

THE INFLUENCE OF HUMAN PERCEPTIONS AND CHARACTERISTICS
WHEN IMPLEMENTING ELECTRONIC SYSTEMS: A FRAMEWORK OF
CRITICAL SUCCESS FACTORS

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A research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Engineering.

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Declaration

I declare that this research report is my own work, submitted with the permission of the bank in question, who was my employer at the time of initiating the proposal. Assistance was provided by the change management project resources in conducting the survey assessments during the project which serves as the case study.

It is being submitted to the degree of Master of Science in Industrial Engineering to the University of the Witwatersrand, Johannesburg.

It has not been submitted before for any other degree or examination at this or any other university.

Thinus Mentz

_____ day of _____ 2017

Abstract

Following the involvement in a project where a bank implemented an electronic inventory management system, a need was identified for further research into the human elements influencing the success of such projects. An initial high level study of some available literature supported the idea of human factors playing an important role. The subsequent research question formulated was:

What are the major human factors that influence the implementation of electronic systems to replace their manual paper-based counterparts, if any?

From literature the major human factors to be analysed were identified as:

- Leadership
- Communication
- Environment and culture
- Change readiness

By employing a mixed method research approach and analysing the change readiness assessment surveys, post-implementation surveys, project team observations and site key performance indicators (KPIs) of 3 implemented sites, these were all confirmed as factors influencing such implementations.

These conclusions were graphically depicted in a proposed framework showing the relationship between leadership as the driving factor to influence culture and change readiness through communication.

To my family and friends who encouraged me to see this through and Jesus who
has made the way for me.

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Nomenclature

ATM	Automated Teller Machine
CBRF	Central Bank of the Russian Federation
CC	Cash Centre
CIT	Cash in Transit
ECM	Electronic Cash Management
EHR	Electronic Health Records
EPOS	Electronic Point of Sale
FOREX	Foreign Exchange
FTE	Full-time Equivalent
GM	General Motors
HAS	Human Activity System
HSTB	High Speed Teller Balancing
ING	Internationale Nederlanden Groep (International Netherlands Group)
ISA	Inventory Supply Accounting (Software developed by DeLaRue)
IT	Information Technology
KPI	Key Performance Indicator
MIT	Massachusetts Institute of Technology
P4P	Pay for Performance
PC	Personal Computer
PCD	Process Control Document
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
POS	Point Of Sale
Prepper	Teller preparing deposit to be counted
SARB	South African Reserve Bank
UAT	User Acceptance Testing
UK	United Kingdom

1. Introduction to the Research

1.1. *Research Context*

A South African bank embarked on a programme to improve the management and control of cash flowing through its network. This included the implementation of an electronic inventory management system in the network of multiple cash centres. These cash centres feed into branches and ATM's for the recycling of bank notes and also orders from and returns notes to the South African Reserve Bank (SARB).

The implementation was partially enforced as a regulatory requirement from SARB as the governing body for cash flow in South Africa, but it was already a proven solution delivering a number of benefits where implemented in other countries and across different industries.

The goal of the system was to replace the old paper-based processes, which were considered as time intensive and ineffective, lacking in consistency and accuracy. This was believed to be part of the indirect costs of remaining with a legacy system overdue for replacement and still completely manually driven through tasks performed by people who also proceed to recapture the results of these tasks. The application of this technology was seen as the appropriate response to try and achieve the operational benefits of visibility, traceability and improved productivity in this environment.

1.2. *Purpose of the Study*

The scope and purpose of this research report was defined to investigate the human factors critical to the success of implementing electronic management systems. This was based on early involvement in planning the mentioned project, which served as the case study to this research along with the high level literature study done.

The expectation was that certain mutual indicators exist in similar implementations that could serve as warning signs of potential issues to be addressed as part of the project preparation. These would then serve as factors to increase the likelihood of achieving success through these implementations.

It was believed that these indicators would be aligned to the principles and best practices which are needed for the successful implementation and prevention of potential future problems. These were expected to be noticeable as well and the aim was to document them as they are identified and verified.

1.3. High Level Background to the Research

1.3.1. Literature Background

A literature review was firstly done to look at theory and past research, as described by Page and Meyer (1). From this initial high level literature review it was found that systems with similar characteristics and objectives as the case mentioned in the banking industry are implemented in a number of industries (2), ranging from service providers such as hospitals (3,4,5) to production focused environments in manufacturing (6,7,8). These systems are based on information technology and aim to manage and enable the process while providing management information and visibility (2,9,10).

Although these industries and applications differ, universally applicable questions relating to the contributing success factors to the implementation of such systems arise (11,12,13). At a high level the implementations referred to across all these environments, all deal with the application of information technology in the form of a system to be used by human end users as part of their daily process, essentially re-engineering the previously implemented paper based processes.

Peter Checkland defined the concept of human activity systems as part of soft systems methodology to address what he described as type 3 systems, where interconnections are cultural and situations are dominated by the meanings attributed to their perceptions by autonomous observers (13). This freedom to

attribute meaning to perceptions has special importance in would-be-problem-solving interventions in human affairs (4). The challenges and difficulties encountered with human activity systems and bringing about sustainable change are common across all these different areas (11,13,14).

Due to this universality and complexity when people are involved, the research question to be answered was formulated. It was concerned with the influence of human behaviour and characteristics when implementing electronic systems to replace manual paper-based systems, with the hope of developing a proposed framework of critical success factors.

Promoting a culture of employee participation, ownership and involvement of all resources even to the level of planning and implementing improvement initiatives, is needed for sustainable improvement and implementations (7,12,15). This is contrary to an approach encouraged around 100 years ago that leaned towards the structuring of work through controlled effort levels and deskilling. This is referred to as Taylorism and the “don’t think, just do” message given to operators in certain environments (16). Viewing people as the most valuable asset of a company and worth investing into carries weight in order to support a sustainable future for the company (17).

The visibility of management’s support and clear communication channels are stressed by multiple sources as top factors influencing the success of a project (18,19). Communication is also necessary to influence or manage abovementioned factors such as culture and perception, along with giving an indication of the management and leadership exercised (11,12).

1.3.2. Case Study Background

A total of around 7 sites were planned as part of the bank’s improvement programme to implement an electronic management system around the country in South Africa. The approach followed by the project team was to perform the

relevant planning and assessments on each site respectively, followed by the actual implementation of the site. These were initiated one by one.

Of these 7, only 3 fell within a reasonable time frame and scope of work for the purpose of this research project. The implementations were however approached for the business benefit with continuous learning and improvement in mind and not as controlled experiments.

Surveys were developed by the business to gauge the readiness along with the bank's aim of continuous improvement. The data gathered from these surveys were used with the required permission as a participant observer, employing a case study approach in this research report. The data was used as secondary data and the surveys were not specifically designed with only this report in mind. The focus areas in the survey were compared to proposed focus areas based on findings from the literature study to verify the relevance to this research report.

1.4. Research Question and Objectives

The research question subsequently formed was: *“What are the major human factors that influence the implementation of electronic systems to replace their manual paper-based counterparts, if any?”*

In order to answer this question, the following objectives were set out:

- Determine from literature what the critical success factors are, pertaining to the human elements involved in implementations such as the case that lead to this research
- Evaluate the case study implementations to confirm the presence of the identified success factors and determine their influence on the project success based on performance KPI's and observations
- Document the findings and arrange success factors into a proposed framework if possible

1.5. Limitations and Assumptions in the Research

It was noted from the outset that the small number of cash centres, being the units of analysis studied, could not deliver an absolute picture across different industries for all implementations of a comparable nature. It would simply serve as an introduction and confirmation to a certain degree of existing theories.

By monitoring the progress and benefits in a shorter time period, along with the immediate response from directly involved stakeholders, the required information was collected to complete the study. Results and findings obtained were consequently viewed with this in mind, knowing that the aim of the business project was not just to realise short term benefits. The time constraint prohibited the long term evaluation of operational sustainability and the conclusions drawn from short term observations and performance trends could only be assumed to be indicative of the trends for future sustainability.

As mentioned, the surveys used for data collection were based on the data gathering requirements of the business and not designed with this research report in mind. These were however compared to findings from the literature to determine and confirm the relevance of the information gathered to this research report, as described in more detail in the methodology section (chapter 3).

The use of qualitative research methods are acknowledged as including certain interpretations of results. As Creswell noted, “Qualitative research is a form of interpretive inquiry in which researchers make an interpretation of what they see, hear and understand” and these interpretations are influenced by their own background and frame of reference (20). With readers of the research report, the researcher and participants all bringing their own interpretations to the table, multiple views of a problem could be expected to emerge (20). This places some bias on the repeatability of the research to achieve the same results and conclusion. In order to mitigate this risk, detailed steps on how themes were coded and conclusions made are included in section 3.7.4 where the qualitative analysis

approach is explained in more detail, as well as sections 4.2 and 4.4 where this analysis approach is applied.

Another potential risk taken into account was the rapid growth of technology. The manner in which people respond to and interact with technology is ever changing, due to the exponential growth in all aspects of general life. This affects the degree to which the findings of this study would be relevant in the future. The assumption made in this regard is that the inherent effect of technology perceived as new by stakeholders and users will have the same influential factors.

1.6. Approach and Organisation of the Research Report

This report is structured to firstly present the context and background by means of an introduction to the overall research, as well as literature review and case study. The purpose of the research as well as the structure of the report is also stated in this introduction.

The literature review is then expanded further to review similar implementations, focusing on a number of case studies in detail before drawing a summarised conclusion. Relevant disciplines and principles are studied to serve as the foundation from which the overall research and main case study are approached. From the investigation of these respectively, the factors to serve as focus areas for the case study are identified.

Taking this conclusion from literature into account, the final methodology and approach is then expanded on in detail, specifying the steps to be taken to achieve the purpose and aim of the research. The research question to be answered is reiterated as the goal to be attained.

The case study is described in detail before the results of the pre- and post-implementation surveys are presented, initially as raw data results. This includes the open ended textual data from surveys as well as the documented project team observations.

The analysis of these results follows. The consolidated data is converted into a more manageable visual presentation through the use of graphs for the analysis of trends and comparisons between sites. The statistical analysis of these results follows to determine the relationships between the identified factors. The site observations documented by the project team are then consolidated and organised into major themes to serve as critical evaluation of the relevance of the data. The investigation into the key performance indicators (KPI) measured at each implemented site hereafter aims to study the success and benefits achieved, as opposed to the expected outcome. This data is also converted to line graphs showing the trends over time against the benchmark from non-implemented sites.

The results and related analysis are then discussed in detail. The assumptions and shortcomings of the research is firstly revisited and expanded on before discussing the identified focus areas in detail. As part of the discussions, theories for the causes and relationships are proposed and tested in relation to other results and analysis elements, in some cases confirming the theoretical conclusions made. The relationships observed in the correlation analysis are also discussed followed by the KPI measurements used for gauging success.

The final conclusion and recommendation aims to summarise the outcome and address any shortcomings or further research to be proposed. The aforementioned literature review and case study findings are reconciled to setup a proposed framework. The intention of the framework is to facilitate the application of findings from this research to future implementations of a comparable nature.

The report is concluded with references to source material used. The appendices containing the surveys used for the collection of information, tables with responses to open ended questions, detailed results of the statistical analysis of responses and the table detailing the comparison of performance indicators follows.

2. Literature Review

To determine the broader relevance and universality of the case at hand, research was conducted into similar implementations. This was considered necessary to assess whether the findings would be applicable outside of this specific case, but to also evaluate the relevant principles and theories derived from similar implementations.

2.1. *Similar Implementations*

Research revealed that similar implementations of electronic systems to replace manual processes have been undertaken in different industries, including healthcare (3,4,5,21,22,9,23,24) and financial institutions (2), achieving varying degrees of success (7,8). Some of these cases have mutual characteristics in common with the mentioned case in the banking industry, especially in also being system implementations dependent on the buy-in and perception of the end users involved (2,22,9).

In all of these cases, the systems are operated by human end users, who can make mistakes or wilfully choose to ignore guidelines for using it (3,5,21,25). This would mean that the success of these systems are closely tied with the acceptance and use thereof by its human operators (5,11,13,10). System acceptance or resistance is based on internal factors to users or external system related factors (26,27). It can be sabotaged to fail from the onset, even by a minority group of individuals (5).

