. I think it comes out in the interviews and I must incorporate it as part of my results.

AM: Okay. That is my opinion. Is that what you want? My honest opinion?

TM: It has to be honest.

AM: Okay. So that was the first one. Budget availability, budget resources actually avail to ensure successful implementation of a project.

TM: Okay. What I got, which was a bit strange was in their projects they never had issues with budget because mentioned that resources were availed unless in cases where the budget really goes over the roof

AM: What do you get from that? That is interesting to me because I also read I would like to just see that in your theme. We have struggled with that in some of our projects. The client knows it is critical to upgrade the process and be more efficient but they are just not prepared to give money. So yeah, I would say add that in the theme as I actually think is this like in my world an anomaly in terms of people are prepared to make it work. So I would think about saying adding something about the importance of the operation drives the budget and that is a good thing.

TM: What do you mean by drive the budget?

AM: Exactly what you said; they will find money because they understand that they need this system. But there must be something about responsibility as well because I think obviously these guys they don't talk about irresponsible budget spend but they talk about how to get this operational efficient and I like that. I like that approach because people normally miss the long term impact of a short term budget allocation They don't want to allocate it, but in operations if you can solve this small issue it can have a massive impact for the long run. To me what I have read from all of them. I was actually surprised. I thought I also want to go work for one of these guys. It should always be about operational improvement. The budget follows; it should not the budget leads.

TM: Okay. Alignment to strategy. So two of the companies have got global companies presence so even in terms of what software they choose or what are some of the partners that they are forced to engage with come from HQ, which is typical. So there is the effect of globalisation there.

AM: So i was happy with that one. I think it is the corporate strategy alignment is quite clear that they do that first. They try to do alignment. They are trying to synergise with the rest of their global operations.

TM: Okay. Technology selection. Issues that came out came out vary from prominence in the industry to corporate strategy.

AM: Yeah, I saw that and that is as theoretically expected according to their answers, which was good to see that people are at the adhering to it. Again, I am going to say I think it is because of operational importance that they are trying to do the base and not taking shortcuts. So I like the method. I mean everybody see it there to check the global first and looking around and functionality wise then it means that technology selection was easy job kind of. They had a choice.

TM: Okay. Configurability versus customisation.

AM: I enjoyed that. So I liked that one. I was kind of not surprised, but it was well yeah, that's nice to see. This indicates to me that in the WMS environment, the expectation of the robust processes is there. Configurability is not about changing the process but about changing the parameters around the process. That is how I read it and most people should do the same way. Maybe, I am not sure if you need to explain that difference, but I actually liked that.

TM: It is there in the questions and the literature review as well.

AM: If you want to add it to say that this indicates that the warehouse management systems are catering for most processed but are flexible around the tolerance or parameters. But it does indicate that it looks like that the WMS software is a mature software. That is what I read from it actually. Not only that, I also read that the users are mature because they understand what configurability and customization. Go ahead.

TM: Local versus international.

AM: So all I read there is that the requirements are mature enough that, you know, for community-based system, which is international. Locals are normally very specifically niche. So maybe that is a bit what you are saying that the requirement of niche WMS is really niche. You know what I am saying?

TM: Yeah. Because that is what came out in one of the interviews. But the issue I think what came up was the issue of local presence in terms of support, that's a big thing.

AM: What I did not see the technology selection is if you talk about support is what about what I call the community. So if there's local support, is there also local users from other companies and then taking it further, easily the community, you know like Oracle, you've got the Oracle user group because that can help. But I do not know how mature the environment that used to say to share our findings because we actually competing but we can share expertise.

TM: I know somebody that was trying to do that, but they are doing it from a sales point where they try to create a community so that he can get more sales.

AM: Well then that might be a good point to state, because this is now a contradiction to what we get. And that is what you also want to say that the establishment of user groups around the community of users on the specific warehouse management system, is still not adopted in the WMS industry most probably because of the competitiveness of the actual work. For example, if I have a finance system, we might compete in the industry but we cannot compete on the finance side because we just do debtors and creditors. But the efficiency of my WMS has a direct impact on the efficiency of my operations which is why I wouldn't want to share because my efficient operations gives me some competitive edge. So that would be good to be like a chapter five comment that you can pick it up as contradiction the world is going to social sharing communities. Well, we, at one stage we spoke about "coopetition" where you have to cooperate on one end, but you have to compete on the other.

TM: Okay. Let us quickly go to the integration capabilities.

AM: This is always a pain hey. You remember the previous comments I said you have to add and I think you have added that so I am happy with that.

TM: Okay. Ease of deployment. So this came out from the 3PL interviewee. So cause you got you is three PO client comes to you today and say okay keep my stock but I want to see it on a system with scheduled reports and all so you need something that is easy to deploy.