One reason for systems not being accepted is that they might be perceived as a threat to the future of the operators' jobs (28). A potential reason for this perception would be that a number of projects in the past aimed to introduce efficiencies and ultimately reduce the headcount required to meet the same demand or produce the same level of output (2,4,12). Another would be that the benefits are not communicated or understood well enough on the floor (28). The result of this is that not enough incentive is then given to patiently endure the

teething period that most such systems go through after implementation before yielding the stated benefits (12,26,27,28).

On a high level, the purpose and goals of these systems are similar, as a source of readily available, accurate information to enable effective management and informed decision making (2,29,9). This ability to measure every part of a system or process has become an integral part of meeting ever growing requirements of reporting (10). In many instances this also forms the basis of growth for companies, driving process re-engineering as well as the benchmarking tools for continuous improvement in order to remain relevant and competitive in the modern day global market (2,4,30,31).

Investigating some of these applications in detail shed some light on the nature and expected benefits along with the universality of the characteristics and elements influencing such projects.

2.1.1. Application at financial institutions and financial departments within organisations

Documented cases of services provided by De La Rue, a company involved in cash handling hardware, software and improvement projects, to the Central Bank of the Russian Federation (CBRF), ING Group Financial Services in the Netherlands and Manchester United football club based in the UK revealed certain similarities in these system implementations (2).

Each of the respective companies was involved in cash handling and processing like the case study conducted in the bank, in albeit different business sectors, with similar problems of inefficiencies and lack of management control (2). The problems experienced stemmed from the fact that cash was traditionally processed manually, in a time consuming fashion prone to discrepancies as seen in other industries as well (2,7). This was likewise also the case in the bank where the new inventory management system was implemented in the case study. The required

objectives from the respective companies that lead to the initiation of the system implementations and subsequent selection of the service provider were (2):

- To increase the efficiency of processing cash and productivity of resources
- To restructure cash processing networks and standardise processes across
- To provide a level of control and ensure the security of the system
- To improve the visibility of information for management decision making and audits

The quantitative benefits achieved from the successful implementation of these solutions met expectations and requirements (2). The throughput rate was increased significantly through the re-engineering and simplification of the process and in 2 of the 3 cases this translated to a headcount reduction and a notable cost reduction to the businesses (2). The reduction of discrepancies eliminated the need for overtime to resolve these, enabling cash in transit (CIT) companies to pick up cash within normal business hours and subsequently reducing additional CIT costs (2). The number of transactions reduced as well for one business, decreasing bank charges (2). The time required for preparation was shortened, saving time in cashiers' readiness to receive floats and detailed, undisputable management reports on the flow of cash made this more manageable as well (2). An additional benefit achieved was that the operators now took more pride in their work and the use of technology perceived as sophisticated resulted in the position of a cash centre operator becoming a more respected occupation (2).

The more qualitative benefits recognised by the Manchester United management team included the development of a disciplined structure which could be adhered to, protection of staff through visibility, reduced security risk of being able to move cash quickly, transparent processes, automated acknowledgements and pre-advisements of activity (2). This is in line with other implementations of similar natures (7,8). All of this gave management more confidence that cash was indeed

being managed accurately and professionally based on the required trust in the system (2), as was also described by Fields (30).

The success of this specific implementation was acknowledged and verified, with Manchester United receiving the reward for Best Use of IT Systems in the Hospitality Environment in June 2007 (2).

In this case the importance of timing and change management, specifically demonstrating the expected outcome to show positive benefits to the users required to work with the new processes, was recognised (2). This aligns with Baronas et al stating that the skill of communicating the change and linking it to users' experiences is even more important than the actual change (32). Creasy et al also confirmed frequent and open communication around the need for change as a top contributor to successful change management (12).

The importance of team work and understanding the requirements of all parties involved and affected beforehand was also deemed a critical success factor (2,27). One business acknowledged that this required a change in their business culture, to accept and support a more controlled approach, as well as defined processing methodologies (2).

2.1.2. Application in the healthcare industry and public sector

In the same manner as which information technology has changed the way the financial services industry and others approach business (2,29), the health care industry has also been affected (3). The introduction of Electronic Health Records (EHR's) has enabled the storage of historical and current documentation pertaining to health, tests, referrals and medical treatments (5). It also serves as a platform used by medical practitioners to order tests and medications electronically as noted by the Journal of General Internal Medicine (5,9,33). One of the major drivers behind EHR's is their ability to make data more readily available and readable, thus improving communication between different physicians and with customers and reducing the number of errors occurring

(3,5,21). This correlates with the requirements and needs identified in the financial services industry mentioned (2).

Except for the process management aspect of these EHR systems, there is a knowledge management component, which includes in some cases having access to research conducted in parallel along with other medical data (25). Brooking defined knowledge as information in context with the understanding required to apply that knowledge (34). Similar to the healthcare industry, some businesses also view knowledge as a source of competitive advantage and the management thereof through the use of systems has grown internationally (35,36). Arntzen Bechina et al studied the application of such a knowledge management system in the public sector and confirmed a number of critical success factors to the implementation (35) in line with what Laumann and the National Academy of Engineering documented (37):

- Leadership
- Employee involvement
- Training
- Incentive systems
- Organisational structures
- Technological characteristics

These six factors relating to people's involvement in the implementation of new technology in an organisation, is believed to determine the culture, subsequently facilitating or discouraging the process of introducing technological change (37).

There are a number of differences between transitioning from paper-based or legacy systems respectively though, as published specifically pertaining to electronic health records (EHR) in the Journal of General Internal Medicine (5).

Leaders in paper-based systems tend to prioritise the following (5):

- Sufficient workstations and printers
- An on-site physician stepping into the role of IT champion
- Workflow education
- Advanced comfort level regarding IT among practitioners and support staff

These relate mostly to the factors of leadership, even though more at a ground level, training on the processes and IT as well as technological characteristics when referring back to the success factors mentioned above.

The aforementioned argument for an on-site IT champion reflects similar thoughts published in Informatics in Primary Care about the importance of a well-trained local data manager to maintain data quality (9). Except for the technical requirements of this role, good communication skills are also vital to perform regular surveys of data quality and to investigate and uncover user problems similar to other industries (12,9,26,38). Laumann et al observed that even stakeholders with a common interest in the implementation of a technology often do not meet together and communicate (37).

The significance of end user skill and comfort levels is seen in cases studies of similar system implementation projects in the healthcare industry where the transition is made from a paper-based system (5,9). Studies into the implementations of electronic health records systems repeatedly found local leaders to emphasise the importance of a local IT champion and the comfort levels of users with the system and similar technologies (5,9). This is usually found to be directly proportionate to the competency and degree of comfort with regards to technology and IT in general of each individual user and then of the team leader or super user (5,9).

EHR-based leaders on the other hand believe that IT proficiency and changes in the workflow are easily overcome and tend to focus more on (5):

- Improved technical training and on-going technical support
- Sufficient protection of patient privacy
- Recognising resistance among physicians

Referring once again back to the success factors listed above, based on the studies consolidated by Laumann et al, these priorities still focus a lot on training, but also on the softer elements touching on employee involvement (5,37). These hospitals moving from legacy EHR systems, having already made the transition from paper-based processes earlier, recognised the significant impact of physicians' influence and their resistance to change (5). Dillon shares similar thoughts on prioritising user acceptance, mentioning the focus of researchers to try and minimise resistance in the process of design and implementation of systems (26).

External influences to encourage buy-in are however often negatively received and many place emphasis on alternative internal options of influencing, also referred to as social contagions (39). As a professional community they often view external controls as threats to their freedom and independence (4). In medical circles, physicians tend to rely on their peers to be notified of new technological advances (39) and in such closed social groups, the use of so called thought leaders and the existing social structure to influence perception and promote acceptance is encouraged (4,22,39,40,41). The significance of this buy-in or acceptance relates closely to the culture of participation and ownership which is to be established, as mentioned by Creasy et al (12) and Vaughan (27).

In either case the support of such a system should be prompt and effective in order to encourage sustainable use and support of the system according to Fraser et al (9) in agreement with Ginzberg (10) and Dillon (26). Both also note that stakeholder buy-in gained through training and change management campaigns can easily be lost if users have to revert back to the old manual processes (10,26).

These campaigns focus on the benefits that can be achieved with the system, but will not be trusted if the system is unavailable or inefficient (10,26). A number of pitfalls encountered during the implementation of these EHR's are listed by Fraser, Biondich and company (9). These include the following user related problems which tie in with the factors of employee involvement, training and technological characteristics mentioned above (37):

- Insufficient training of users
- Lack of involvement and input from local staff in design and testing phases
- Lack of perceived benefit for users who collect and capture the data
- Dependence on one individual as the 'champion'

A number of the user problems identified above are directly or indirectly related to the involvement and buy-in from an end user's perspective which only follows the prioritisation flowing down from an executive or management level (12,10,26,38). In accordance with the mentioned perceived benefit and complexity, Dias also confirmed that the perceptions of the following three factors are major motivations for the use of information technology (42):

- Usefulness
- Ease of use
- Enjoyment

These perceptions can only be managed through leadership and communication. Laumann et al refers to leadership as the small group responsible for initiating the change, committing resources and establishing the cultural framework for the implementation (37). This also includes providing support throughout and communicating the shared vision which would include certain benefits (37).

Enabling users to become familiar and operate a new system effectively a number of training interventions and learning material is normally utilised (5,12).

Dependent on the complexity of the system and the role to be fulfilled by the user, their ability to learn and understand would play a major role in equipping them (5,9). The ability to refer back to material and convey this information to newly recruited employees receiving on the job training after induction is also important (22).

The frequency at which these methods are discussed point once again toward the universality of the issues encountered when buy-in, support and ownership lack from the users' side (5,12,26,27).

2.1.3. Conclusions from similar implementations

The objectives behind efforts to replace manual paper-based processes through the implementation of electronic systems prove to be very similar across different service industry sectors such as financial services, public sector and healthcare as referenced above (2,5,9,10,29,31). From these efforts, the major benefits to be achieved relate mostly to the availability and visibility of accurate information and more often to efficiencies and productivity in the cash handling environments studied (2,5,9,10,27,29).

It is also used as a tool to attempt to drive a change in behaviour or culture in some instances, but usually towards the end goal of productivity and visibility of information (2,4,7,22,31,39). Without an understanding of the purpose and benefits of the system down to the operational level though, as it affects end users, change management activities have little to no foundation to work toward making it a sustainable change, making effective communication the foundation for any change (12,27).

The stakeholders are also comparable, with a management level, end users and customers being affected (12,26). The challenges surrounding buy-in from management as well as support and ownership from end users are relevant in all these industries (12,10,26,27). The views of management or the company determine the level of support and the perception of the system is also tied in with

their view of their own roles and responsibilities (5,11,12,10,26,38). Training to enable operational, as well support resources is essential, with different levels of relevant skills being brought to the table by the group of resources as well as perceptions and expectations (3,12,17,27).

The major recurring factors from these cases relating to the stakeholders as the key to successfully implementing the system or change can be grouped together under the following (12,10,26,27,37):

- Leadership and communication
- Employee involvement and buy-in
- Training
- Organisational structure

The nature of these implementations is to be run as projects as opposed to business as usual by frontline operations (2,9). The disciplines of project- and change management would then be expected to play a role (19). With the impact and major areas of change generally being the operations business units, operations management as a specific discipline is also identified to be worth studying in further detail (27).

2.2. Disciplines and Principles

In all of the abovementioned industries where systems with similar purposes and characteristics have been implemented, management principles and best practices identified over years of experience are also relevant. These system implementations are managed as projects and involve a change that is brought about in the operational environment. For this reason literature on the disciplines of project management, change management and operations management were specifically reviewed. Psychology, behaviour and leadership were also of interest, with the focus of this research being on the human factors involved.

2.2.1. Project Management

The types of implementations of electronic systems discussed adhere to the definitions of a project, as set out by the PMBOK and Prince2 approaches (18,19).

A project is defined as a temporary endeavour or organisation with a definite beginning and end, aiming to create a unique product, service or result as agreed beforehand (18,19). The characteristics distinguishing a project from everyday business as usual are (18):

- Introduction of change
- Temporary nature
- Cross functional teams
- Every project is unique in some way
- Risk and uncertainty

Environmental factors that can enhance or constrain the project include the following at an enterprise level (19):

- Organisational structure, culture and processes
- Existing human resources
- Stakeholder risk tolerances
- Organisation's established communication channels
- Project management information systems

In research done by The X-Pert Group, specialist project management consultants and academy now known as All About X-Pert, studies found that the top 5 contributing success factors in projects were the following in 2008 and 2010 respectively (38):

TOP 5 FACTORS (2008)

- 1. Communication between team and customers.**
2. Executive support.
3. Handling of change.
4. User involvement.
- 5. Clarity of business objectives.**

TOP 5 FACTORS (2010)

- 1. Communication between team and customers.**
2. Communication between Project Team members.
- 3. Clear business objectives.**
4. Clear requirements definitions.
5. Good understanding of users needs.

Communication between team and customers are seen to be rated as the top influencing factor in both years, with communication between project team members rated as the second highest factor in 2010 (38). This emphasises the importance of communication within the project team as well as with stakeholders.

2.2.2. Change Management

Any project aims to bring forth an agreed upon desired change as its result (19). Inevitably this change will be met with mixed responses by the stakeholders affected if not managed closely from the start (11,27). These stakeholders hold a great influence in the degree to which this change is sustainable and if the required result and subsequent benefits are fully achieved as planned (11,19,38). Laumann states resistance as being the opposite of employee participation and expands that resistance occurs when the need for the change is not understood well (37). When employees actively participate in the decision making process however, it creates a sense of ownership over the change (37).

Jellison developed a 5 stage model based on the J curve, describing people's performance, thoughts and emotions through this process (43). The 5 stages mentioned, are static quo, the plunge, bottoming out, gaining control and mastery (43). The below diagram depicts these 5 stages as they are experienced over time and the impact of overall performance and perceptions (43):

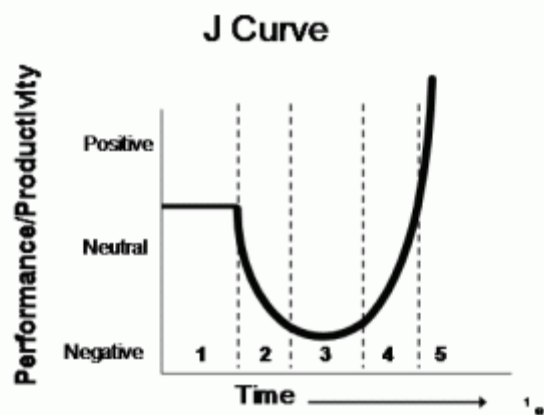


Figure 1: The J Curve of Change (43)

In a study done by Prosci, to document the lessons learnt from practitioners and consultants in the area of change management, the top 5 greatest contributors to success were documented as (12):

1. Active and visible executive sponsorship
2. Frequent and open communications around the need for change
3. Structured change management approach
4. Dedicated resources and funding for change management
5. Employee engagement and participation

Investigation into project success on the three aspects of meeting objectives, staying on schedule and staying on budget revealed a direct relationship to the effectiveness of change management (12). The correlation between the elements was observed in all three cases respectively, but to varying degrees (12).

Likewise in an article published by Effective Inventory Management Inc., Jon Schreibfeder aptly compares the implementation of an information system to painting a house (44). The success of the job is determined by your preparation of the surface before ever applying paint to it (44). If the surface has not been scraped and sanded, even the most expensive paint will only peel off (44). Similarly even the most expensive system will not yield benefits if the operating

model of the business or staff environment is ineffective and have not been prepared (44).

2.2.3. *Production and Operations Management*

This notion of the existing state of operations and environment to be considered as a factor when a change is to be implemented can be related back to the management of operations (12). Projects always impact business as usual in some way, as the need for the intervention to bring about change was identified in the normal operations environment (18,19). For this reason the disciplines of production or operations management must not be ignored in favour of project and change management principles to be applied for the duration of the project.

The capability maturity model as originally developed by Carnegie University (Figure 2) describes the maturity of a process or operations through 5 levels that follow each other (45)

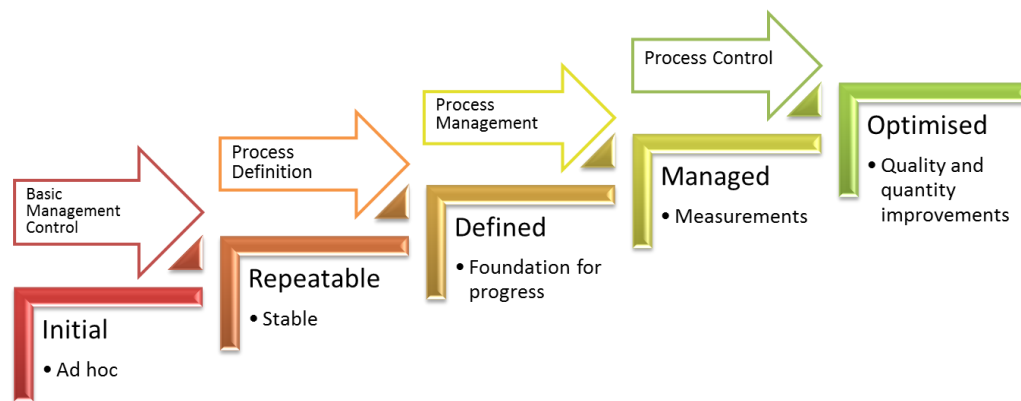


Figure 2: Capability Maturity Model (45)

The respected Massachusetts Institute of Technology's (MIT) Sloan School of Management describes operations management as a discipline dealing with the aspects of design and management of products, processes, services and supply chains including the acquisition, development and utilisation of resources (46).

This management of operations intersects with project and change management at certain stages, especially when changes are introduced in the business (19).

These resources include the workforce, as one of the most important and expensive assets of any big company (8,17,47). Different views exist on how to get the most out of a company's workforce, the ideal level of employee participation and how to approach improvement initiatives though (14,48,49).

In 2008 Toyota overtook GM in vehicle sales to become the world's largest car company according to John Bicheno (7). Toyota's success can be partly attributed to the Toyota Production System, from which the origins of a number of the principles of lean manufacturing can be traced (7). Jeffrey Liker identified a number of principles as central to the Toyota way, including the following (8).

- Creating a continuous process flow surfaces problems.
- Visual control is used to create visibility around problems.
- Only technology that has been proven to be reliable through testing is used and with the purpose of serving the people and processes.
- Leaders are developed to really understand the work, live the philosophy and teach it to others as well.
- People and teams are grown to be remarkable and to follow the company's philosophy.

The emphasis on people as its most important resource and the necessity to further develop employees can be seen in some of these points. This is re-iterated by multiple sources, such as Spear and Bowen stating that Toyota essentially "creates a community of scientists" (17). From managers down to the workers on the shop floor, employees are encouraged to experiment and learn (7,8,17). The resulting improvement recommendations are not enforced from a management level, but implemented at the lowest level under the guidance of a teacher (17).

W.E. Deming made the statement that most problems can actually be traced back to the process and not necessarily the person, as is the general assumption (29). Making this mind shift would enable companies to “drive out fear” and promote “pride in work” and improvement (7). This entails addressing change on all levels of the socio-technical system consisting of machines, technology and people (50). Key aspects to factor in when looking at the social system as part of this change include (7):

- Work organisation
- Responsibilities
- Performance measurement

The challenges and difficulties encountered with people as part of these complex systems are common across all these different areas as suggested in Peter Checkland’s approach to systems engineering (11,13,14). Peter Senge proposed a number of system laws, which aid in comprehending systems and dodging implementation pitfalls (50). These include among others:

- Faster is slower
 - Buy-in must be obtained, even if it takes time, in order for deployment to be successful.
- You can have your cake and eat it too, but not at once
 - Short lead time, high quality and low cost can be achieved, but this will take time.
- There is no blame
 - The importance of starting with the process and not the person.

Acknowledging the significance of people as an asset to a company and their impact on any system, their characteristics as role players were also deemed worth studying further.

2.2.4. *Psychology and Behaviour*

The inherent qualities in humans, surfacing when faced with a seemingly unknown role player such as technology, becomes apparent when looking to studies done in technology sectors (51). The way in which this perception can be manipulated has been documented through various psychological studies (52,53).

Alavi and Joachimsthaler suggested that demographics are one of the most relevant user factors determining the acceptance of technology, along with cognitive style, personality and user-situational variables (54). This relationship was however found to be weak and dependent on other situational factors (54). Age and education was identified as the main contributors nonetheless, with higher education and lower age showing the most positive results (54).

In a study investigating computers as social actors and the seemingly automatic responses triggered in human users, Fogg discusses the persuasion dynamics or social influence involved (51). The 5 primary types of social cues identified are (51):

- Physical
- Psychological
- Language
- Social dynamics
- Social roles

The attractiveness of a technology or interface can result in the halo-effect, just as is the case with humans (52,53). This means that users tend to assume the product to be intelligent, capable, reliable and credible based on its appearance (52,53).

The principle of similarity also plays an important role, as proven by experiments designed to focus on the aspects of personality and affiliation conducted at Stanford in the mid 1990's (51). People with personalities on the extreme ends of dominant or submissive were assigned to different versions of the same computer

program (51,52). The program was also designed to be either dominant or submissive, it was found that people allocated to computers matching their own personality types found the interaction to be more satisfying and beneficial (51,52).

Likability and credibility are key predictors of persuasion and were measured to attain this result (52). A second experiment created the perception of affiliation by allocating computers to users, with half being labelled as the users' team mates and the physical appearance also altered to emphasise this (51,52). The other half were not labelled and the study found that the perception of shared affiliation (of being on the same team) meant that these users tend to think of their computers as smarter, more credible and more likable (51). Similarly, people not only form perceptions of technology, but also relate to their co-workers and organisational environment based on their background and value systems (55).

The psychology behind social and cultural value systems has a strong influence on relationships within an organisation (56,57,58). Four of the significant dimensions mentioned by Hofstede are (55,56,59):

- Power distance – The acceptance of inequality or expectation of equality in power
- Uncertainty avoidance – The level of comfort with uncertainty and the unstructured or unpredictable compared to valuing certainty and conformity
- Individualism and collectivism – The degree to which social networks are knit together and expect people to look out for themselves or one another
- Masculinity and femininity – The preference of achievement, heroism, assertiveness and material success compared to valuing relationships, cooperation and quality of life

Daft emphasises how the way that leaders handle these cultural differences has a tremendous impact on the satisfaction and effectiveness of employees within an organisation (56).

2.2.5. Leadership

Leadership can be difficult to define, as it means a lot of different things depending on someone's experience and perspective (11,60). One such definition of leadership is simply making something happen, that would have otherwise not happened (11). From the literature on similar implementations, leadership was mentioned as an important factor in managing change and the cultural framework in which it happens (35,37).

Organisational change is deemed impossible without leadership bringing the external environment together with the organisation's mission, strategy and culture through the vision (11,56,61). This reiterates the emphasis of some definitions that leadership is an influence relationship between leaders and followers who intend real changes and outcomes that reflect their shared purposes (60,62).

Weisbord's six box organisational model (Figure 3) is a graphical representation of the questions he asked in the process of defining an organisation (11,63).

- Purposes: How clear are organisational members on the organisation's purpose and mission and how supportive are they of this?
- Structure: How well does the organisation's purpose/mission fit in the internal structure designed to achieve this?
- Rewards: What are the similarities and difference between perception of and the actual causes for reward and punishment?
- Helpful mechanisms: Which processes and procedures in the organisation assist or hinder member in performing their work?