AM: Is this the ease of deployment not a go live or is it any deployment? That is probably, yeah. Usually ease of deployment also goes hand in hand with ease of customisation. So when I look at the theme it hits me in the face to say this is like a wish list. Everybody would like that. It would like ease of deployment. So what do we really get out of that

TM: Okay so yes, I understand. So the other, for example, I will give you, if you got all the master data and the processes are the same. So the issue is always the exceptions that you need to cater for right. So if you standardise a process, all you need to do is upload the data. That is it. So in 3PL mostly its generic warehouse management with little value adding services in between unless if it's a big project then you are going to have to cater for other things. That is why you see this only one comment because this came out from 3PL person as a specific comment,

AM: My question is more theoretically about the research by asking if there is any value in that theme. Do you understand what I am saying? Because if I go and I look for requirements for implementation software, everybody is going to say ease of deployment. So maybe my comment or question to you is, do you think that interviewee understood what ease of deployment means? What you just explained to me now, do they know that?

TM: Yes.

AM: Because this talks to your interview, otherwise it is just a wish list. Yeah. If you ask me now and I have to quickly think about it, I would echo exactly what you say that the process stays the same and that reports can be easily added. That might be a fair request for ease of deployment.

TM: Okay.

AM: You understand where I am going. If my user understands the complexities then you can also understand that ease of deployment is important in certain areas and this is how they evaluate it.

TM: Okay. Industry specific capabilities. I think you asked for this last time. So that is around FIFO rules, expiry dates and batch tracking.

AM: Yeah. My comment here it is a nice theme but again I would have seen on the theme, from what you have experienced. Do the interviewees know what are the industry specific requirements or do they find it out afterwards? That would be the important topic for me. For pharmacy, they know that first expiry first out is critical. So I would add, as statement if you know it, that it came across that users knew exactly what is required for specific industry needs or it came across that there we no industry specific requirements that would not be included in the standard.

TM: I would just add. That came up in the interviews. Okay. Master data.

AM: Yeah, this was a cool one. I saw that there were many strong opinions. And then, I mean you write whatever you want and I don't have all the background, but I am caught here between whether the question related to what they consider or was the question related to what they implemented? One question I would have is this interviewee company is whether they understand their master data

TM: Yeah. I think what came out initially, some of them they did not. They thought they had a good handle on it until they went live.

AM: No. But just bringing us back to the theme that the WMS upgrade was a replacement of a clipboard system, on the clipboard system, you also have master data like your SKU's. So the question I would just like the added there say that the companies understand what level of complexity they required for master data management.

TM: Yeah, I tried to put it in the last part of the theme but maybe I can expand it.

AM: Yeah. So what I'm missing is again the way you say it. The availability and quality of the data was described as the oxygen. Okay, cool. Great. So we knew that, that's why we added the question in there about master data. So we actually kind of knew that we were just checking that they know it. Okay. So you're saying they know it because your language says "need to

have”; should it not be they have or they do not have? I do not know. You see the difference there.

TM: That is right. Because chapter four should be results and that coming out very clearly.

AM: What I like about that is that it is factual. We went in with this question and we already knew that master data was an issue. We got the emotional intelligence or whatever they call it, that these guys know it, but what do they really have? It does not matter if they implement it or not.

TM: Okay, perfect. Now partner collaboration.

AM: You need to change your "needs to have" to "had”. It changes the meaning of the answer. You must decide what you want to state. I like the "had" because it was an interview as you know, they do not. If it is a "need to have", it tells me they still have to do it.

TM: Thanks so much. Project management.

AM: I was a bit surprised in terms of the maturity of the approach. I mean a lot of people talk about it. These guys, from the comments, are doing it and they put an emphasis on it.

TM: Yes, I picked up that also but also like you mentioned, they almost had to go through that process where one person mentioned that before it was just two guys running with this project and later they implemented this PMO structure.

AM: And I think the one even mentioned that, even if it's internal, external project, but PMO is now part of the lives. So I'm already thinking chapter six, but one of the lines in chapter six should say that the WMS industry is a mature industry. So the community user groups is lacking, but in terms of understanding the importance from operations, this is much higher than what you would you get from the TMS guys for example.

TM: Okay. Risk management. What came out is that risk management must be considered in the early stages of a project.

AM: I would add something there. I think the 3PL guy was talking about how the risk is wider than just themselves. So I would add something like, if it's true, that the companies know the extent required in managing the risk the clients. Because, some do not. If you are the owner of the warehouse and the product, the client does not have a risk. So I like that the people are aware of where the risk lies.

TM: Okay, perfect. Next is Project Team. What came out is the need of a dedicated team instead of pulling people from their roles.

AM: And this is a headache. I went through that and linking that to change management, which is coincidentally the next one. I was trying to make the link to say, but we always say we want to implement something with the guys on the ground, but they have to do their day job. Cannot switch off the warehouse for two weeks and do it. So what I am missing here is how do they do that? How do they solve that problem? Do you remember Heinrich said "we building the air plane while we flying". And linking change management in terms of, I'm not going to lose my job, so now I have to work extra hours to implement something new and I'm addressed to lose my job. How do they handle that? How do they handle the project teams, you understand what I am saying? I was curious to see that

TM: Okay, so what came out is there is a PMO structure. So what I've got is they've got their project management team, which is running all the projects or whatever the companies does. And for this project they've got your analysts almost dedicated to that project and are not operational guys. But I think your question is interesting because, in terms of change management, you have got a team doing it, how do you almost take along the operational team along with you because they're continuing their lives.