- Relationships: What is the quality of relationships between individuals and groups, as well as between a person and his/her job? Are the conflict resolution structures adequate?
- Leadership: It is the leaders' responsibility to monitor and maintain balance between the other 5 boxes in the model

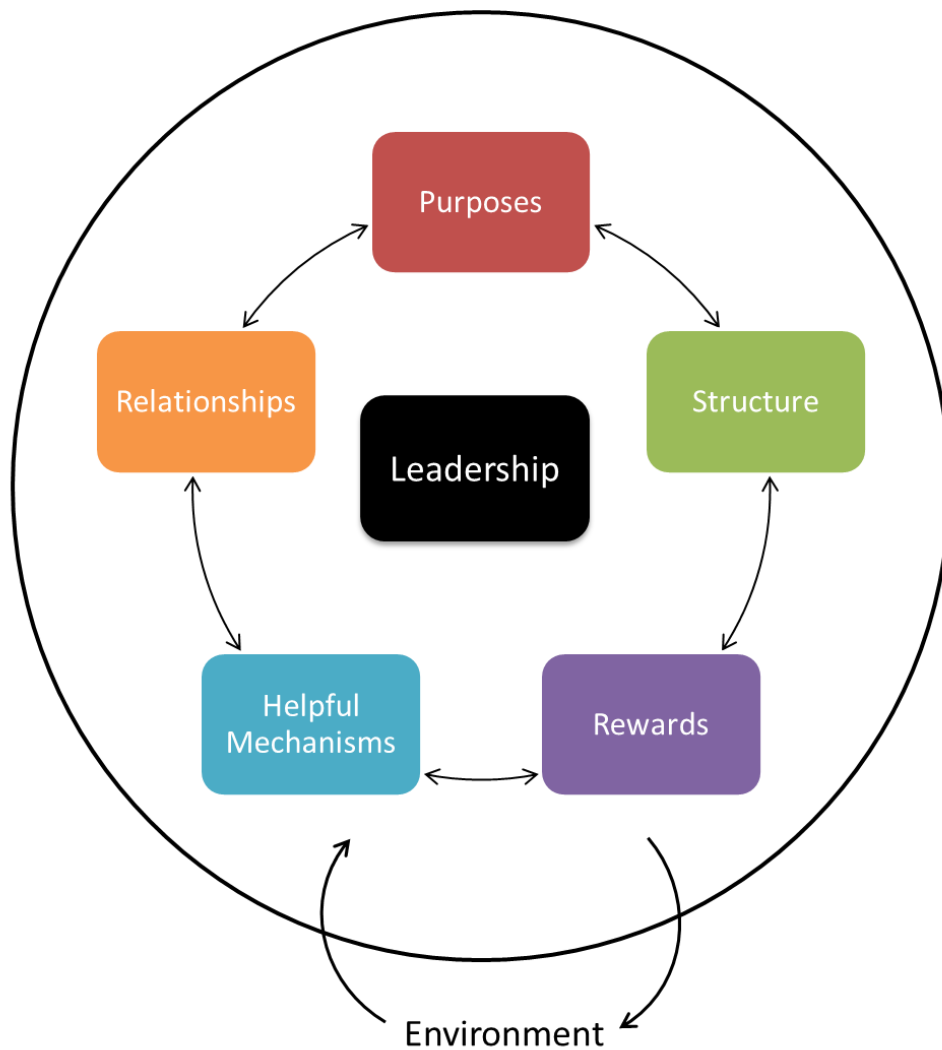


Figure 3: Weisbord's Six Box Model (After Weisbord 1976 (63))

This model depicts leadership as the central element, to a degree maintaining and holding the other components mentioned in place, in agreement with Burke's description of a leader being the captain of a ship (11). In line with this, Laumann et al states that it is the leadership that creates the mechanisms to enable and support the other success factors such as employee participation, training,

incentive schemes, organisation design and structure, as listed in the above literature review (37).

The impact that leaders can have on groups is evident in a somewhat simplified sense when looking at history in the military and sports teams (64). This impact can be positive or negative, with the latter rooted in competence or ideals in cases such as Hitler and Stalin (48,65,66). Leaders operate on different levels and in all areas of society, not limited to business and politics or to the executive decision making levels according to Daft (56).

Leadership has been categorised based on the way they relate to these purposes, relationships and structure (11,14), with transformational leaders being more personally and intuitively involved and transactional leaders, or managers, more impersonal and according to roles (67,68). It is however believed that leaders that want to be successful in the 21st century need to move away from the paradigm based on stability and control to embrace the ideas of constant change and the empowerment of people as a business' most valuable asset (56,69,70,71,72).

The role and function of leaders change as an organisation moves through different phases in introducing change according to Burke (11) and Zaccaro (73). The establishment of communication channels and vision, constant communication and clarification of the need for change runs throughout these phases (11,73). An important part of a leader's role is channelling the motivation of employees toward the achievement of goals, which requires good communication skills (56,74,75).

This communication and the success of implementation is however also dependent on the ability to receive feedback as input to decisions as well as confirmation of understanding (47,48,76). Daft notes that regular communication is essential in building trust and commitment to a vision, but this does not happen through words only but actions as well (56).

Nurturing a culture of information sharing in all directions, especially across functional and hierarchical boundaries, enhances communication by building a network of personal relationships with a shared vision (49,56). This develops an open climate, which is essential for the cascading of a vision according to the following 3 natural laws discussed by Wall et al (77) and mentioned by Luthy (78):

- You get what you talk about
- The climate of an organization is a reflection of the leader
- You can't walk faster than one step at a time

2.2.6. Conclusions from Disciplines and Principles

The successful management of projects and change starts with communication and providing vision and clarity on the direction and need for the change even before implementation as referenced above from a number of sources (11,14,26,27,48,61,66,76). This sometimes requires a change in the existing culture and environment to open it up and enable communication channels in both ways (11,56). Various authors mention that such parallel communication allows for the utilization of the people as a business' most important asset as well (11,14,47,49,60,62,74).

This embracing of leadership and not only management to maintain the status quo is essential for continuous change and sustainability in modern times (60,68,69,73,74,76). Not only spoken or written communication are included, but actions and the visibility of leadership as well as noted from numerous sources (66,67,68,73,77). The culture and practices in this regard are related and impact each other as well as the environment in which the change is happening (11,12,14,17,48,61,72,75).

2.3. Summary of Literature Review and Conclusions

Different literature sources support the notion that the preparation activities before actual implementation are just as, if not more important than the implementation and commissioning of a system (8,12,13,18,19,44,38). The way business as usual

is managed prior to implementing a system can play a major role, as this is the foundation on which the project will be built and operational issues will be magnified and tends to become increasingly visible during implementation (7). The stability of operations relates back to the process capability maturity diagram (Figure 2) and having repeatable, defined, managed processes before attempting to optimise as problems can often be traced back to the process rather than the people (29) and in some cases even previously implemented solutions which only looked at a problem in isolation and not holistically (13).

From the study it can also be confidently deducted that certain human behaviours and perceptions can be expected when introducing any change irrespective of industry (12,14,22,26,50,51,78). The management of this starts before implementation, in the preparation phases, and needs to remain continuous to enable the new culture of embracing change (8,44,38).

The culture and environment dictate the effectiveness of communication and the ownership and participation by users as concluded by various authors (11,14,48,49,70). This forms the foundation and linking that keeps the effort focused, with leaders having to take up the responsibility of cultivating an open climate and putting structures and people in place capable of driving this (60,67,68,74,76).

The major recurring human factors of leadership and communication, employee involvement and buy-in, training and organisational structures, summarised from similar implementations (10,35,37), were confirmed when reviewing the aforementioned disciplines (11,12,14,26,27). Based on the literature regarding change management, employee involvement and participation can be divided into the environment and culture, as elements determining the mentioned levels of participation (12,37).

This level of involvement and ownership, along with the required training would support the readiness for the change being implemented (3,12,17,27). Leadership

determines the organisational structure (11,37), which in turn also influences the culture and level of participation (35,37).

Taking this into account along with the literature review, the human factors to be focused on are listed as:

- Leadership – The presence and style of leadership and management as well as the employees' perception thereof.
- Communication – The sharing of information and experience with regards to the effectiveness and culture surrounding communication.
- Environment and culture – The stability of operations, state of morale and relationships as well as the perceived support.
- Change readiness – The expected outcome of training and communication done as part of preparation prior to implementations, leading to a confidence in the project and readiness to embrace the change.

2.3.1. Graphical Framework of Major Human Factors

These human factors to focus on, as identified from the review of existing literature, were arranged into a simple graphical framework. The aim of the graphical representation is however not to create a new theory, but simply to enable further reference and the contextualising of any potential elaboration from the findings and conclusion of this report.

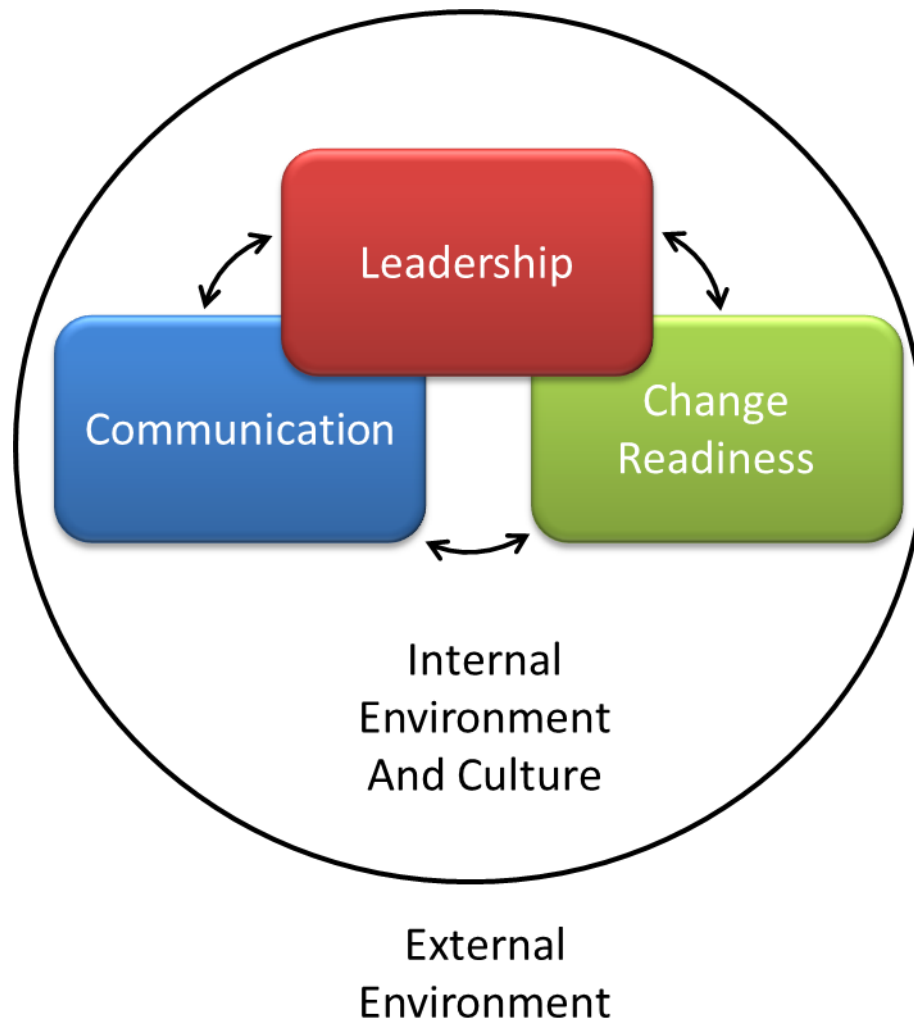


Figure 4: Human Factors Focused On (developed by the author)

The human elements of leadership, communication and change readiness are depicted within the existing environment and culture of the business as influencing one another as well. As seen in this simplified graphical framework, the external environment is acknowledged as a role player, but in order to control the scope of this research it was not included in the focus areas.

3. Research Methodology

3.1. *Introduction to the Methodology*

The research question to be answered as defined in section 1.4 (Research Question and Objectives), is “*What are the major human factors that influence the implementation of electronic systems to replace their manual paper-based counterparts, if any?*”

During the abovementioned project where a bank embarked on the national roll out of an electronic process and inventory management system at multiple sites, the implementations of the 3 different sites were planned with continuous learning in mind. The future sites to be implemented as part of business deployments would then benefit from the lessons learnt at previously implemented sites. This means that these were not set up as experimental trials in a controlled environment. Due to this non-experimental nature of the research it was also not centred on a hypothesis.

As mentioned however, this project played a major role in the motivation behind this research, so the decision was made to apply the literature to this project and include it as a case study in the research.

This research aimed to answer the mentioned research question as a participant observer. Qualitative and quantitative data from the mentioned implementations were used as part of a case study in order to achieve this. The research design is therefore classified as mixed methods, incorporating elements of both qualitative and quantitative approaches (20).

3.2. *Research Process*

In this section the process applied to perform the research is described to give a coherent holistic picture of how the different steps and methods used fit together. These steps are however discussed and elaborated on in more detail in the respective sections referenced below.

To achieve the stated objectives and answer the research question, the following steps were defined as part of the refined research process:

- Identify human factors which impact implementations of electronic systems from literature (see section 2.1)
- Determine the expected effect of these factors within an implementation environment and their relationship with each other (see section 2.2) and narrow the identified factors down to decide on focus areas (see section 2.3)
- Verify the presence of these factors in the case study implementations and if other root causes or interdependent factors are prevalent through surveys and project team observations (see sections 3.4 and 3.5 for more detail)
- Investigate the success of each implementation in the particular case study through the analysis of key performance indicators and project team observations as additional context (see section 3.6 for more detail)
- Test if factors of influence identified contributed to the success of implementations, by reviewing the prevalence and relationships of identified factors in unison with the findings on the level of success achieved in the respective implementations (see chapters 4 and 5 where the analysis is done and discussed respectively)
- Document human factors to be taken into account as critical, along with their influence (see chapter 6 as the final conclusion)

Data was collected by the change management team of the business before and after these implementations through the use of surveys. In order to verify the presence of the factors identified in the case study implementations mentioned, a decision was made to use this available data from these surveys. The survey design and methods employed for data collection are discussed in more detail in section 3.4.

This secondary data along with project team observations documented during the implementations would give insight into the respective implementations. The view taken was that these observations would give more context to data and allow for the confirmation of analysis findings. The method and context to these project team observations as part of the case study is elaborated on in section 3.5.

The success of each implementation was to be gauged through the evaluation of key performance indicators (KPIs) developed by the business and these are detailed in section 3.6. The issues and outcomes documented by the project team throughout the implementation further established these estimations of success.

This approach is in line with Creswell's mixed approach research design selected (20). The bulk of the survey data and KPIs are quantitative in nature, being the numerical sum of responses selected, but will be analysed using descriptive statistics to explore potential theories and compare between sites. The project team observations along with open ended responses in the surveys on the other hand are more qualitative as textual data (20).

The aim is to establish an understanding of the data through exploring it in an inductive style and consolidating towards general themes (20). Creswell explains this inductive approach to data analysis as "building patterns, categories and themes from the bottom up by organising the data into increasingly more abstract units of information" (20). The quantitative side aims to test objective theories through the statistical examination to determine the existence of relationships between different variables (20). The combination of these approaches increases the overall strength of the study according to Creswell and Plano Clark (79). Refer to section 3.7 where the analytical approaches used are discussed in more detail.

Creswell details a number of mixed method strategies, one being the concurrent mixed methods procedure (20). In this approach qualitative and quantitative data are collected together and merged in order to provide a more comprehensive picture of the overall results (20). In line with this, the more qualitative open

ended responses formed part of the surveys which were overall more quantitative. The data was collected at the same time and used to interpret results together. Viewing these results in the light of the qualitative project team observations as well, adds to the research as an additional method used to elaborate and expand on findings.

As mentioned above and expanded in section 3.7.4, the human factors identified from the literature review formed the basis for the coding applied to data to perform the comparison back to the literature. Figure 5 visually depicts this overall methodology as applied to the research project and the respective elements mentioned are discussed in more detail in the next few chapters:

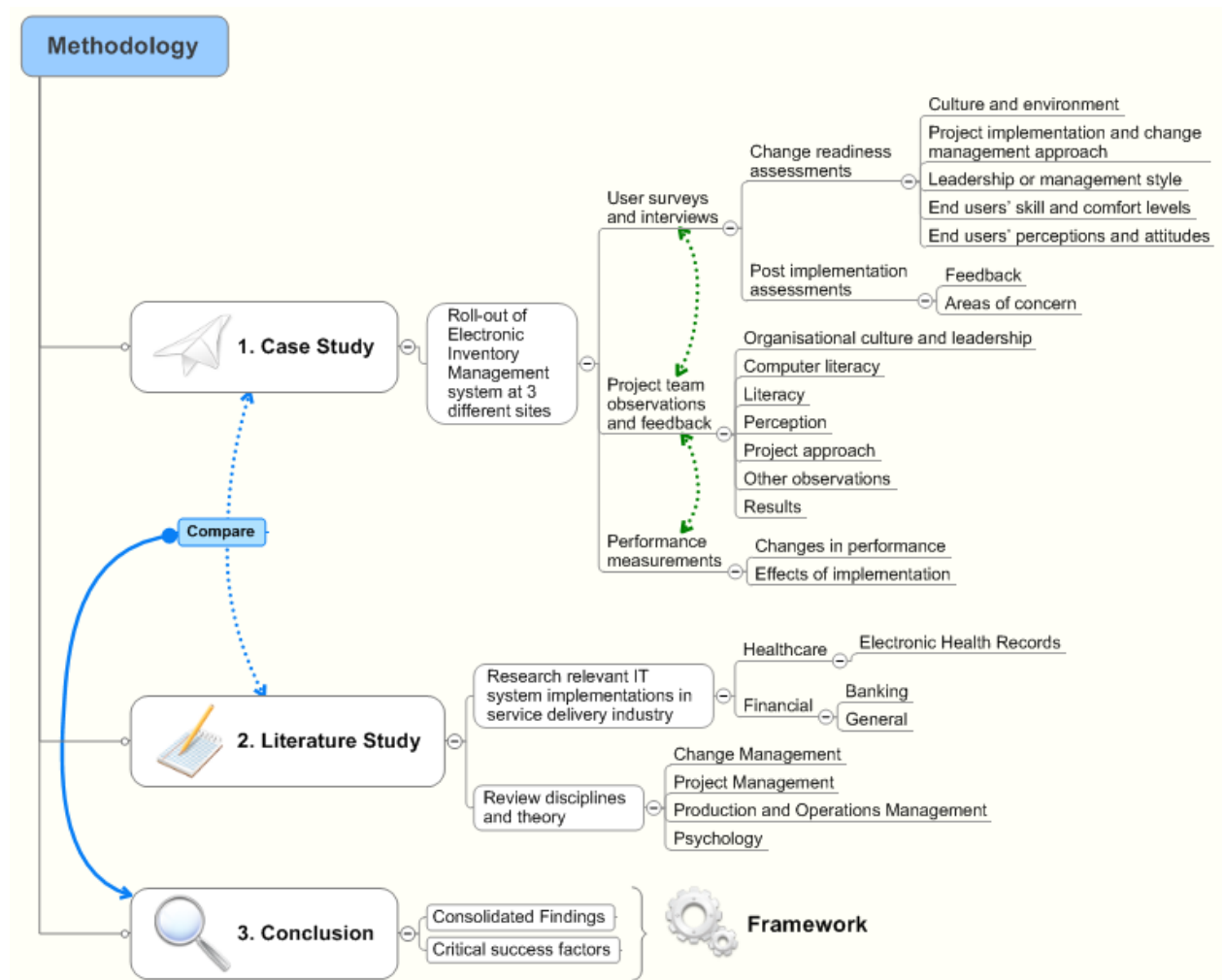


Figure 5: Research Methodology

In order to graphically depict the conclusion and findings, a decision was made to try and arrange the major factors identified into a simple framework. Taking from the literature reviewed, including Weisbord's six box organisational model (63), the basis for this framework depicting the human factors focused on has been established in section 2.3.1. The feasibility of this approach would however be dependent on the findings and conclusion of the research report.

3.2.1. Research Validity

The validity and accuracy of findings based on the qualitative part of the approach employed were enforced through the use of a number of strategies discussed by Creswell (20):

- Triangulating information from different sources - In this case the user respondents as well as project team, to build coherent justifications for themes
- Detailed descriptions of the setting and perspectives to make results more realistic to the reader
- Negative and discrepant information were also presented realistically as it was analysed in building towards themes and evaluating potential theories
- Spending prolonged time in the field – In this case the author spent more than a year on the sites, developing an understanding of the environment and people

There are certain limitations of using such a qualitative approach, such as the potential for bias because of the interpretive nature of the approach. These limitations are documented in section 1.5 and revisited in section 5.2.8 as part of the conclusion. As mentioned, by additionally employing this qualitative analysis and making the overall research methodology a mixed method approach, the research is strengthened and potential bias in conclusions further mitigated, with the quantitative foundation.

Creswell also mentions a number of threats to the internal validity of research when using the quantitative approach (20). These threats were mitigated to a

degree firstly by engaging the whole population from a site instead of selecting a sample and also evaluating the response rates to determine adequacy (see section 3.7.1 Acceptable Rates in Data Collection).

In section 2.1 of the literature review, similar implementations were investigated and compared. A level of universality was confirmed, in the nature, perceived benefits, stakeholders and perceived factors of influence identified across different service sectors. This supports the external validity for research conclusions to be relevant outside of the implementations sites analysed.

In this concurrent triangulation strategy, as defined by Creswell (20), within the mixed method approach, the different data sources from the case study come together for findings to be compared and validated.

3.3. Detailed background to the case study

3.3.1. Operational environment

As mentioned in the introduction, involvement in the project where a South African bank implemented an electronic inventory management system in its cash centres, lead to the initiation of this research report. As part of this project, time was spent in these cash centres to understand the business processes. These processes were however not academically analysed in the scope of this research, since the focus is on the human factors and environment with regards to the research question at hand. The processes and operations are explained at a high level in this section as a participant observer, for the purpose of providing context for readers who might not be familiar with these types of operational environments.

Cash centres are facilities where banks process bulk deposits and bulk orders for cash as received from their customers or branches. These cash centres receive cash and cheques in sealed containers such as stoploss bags and drop safes via Cash in Transit (CIT) companies. It is generally delivered by an armoured truck to

the facility where it is accepted into the cash centre. The responsibility and liability is transferred firstly from the customer to the CIT company and then from the CIT company to the cash centre at this point.

These deposits are then prepared in a suitable manner for the cash to be counted. The process where one teller prepares and counts the deposit is called desktop processing, while deposits where more effort is required in the preparation are split for one person to do the preparation before passing the prepared deposit on to a next teller to count. In the latter process the handover between tellers are controlled by making use of a process control document (PCD) which is scanned and linked to the deposit.

The counted amounts are to be recounted for verification and with the process of high speed teller balancing (HSTB) this verification can be combined with the next step, which is the sorting process. During this sorting process notes are bundled per type and classification, depending on the level of deterioration it has undergone.

It is then packed together with bundles of the same denomination and quality into boxes which are sent away and securely transported to the vault. Customer or branch orders for cash required are then filled from the vault, as the central point of control for inbound and outbound cash, and despatched through chutes to CIT companies for transportation. The relevant accounts have to be debited and credited accordingly for each transaction.

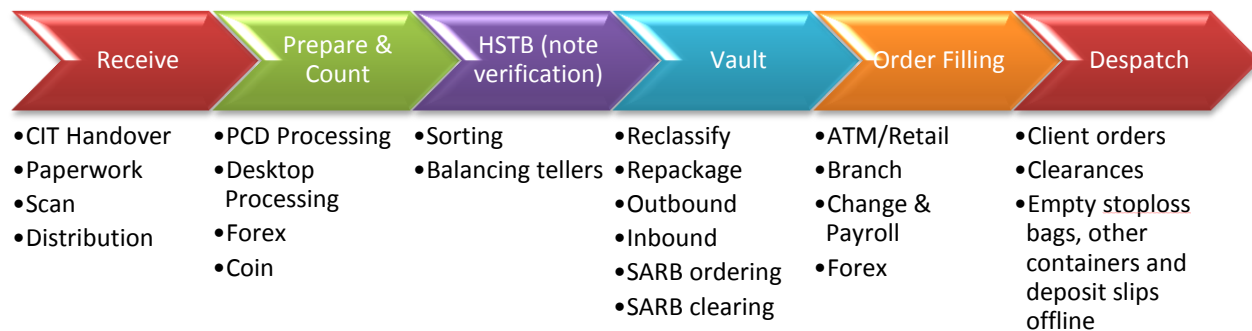


Figure 6: Cash Centre Value Chain (developed by author)

3.3.2. Project background

The bank embarked on a cash optimisation programme, consisting of a number of projects related to physical cash flow through the banks national network and the way it is handled at different nodes. Among these projects was the re-engineering of cash centre processes and the implementation of an electronic cash management system in these cash centres, where the author of this report was present as a participant observer.