AM: Again, what I have seen numerous times is that the guy on the ground understands the process better and is running that standard operating procedure on a daily basis and you've got the opportunity now to improve that in terms of the staff he has to do manual workarounds? How do you involve him covering both project team and change management?

TM: Yes. It comes out on the change management side in terms of the stakeholder management but I need to change to give the theme of what and how they have done instead of what they should be doing. Okay, perfect. A.

AM: All right, next is project documentation. You should also give the result of the interviews instead of what they should be doing.

TM: Okay. Change management.

AM: So I like this. The change management one was, at least what came out here, none of them were successful it seems. Or maybe it was clear in the content, not in the theme, so it was just

make sure that it come out that change management was unsuccessful and what the reasons were.

TM: Yeah. Okay. I think it very clear now. I need to put the result instead of what I was almost putting what, what should happen instead of what came up. Thanks for that.

AM: Yeah. But this was cool. I enjoyed this. This was the change management, but it is again, it is like "next time I will stop at the traffic light", but why did you not do this time?

TM: Yeah, I think it is the doing part, which is the problem with change management. Okay. So what came out of training is training is you can do it, but it's not always enough.

AM: You see your sentence is now correct. "Most of the respondents conceded that little training was conducted in the implementations". So even the next one

TM: Okay, cool. Even the dry-run part. Okay. System testing I think is the same thing. Maybe this is a question for you to say, okay if you test but you meet new stuff when you go live, is it because you have not tested enough?

AM: What did they say? So my opinion is you cannot test everything otherwise you are not going to go live. Okay. That is my opinion just like Dean is always saying; "you have to take it out of the lab". But we have a new saying now: “critical processes, functional completeness”. Some call it the “happy path”. That is the core process that must be tested and then you must make sure all the functionalities. But if there is functionality missing, you've got a problem. Your critical processes must work and your functionality must be complete. That is the goal.

TM: So you almost say agree with that here will always be those exceptions that you must expect at go live?

AM: Yeah, I am interested in the dry run. Do they do a dry run. Is it set the policy for them to do dry run?

TM: Yes, but there were reservations from other parties that did not cover all possible scenarios since it is done in a controlled environment.

AM: I mean if you can practice it all the time then that is great. But I would just say just state the fact that some guys are actually doing dry runs and giving a benefit, but there is reservations from the participant. You must be careful there not to make it a big paragraph again.

TM: Okay. Go live. Everyone need issues with their go live. All the participants raised the challenges in their respective implementation goals with reasons including poor project planning, inadequate training, and insufficient change management.

AM: That is referred to at the top. I mean the reasons are there. That is fact so I think that is okay.

TM: Okay. Cut over. Plan. I need to change this one.

AM: Yeah. This looks like a definition. It is totally out of this. How did they do it? How long was it? Same on the rollback plan. I would like you ask about the rollback plan if they had one.

TM: Yes. Only one had.

AM: Okay, so now it is important that they had one. In the software world, it is critical to have a rollback plan. So you can actually include this in your discussion and they are not complying. So, in my mind what our media is, which is cool actually, is we are sitting with a mature audience that understand the importance of a system where the process is not really changed but the tool is just upgraded, but they still miss critical things like that roll back plan. Okay, is it because there are over-confident what is nice, it will give you in your chapter five a nice comparison with all software best practices.

Speaker 1: Okay. The next point under Go live activities I called Business Intelligence.

AM: I was struggling to understand what you are trying to do there. What was the question about BI?

TM: Okay. So, it's around at the point of go live no one had visibility around the progress of the stock take on process to compare the initial stock value in their ERP to ensure that it matches what they have counted or received in the WMS.

AM: I am happy with this. I just wanted to confirm the rationale.

TM: Should i maybe rephrase it?

AM: I would call it BI availability, because now I have go live activities and BI availability. Okay, now it actually makes sense. I mean I made the same conclusion as you did, I was not convinced myself hence I needed to confirm. Okay.

TM: Okay. Next is handholding and stabilisation. I am already seeing that I need to rephrase my theme there.

AM: And I think the content you have at the top is quite good. I mean, this guy's told me specifically like 3 weeks hand-holding. Where did you talk about the Skype thing?

TM: That is company C

AM: So what I liked about that is, you know, if you look at ITIL you have the build, transform and operate stages and in the transform stage, which you are talking about, you, must have a direct interaction. So you can also include the ITIL process in your discussion. I am sure for all these guys, this was their best period; the handover and stabilisation.

TM: Okay, the last one. Access to WMS experts. All respondents underlined that they had challenges in getting the WMS experts transferring knowledge to their internal resources and that it is necessary to have a process in place to ensure that such knowledge transfer happens.

AM: So what I read from this one, if I recall now, it was that they tried you know. They tried to get access to the experts and, but they were hampered. So in this case, I would also mention that all or some of the respondents made an effort to get the experts to help in transfer of IP as well as mentioning the reason they failed.

TM: This is the end of our interview. Thank you very much for all your inputs. They are really appreciated.