The objective of this was to improve the productivity and cost effectiveness of cash centres while driving the availability of accurate information for decision making purposes in the cash network. The system replaced old paper-based legacy processes through the application of technology and best practices. The objective at hand was to achieve the operational benefits of visibility, traceability and improved productivity by better leveraging existing note counter capabilities. These old processes were viewed as being error-prone and time consuming, partially because of the duplication of work that occurred to create the required feedback and reporting at a management level.

From the planning and initiation phases the change was deemed to have a major impact on cash centre staff and management. It was not only the introduction of a new system and processes, but the related requirement to be proficient with the

deployed technology. Performance measurement data would be more readily available and a drive towards continuous improvement based on newly available data and measurements would be initiated.

Change readiness assessment surveys prior to implementation and post-implementation surveys were conducted to gather information from operators involved in and affected by the mentioned project. The purpose of these conducted as part of the change management activities for the project was to manage this change impacting the business. Although mostly consisting of close ended questions where responses were selected from a predetermined list, these surveys also included open ended response questions.

The project team also documented observations during the implementations at the various sites, including the issues encountered. These give more context to the data gathered from the surveys as well as the KPI's used to measure the success of implementations.

3.4. Surveys used in the Case Study

3.4.1. Background

As part of this project data was gathered through the use of surveys developed internally to the business and this data was used as secondary data in this research paper conducted as participant observer. This was done towards the aim of investigating the major human factors involved, as supported by literature reviewed.

Pre-implementation surveys to assess the change readiness levels of affected staff before the project implementation as well as post-implementation feedback surveys after the implementation were conducted to gather information from operators at 3 different implementation sites. The size of these 3 sites ranged between 23 and 110 staff, but they are all similar in their structure, operational processes and environment. The number of employees at each site respectively is not shared due to the sensitive nature of the business and potential risk.

These surveys are included at the end of this research, along with the open ended responses, in Appendix A.

3.4.2. Survey Design

As stated, the surveys were conducted with continuous improvement in mind by the change management resources on the project team. For this reason minor changes were made by the change management team administering the pre-implementation surveys and not all questions were completed by all sites, as they were added or removed based on the lessons learnt.

One of these changes made to the survey over the course of the project, was the inclusion of gender as part of the background section, after it was neglected for site 1. Indicating the department of the respondent was removed in this same survey from site 2 onward. As part of the computer literacy section of this survey, participants were asked if they are comfortable using a mouse and various applications. After learning from site 1, the change management team deemed it necessary to add a question on whether users are also comfortable using a keyboard. All these changes were however judged to not have a direct impact on any of the focus areas of this research and therefore not seen as a hindrance or constraint.

In the pre-implementation survey a background to the project is first given, followed by the purpose of the survey, as prescribed by Creswell (79). This purpose is noted as the project team learning more about the employees who would be affected by the project and how ready they felt for this change.

Likewise the purpose of the post-implementation survey is stated as an opportunity for users affected by the change to express their views regarding the new system. The input would assist the project team in designing the required performance support and other necessary actions, in order to successfully roll out the system to more sites.

The sections in the pre-implementation surveys were the following:

- Background information
 - Age
 - Gender
 - Region
 - Department
 - Current position
 - Number of years in position
- Computer literacy and training needs
- Training delivery
- Learning style
- Literacy
- Awareness and understanding
- Organisational culture
- Change readiness
- Communication
- Other (Open ended questions)
 - If there is one thing that you were able to change in the Cash Centre relating to your role, what would it be?
 - What do you like most about the Cash Centre or your role specifically?
 - Do you have any other burning questions, concerns, comments or suggestions you would like to share with the project team?

The open ended questions at the end were completed voluntarily, with a number of respondents feeling that the short questions completed were enough to capture their thoughts and had nothing to add in the open ended questions. The original detailed responses prior to analysis for site 1 was unfortunately not available to include, so only the responses filtered by the project team could be included for site 1.

With the detailed results being extensive, these are reflected in tables 14 and 15 as part of Appendix A and not in this section. Qualitative content analysis was performed on the responses to highlight specific recurring themes and phrases in the analysis section in chapter 5 and the approach used for this is discussed in section 3.7.4.

Similarly, the sections in the post implementation surveys were as follows:

- Background information
 - Age
 - Gender
 - Current position
 - Team leader
- Readiness
- Computer literacy
- System Training
- Communication
- Leadership
- Support
- General (Open ended question)
 - Do you have any other burning questions, concerns, comments or suggestions you would like to share with the project team?

Except for the general open ended question at the end of the survey each section allowed for open ended responses with regards to areas of concern, constructive statements and general comments pertaining to that section. This can also be viewed in Appendix A.

These responses were analysed in order to identify specific recurring themes and phrases which were denoted in the analysis section, with the detail in Table 22: Post implementation open ended responses, as part of Appendix A. This detailed table was compiled by the change management resources on the project and used

as secondary data, with consolidated descriptions of the responses from sites and some directly recorded comments lastly in each section.

Similar to the pre-implementation open ended responses, the analysis can be viewed in chapter 5 and the approach used for this is discussed in more detail as part of section 3.7.4.

When comparing the different sections of the survey back to the findings from the literature study done on human factors to investigate, specific sections were confirmed to be relevant to this research report. The organisational culture, change readiness, communication, leadership and organisational support as a specific part of leadership and culture relate back to the identified focus areas. Background information forms part of the environment and demographics, while literacy, computer literacy and training can be grouped with change readiness as part of the general activities to support readiness (12).

The importance of leadership to establish the culture and drive open communication was emphasised in literature (60,67,68,74,76). The impact that this has on other aspects of the environment and people as a company's most important asset was also noted by a number of authors (11,12,17,26,27,61,75). One of these aspects is the readiness for the implementation of the project or change, but the preparation for this has to start before the actual execution to support the effectiveness (8,12,13,18,19,44,38). Computer literacy and other training form an important part of this preparation in these types of projects seen across different industries to ensure that users are ready for the change (3,12,17,26,27).

The presence and extent of these factors at each implementation was studied and analysed through the data collected from surveys. The subsequent relationships between these factors as well as their influence on the success of the implementations were investigated further.

A certain dependence on rationale in order to find reasonable explanations to why they were related was recognised, while still taking findings from the literature and other available information into account concurrently. From this study the proposed factors of influence observed in the implementations can give insight into confirming or challenging the literature conclusions.

3.4.3. Instrument for Data Collection

The instrument for data collection was through self-administered surveys, as categorised by Fink, but participation was coordinated through groups (80). The benefits of this were, as proposed by Bornman, that a large number of questionnaires could be completed in a short time in a controlled environment with the project team present to clarify any questions if needed (81).

The presence of the project team also protected respondents from any potential intimidation or biased influencing from other stakeholders such as the management team during the feedback sessions. The different surveys were conducted at different points in time before and after the implementation, hence they are viewed as independent cross-sectional surveys (20). The results are however used concurrently to interpret them in context to other feedback and data received.

The post implementation survey was conducted following the implementation and a short stabilisation period. Unfortunately the results of the survey for site 3 were however not available at the time this research report was written.

This hampers the conclusions that can be made from the results of the post implementation survey, but a decision was made to move forward and still do the analysis using available data to gain more understanding and look at realistic conclusions that can be drawn without making too many assumptions.

The full populations of each cash centre were included in the surveys, instead of only a selected sample. This was originally done due to the purpose of the surveys

also being to involve stakeholders affected by the implementation to get their feedback and buy-in. In the process this also ensured that they understand that their input matters. The approach discussed complies with literature surrounding change management and also relates to the importance of communication to facilitate engagement and buy-in (12,38,56).

The use of the complete population attests to the reliability of the study, with results being more repeatable and consistent (82). An additional benefit of not limiting the responses to a selected sample would be to limit coached or incomplete responses from participants (82). The mixed research approach used conversely strengthens the validity of findings through additional context provided and testing of proposed theories (20).

This meant that no sampling technique needed to be selected and that there would be no need for stratification (20). Stratification is the selection of sample groups based on criteria to ensure that certain aspects or elements are included, but in this case all relevant elements are included with no planned exclusions of participants (20).

It was however understood that a minority of users were expected to not participate due to possible absenteeism or unavailability at the time. Rogelberg et al noted that non-respondents generally have lower levels of organisational commitment and satisfaction with leadership, which is of relevance specifically to the perception of the culture and leadership in this study (83). A high rate of non-response also results in a higher probability of statistical bias according to Tomaskovic-Devey et al (84). For this reason the response rates were to be reviewed as part of the analysis in chapter 5, to determine if an acceptable rate was achieved (20).

As per the literature on data collection instruments and survey design, the surveys used comply with requirements and proposed principles elaborated on above (20). Likewise, the survey design aligns with the focus areas identified from the

literature review, as discussed in detail in section 3.4.2. This verification was required with surveys originally designed for business improvement use and change management before being used as secondary data of sorts for this research report.

All data had to be represented as rankings and percentages, excluding the actual numbers, as agreed with the bank in gaining approval for the data to be used in this research. The reason for this is the potential risks associated with the nature of the industry and business. These do still however give a good indication of the results, albeit the processed results instead of raw data numbers.

3.5. Project Team Observations as part of Case Study

Notes documented by the project team at the time of implementation, including the issues encountered at each of the 3 sites, were analysed to provide context and additional information on the prevalent human factors and perceived success. These notes were made by individual project team members, including the author of this report as participant observer, and sent as informal feedback reports to the project manager. In some cases these were in the form of verbal discussions after the implementations.

The project manager consolidated the feedback and observations documented with the purpose of adapting the approach to the other sites to be implemented accordingly. Copies of all the original reports were not available, but would have nevertheless been too sensitive to include in the appendix of this research. Based on verbal feedback from the project manager and the available written reports, findings and themes were used as additional information and reference.

Even though this information is only secondary and collected in such an informal manner, using these observations as the collection type for information meant that some advantages noted by Creswell were attained (20). These mentioned benefits include first-hand experience with participants, real time recording during the

implementation and occurrences or incidents that would be uncomfortable to discuss with stakeholders or survey respondents could be documented (20).

To simplify and facilitate observations made by the project team these were originally coded into the following groups:

- Background (to the site operations)
- Environment (cultural and physical)
- Leadership (including management style)
- Approach (project implementation and change management)
- Issues encountered (related to the above or not)

This forms an important step in working towards general themes as described by Creswell (20). These groups relate back to the human focus areas identified from the relevant literature in chapter 2 (7,13), including that pertaining to project and change management disciplines (12,19,38). This qualitative analysis approach used is described in more detail in section 3.7.4.

With literacy, computer literacy, training and learning experience and preferences as well as change readiness in general being more internal to users and measured by the surveys, the project team could not make detailed observations in this regard independent of the surveys.

The feedback from the project team in the form of observations and lessons learnt formed part of the explanation building exercise.

3.6. Measuring the Success of implementations in the Case Study

Analysis of the surveys conducted prior to implementation aims to give insight into the factors to be taken into account as well as the inter-related relationships present. The post-implementation surveys build on this, but also introduce certain elements pertaining to the outcome of the implementations.

The project team observations give context to the survey analysis findings, but also expand on the outcome of implementations by mentioning the issues encountered.

With these views of the implementation outcomes being qualitative in nature, the key performance indicators were also analysed using descriptive statistics to measure the level of success achieved through the realisation of benefits. These indicators were already established in the business as measures, with sites being measured against these prior to implementation. The expectation was however that some of these KPI's would be impacted by the implementations in the short or long term, as per the project's expected benefits of visibility, traceability and improved productivity throughout the process discussed in section 3.3.2. Being previously established by the business however, these KPI's were not validated against best practices or other literature.

The same KPI's were included for non-implemented sites to serve as a benchmark for what would be normal during that time of the year. Seasonality was expected as a normal part of the business, since cash received from or required by retail clients, toll gates, businesses or bank branches would peak at certain times of the year. The mentioned seasonality is especially noticed during holidays such as the end of the year and over the Easter period. This is a common known trend from historical data and experience throughout the business.

Another expected consequence of the implementations was that overtime would increase temporarily before improving below the levels prior to implementation. This assumption was based on a potential backlog of work that would build while the system is implemented, with productivity expected to slow down for a short period of time due to interruptions and additional monitoring and checks required initially. Jellison described this initial decline as part of the J curve of change mentioned in the literature review (43). The overtime was however expected to

improve with increased productivity as an expected benefit over a longer time period.

The following KPI's were studied:

- Controllable irrecoverable ratio
- Controllable irrecoverable Rand value
- Staff headcount
- Total cash deposited
- Retail deposits
- Turnover per head
- Overtime worked

Controllable irrecoverables is a term used by the business to refer to losses deemed to have occurred due to internal processes, which could have been prevented. These would include losses from processing activities such as cash counting inaccuracies resulting in customers debited in excess or claims if debited short. The controllable irrecoverables ratio is the calculated percentage against the total cash deposits received, while the Rand value is the monetary value in South African Rand of these losses.

Staff headcount indicates the number of people working in the cash center. This is also used to calculate the turnover per head, which forms a separate indicator of productivity, based on the revenue generated divided by the number of staff employed to generate the revenue.

The total cash deposited is a measurement of the total value of cash that had to be counted and processed, while retail deposits are the portion of this total that were received from retail customers as a specialised segment. Retail cash withdrawals refer to cash notes ordered by retail customers, which have to be verified and packaged to send to the customer to be used as change, petty cash or for other cash payments.

The overtime worked is the hours spent additional to normal working hours. This overtime is mostly accrued by staff processing cash and would be related to productivity levels, increased volumes or other issues encountered which hindered normal processing.

These KPI's along with observations and documented lessons learnt from each site were used in conjunction to evaluate the perceived success of each implementation. The presence and state of the identified major human factors were then examined to determine the relationship and contribution to this success or shortcoming.

3.7. Analytical Approach to Data Collected

As per the mixed method approach mentioned, qualitative and quantitative data and analyses' approaches were incorporated and used in tandem (20). Different data was merged to form a holistic view and confirm or disconfirm theories in accordance with the concurrent triangulation strategy deployed as mentioned in the description of research process (20).

The conditions that were taken into account in this analysis, as described by Mitchell et al as essential for causal relationships between variables, are time order, co-variation, rationale and non-spuriousness as feasible for each relationship (82). Time order means that the cause must exist before the effect, while co-variation dictates that a change in this cause produces a change in the effect. Rationale refers to a reasonable logical explanation of why the variables are related and non-spuriousness to the elimination of other potential "rival" causes identified (82).

3.7.1. Acceptable Response Rates in Data Collection

In section 3.4.3 where the instruments used for data collection are discussed, it is noted that the whole population of employees at each cash centre were included instead of using only a selected sample. This eliminates the risk of selection bias to prove a theory and supports the reliability and repeatability of the analysis. As

stated in section 3.4.3 however, as part of the analysis the response rates are to be reviewed in terms of statistical bias and the responses not being representative of the whole population, since this is the purpose of the data collected.

Scholars have suggested minimum acceptable response rates, but these differ. A number of authors, including Babbie, Dillman, Rea and Parker as well as Roth and BeVier agreed on a suggested 50% minimum (86,87,88,89,90). Baruch and Holtom are however adamant that in cases where a questionnaire is administered and the respondent fills it in as part of their job the usable responses should not be recorded as a response rate in line with these minimums (91). Baruch and Holtom's study also revealed that a number of journals neglect to determine the adequacy of response rates in studies before publishing these (91). In line with this, some research journals also adjusted their expectations for acceptable survey research response rates to be stricter based on a study by Draugalis et al (92,93).

For responses to be accepted as representative of the population, a response rate of 80% is to be achieved by researchers (92,93). This is taken as a guideline in the analysis performed in section 4.2, even though it is stricter than generally accepted in other research.

The reality of blank responses to only certain questions in the survey needs to be considered and addressed as well. It is noted that while self-administered questionnaires, such as is the case in the surveys at hand, are more suitable for honest answers to sensitive questions than interview surveys (94). This reduces the risk of missing data with sensitive topics, but respondents can still make mistakes such as accidentally skipping questions (95).

De Leeuw et al explained that analyses from survey data that include missing data, also referred to as non-response items, can only truly be unbiased if the data are missing completely at random (95). When data is not missing at random, the reason for the missing data will likely be related to the missing answers (95).

There are two different categories of non-response items in surveys (96). Non-informative non-response occurs if the data is missing for a reason unrelated to the true answers, while in the case of informative non-responses the absence of an answer tells the researcher something already (96). They also stated that “a little potentially informative non-response may be ignorable if there is plenty of data”, but what can be inferred should take the missing values into account if it is more frequent (96).

De Leeuw et al further emphasised the importance of understanding the missing data mechanism or reason for the occurrence of non-response items, in order to determine the appropriate treatment thereof (95). As part of the analysis done in section 4.2 this is taken into consideration.

3.7.2. Quantitative Data Analysis: Descriptive Statistics and Visualisation

As mentioned in the research process discussed in section 3.2, the quantitative survey data from multiple choice questions in the surveys and KPI measurements were analysed using descriptive statistics in chapter 4 of this report.

The survey response data relates to the perceptions and feelings of the operators involved and affected. Perception is simply defined as “the way you think about or understand someone or something” according to the Merriam-Webster dictionary (97). Although this information is then subjective, in the case of this research report this subjectivity is of interest in order to answer the research question by taking into account the human perceptions and opinions involved.

As per Borrego et al’s explanation, descriptive statistics such as percentages are used to illustrate various points and describe a situation (98) or to summarise various aspects about the data according to Larson (99). Except for the open ended questions, the surveys allow respondents to choose from a set of answers. The responses then result in variables that can only assume certain values, making them discrete in nature (99). Due to this discrete nature of the variables,

descriptive statistics commonly associated with continuous variables, such as location statistics (mean, median and mode), dispersion statistics (variance and standard deviation) and shape statistics (skewness and kurtosis) were not used (99). Instead percentages were shown in accordance with the mentioned data confidentiality agreement and frequencies were analysed as appropriate for the discrete variable type (99).

Larson also notes that graphs are better suited for the identification of patterns in data, compared to tables showing large amounts of data with numerical detail (99). The full tables with data from the surveys and KPI measurements were not included in the appendix, due to the mentioned agreement with the bank to protect data by not giving exact values, but rather using percentages and relationships to compare sites.

In visually representing data with graphs, an overall sense of trends and themes could be gathered. This was defined by Shneiderman as multidimensional visualisation (100), with Zoss giving bar charts as an example (101). This approach was deployed with an exploratory mind set to identify patterns from the volume of questions in surveys and resulting secondary data available, without losing sight of the focus areas which form the theory this is compared to. This is in line with Shneiderman's visual information seeking mantra of "Overview first, zoom and filter, then details-on demand" (100).

The graphical depiction through graphs of both the quantitative survey data, as well as the KPI measurements at a later stage, firstly gives an overview comparison between sites and high level trends and patterns. From this items of interest can be zoomed in on and others can be filtered out in the process of investigating and comparing the details to form potential theories for comparison to the focus areas. As per one of Shneiderman's seven tasks at a high level abstraction, he also noted that relationships between items can be seen through the visualisation of data, which is of specific interest in this research report as well (100).

Stacked bar charts were used to represent the different survey responses as proportionate to the total number of responses from the site in question. By placing site data next to each other on the x-axis of the graph, the high level comparison of ratios differing or being the same across sites are made easier without losing the detail from each site.

The KPI measurement data was presented as line graphs, with a line for each site implemented and an average for sites not implemented yet serving as a type of reference point. The x-axis of the graph indicates time, which is of interest since the implementations were initiated at a specific point in time for each site respectively. This allows for sites to be compared at a high level to each other over the space of time for which data is available, without divulging the sensitive numerical figures.

Findings from surveys were analysed and discussed accordingly in chapter 5 to establish if any probable relationships could be identified between variables denoted by the different survey sections forming part of the focus areas (82). Theories were proposed and discussed in context with other available information to confirm or eliminate these.

3.7.3. Quantitative Data Analysis: Correlation Analysis

Instead of trying to create a mathematical or empirical formula with limited quantitative data input, a simple correlation analysis was considered to determine the existence of potential linear relationships between the variables belonging to the coded groupings (20,102). Evaluating the existence of these relationships in this way could potentially inform theories derived from the descriptive statistics and qualitative analysis, by confirming or disproving some relationships identified from patterns and themes. The expectation was that the major human factors identified do impact each other, as part of the complex system of human perception and behaviour.

This forms part of inferential statistics, as opposed to the descriptive statistics described in section 3.7.2 (103). Inferential statistics is a broader category of statistical analysis, more concerned with making conclusions about the population from which data is sampled (99).

Mukaka clarifies that the term correlation refers to an association, connection or any form of relationship, link or correspondence, while in statistical terms it is a method of assessing a possible two-way linear association between two variables (102). This is measured through the correlation coefficient, representing the strength of the linear association (102). Correlation coefficients vary between -1 and 1 (102,103). The sign of the coefficient indicates whether the relationship is positive or negative, while the numerical value represents the magnitude of the correlation (102,103). A number closer to -1 or 1 represents a stronger relationship, with zero indicating that no linear relationship exists (102,103).

According to Stevens' classification of the level of measurement, the percentages of specific responses in the surveys would be of the ratio type scale (104). This means that the data has the attributes of equal intervals of measurement throughout and a meaningful zero, which the percentages used comply with (105). Onwuegbuzie et al confirmed that the Pearson product-moment correlation coefficient is appropriate for use when both variables are of the ratio scale of measurement, as is the case with the data at hand (103).

The Correlation analysis function in the Microsoft Excel Data Analysis ToolPak was used to perform correlation analysis using the Pearson product-moment correlation coefficient in section 4.3, with the full analysis table available in appendix C. The calculation performed by this function of the Analysis ToolPak is the same as the "CORREL()" function in Microsoft Excel, denoted by the below formula:

$$\text{Correl}(X, Y) = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

Figure 7: Excel CORREL() Function Formula

The unit of analysis to move towards this point was each implementation site respectively as made up of the aggregated individual responses to the variables in question (82).

After consideration, Cronbach's alpha was not used as a potential method to test the reliability and consistency of selected sections of feedback gathered through the surveys. The use of yes/no questions instead of for example a 5-point Likert scale makes this impractical (82). The reliability was however not seen to be in question, partly due to the use of the mixed method approach, including qualitative analysis (refer to sections 3.7.4 and 3.7.5) as well to strengthen the research, as mentioned in section 3.4.3. The descriptive statistics mentioned above in section 3.7.2 formed the basis of the quantitative portion of the analysis.

3.7.4. Qualitative Data Analysis: Content Analysis

Hsieh et al describes content analysis as a qualitative research technique used to interpret meaning from the content of text data (106). The data from open ended research questions as well as project team observations are examples of such text data; hence the data analysis method followed in analysing this data was content or basic qualitative data analysis (20,82).

This involved organising and preparing data, first reading through everything to get a general sense of the information and the overall themes and meaning (20). Coding was applied based on the focus areas found in the literature review and survey sections, as per guidelines from Tesch (20,107).

In agreement with these guidelines, this process included jotting down ideas that came to mind with the overall sense of the information before going through a number of responses while making notes of what these were actually about in a separate space (107). This was followed by reading through the responses, paying

special attention to look at the repetition of certain phrases or ideas in the survey responses (107).

As per Yin's suggestion for a consistent, reliable approach, the detailed procedure steps followed were documented and all results included in the appendixes for the reference of the reader (20,108). An example of these steps followed on a section of the data is documented in the next section for clarification.

3.7.5. Qualitative Data Analysis: Example of Content Analysis Process Followed

As an example to clarify this process, the results of the pre-implementation survey's first open ended question (refer to Appendix A section 8.3.1), "If there is one thing that you were able to change in the Cash Centre relating to your role, what would it be?" were analysed below. Taking an extract of the first seven responses from each site, some general themes can be identified from reading through.

Table 1: Extract from Table 14 (Open ended responses - One desired change in environment)

Site 1	Site 2	Site 3
Working late shifts / night shifts	Sorting - wish there will be no sorting at all, because I have to come early to fine sort all the deposit slips and it takes 30 min to an hour	Automate the numerous returns that we submit
Opportunity for growth across departments	Working with a prepper that doesn't care	Make everyone a team. If someone still has work, give to others (distribution of deposits still to be processed at the end of a shift)
Security by introducing scanners, so we are no longer required to take off shoes	The prepping part - I wish we could run everything out of bags	The shift we are working on, especially the night shift
Manual hand over of work (recon) / paper based record keeping	The working hours (maybe more working) the time we leave because of transport home	Management can be fair and see them as equal

Automate cash connect queries	To stop doing 2 peoples' jobs eg: prepping and running, rather do 1 thing and master it	Make sure that everyone is happy so that we will have a happy team
Deliver quality service to our customers	To stop doing other peoples' duties	Change the normal working hours
Teamwork and attitude of colleagues	The peoples' mind sets	Reduce paper work and get information as quick as possible

An overall frustration with certain aspects of the process, working hours and people having to try and work together as a team is especially picked up from initially reading through the responses (grey cells in table 2 below), with the latter two mentioned, being the most relevant to the human focus of this research (bold text in table 2 below). Referencing back to the human factors of leadership, communication, environment and culture as well as change readiness to be focused on, as identified from the literature review, the responses from different sites were analysed for recurring themes.

Table 2: High Level Content Analysis of Table 1

Site 1	Site 2	Site 3
Working late shifts / night shifts	Sorting - wish there will be no sorting at all, because I have to come early to fine sort all the deposit slips and it takes 30 min to an hour	Automate the numerous returns that we submit
Opportunity for growth across departments	Working with a prepper that doesn't care	Make everyone a team. If someone still has work, give to others (distribution of deposits still to be processed at the end of a shift)
Security by introducing scanners, so we are no longer required to take off shoes	The prepping part - I wish we could run everything out of bags	The shift we are working on, especially the night shift

Manual hand over of work (recon) / paper based record keeping	The working hours (maybe more working) the time we leave because of transport home	Management can be fair and see them as equal
Automate cash connect queries	To stop doing 2 peoples' jobs eg: prepping and running, rather do 1 thing and master it	Make sure that everyone is happy so that we will have a happy team
Deliver quality service to our customers	To stop doing other peoples' duties	Change the normal working hours
Teamwork and attitude of colleagues	The peoples' mind sets	Reduce paper work and get information as quick as possible

These results are interpreted and compared for the different sites. Similarly the full tables of open ended responses presented in appendix A, were analysed and themes identified were discussed further in sections 4.2.2 and 4.2.4.

3.8. Ethics Consideration

As mentioned by Punch, research includes collecting data from people, about people (109). This notion is very applicable to the research done in this specific case study, with people participating in surveys in order to understand the human factors impacting these types of implementations. The obligation to protect these participants falls on the researcher according to Isreal and Hay (110). Isreal and Hay also state that this protection includes the personal privacy of participants, without neglecting to ensure the authenticity and credibility of the research (110).

Both original pre- and post-implementation surveys used by the bank are included in Appendix A as the method for collecting the data used as secondary data for this research. When looking at these sources, it is evident that participants were made aware of the purpose of the surveys, as Sarantakos proposed (111). They were assured that the feedback would be handled confidentially as well.

As mentioned, the surveys and documented project team observations were conducted by the bank, with the informed voluntary consent of the participants as employees of the bank. Measures were taken as described to prevent intimidation and to ensure the anonymity of participants to make sure that no participants were put at risk, as prescribed by Sieber (112). Even though these surveys were conducted by the bank prior to this research, these ethical considerations made were taken into account as the secondary data source for the case study.

In accordance with these principles and the related Wits ethics policy, the research and methods used were deemed to have been ethically conducted and was cleared by the School of Mechanical, Industrial and Aeronautical Engineering ethics committee at the proposal stage (ethics clearance number MIAEC 047/15).

A consent letter is included in Appendix D of this research report, stating that the bank agreed for the data collected to be used as secondary data for the purposes of this research. The agreed limitations were that no personal information of participants or details with regards to the bank, locations of sites and cash values processed were to be included. These limitations were adhered to in the analysis and portrayal of survey results, project team observations as well as key performance indicators.

4. Data and Analysis

4.1. *Introduction*

The purpose of this section in the report is to evaluate the data from the pre- and post-implementation surveys as well as project team observations and key performance indicators and to consolidate these into a more manageable and understandable format. The detailed output from the data collection and analysis are tabled in the relevant appendixes as noted throughout this chapter. This data is presented in a raw format, only processed to the degree as agreed with the provider for security and risk purposes to not expose any sensitive details regarding either site.

A degree of analysis and structuring of the data gathered from KPI's was required to adhere to the agreed constraints from the bank. This was done to not present the actual monetary figures with regards to any of the key performance indicators, but to rather present them graphically as comparisons between sites to give insight into volumes and changes in indicators.

Results from the data collected through surveys are represented in the form of graphs for a more graphical representation to aid with comparisons and pattern matching. Correlation analysis was also performed on these results to determine the direct relationships between them.

Similarly the data collected in the form of KPI's to investigate the success of the implementations respectively are presented in a graphical format. Line graphs were used to show changes in KPI's over time to identify trends, indicating the implementations as discreet events, with the average across non-implemented sites as bar graphs in the background to serve as a contextual benchmark for the business.

The qualitative and quantitative methods used were discussed in detail as part of chapter 3, Research Methodology.

4.2. Data Analysis of Survey Data

4.2.1. Pre-implementation Change Readiness Survey – Descriptive Statistics and Visualisation

The change readiness assessment was conducted prior to the start of the implementation of the project after training was provided to the cash centre staff. Blank responses were recorded as “N/A” for questions not answered or where the “NA” answer was purposefully selected, but still recorded for the reference of the reader. As discussed in section 3.7.1, non-response items can potentially be informative of the missing answers and as such be indicative of response bias. Since the patterns were not confirmed to be random or clearly non-informative, these responses were taken into account as part of the formulation and evaluation of potential theories. Therefore these were included in the visualisation through graphs and not replaced with mean values or performing adjustments which could cause potential bias.

An acceptable response rate was gathered from the sites 2 and 3, with 88% and 82% of cash centre employees participating in the surveys respectively at each site. A response rate of 79.3% was achieved at site 1. This is 0.7% below the guideline of 80% mentioned in section 3.7.1. The difference is however less than one person at the specific site and with the guideline noted as stricter than most literature, this margin was deemed acceptable as long as no unconfirmed theories are formed from site 1’s feedback alone.

A descriptive statistical analysis approach of the visual graphs was applied, to investigate the results at a high level and potentially identify patterns.

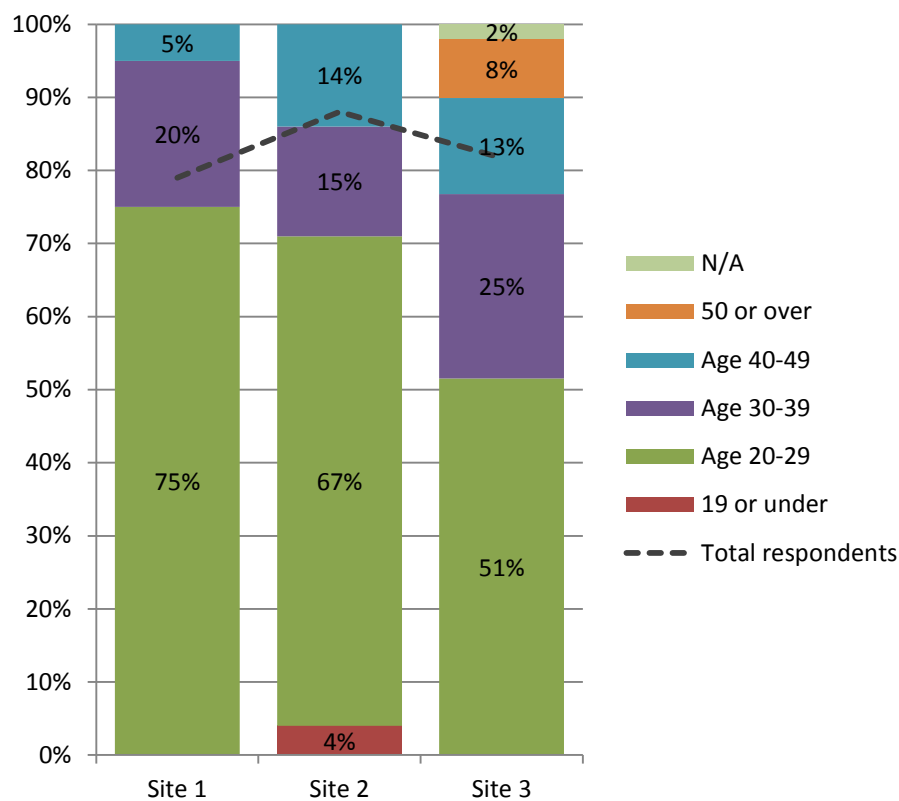


Figure 8: Age Comparison Graph

It is clear based on results of the change readiness assessment done before the implementation seen in Figure 8 that the general age brackets of employees at the different sites varied. Site 3 had a much larger percentage of older staff and only approximately 51% below the age of 30 compared to more than 70% in both the other sites. It also was the only site with a percentage of people over the age of 50, while site 2 was the only one with a visible percentage of people below the age of 19. The dashed line graph indicates the response rates at each site, as discussed earlier in section 3.7.1.

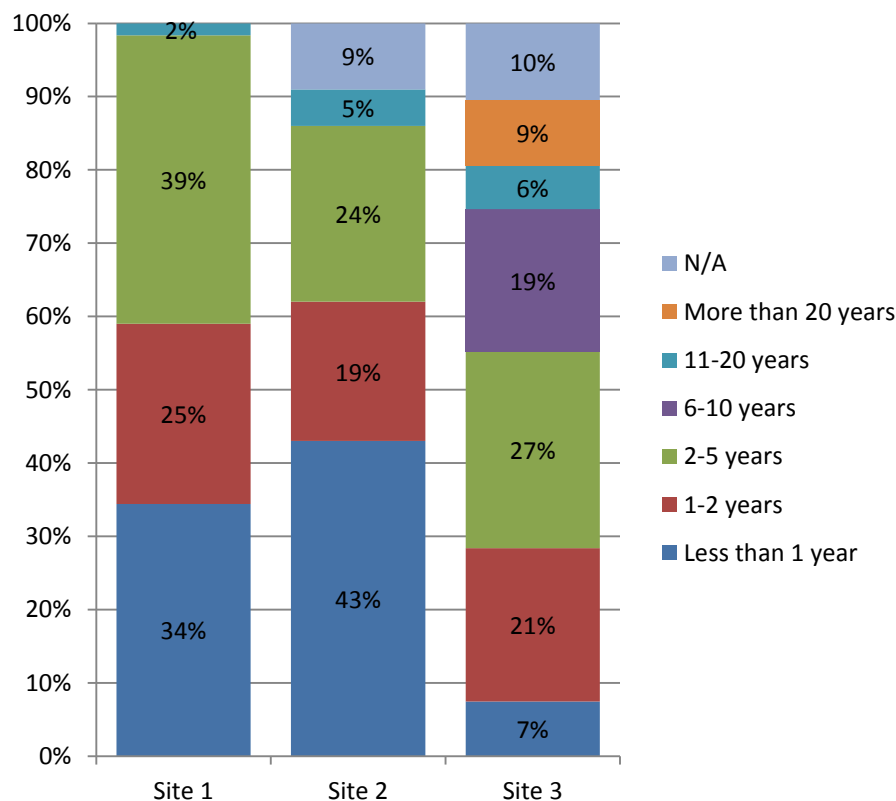


Figure 9: Number of Years in Position Graph

The number of years in current positions or roles in the cash centres (Figure 9: Number of Years in Position Graph) ties back to the age brackets observed in Figure 8. Site 3, where the highest general age was observed, was the only site where a significant percentage of employees were in their current positions for longer than 5 years. Site 2 conversely had the highest percentage of staff which had been employed in their current positions for less than a year.

It is also worth noting that almost 10% of the people at site 3 have more than 20 years' worth of experience in their current positions, which is higher than the other sites and points towards a wealth of knowledge and experience in the centre.

Site 1 is perceived to be a more balanced albeit with most of the staff having 2-5 years' worth of experience in their current positions.

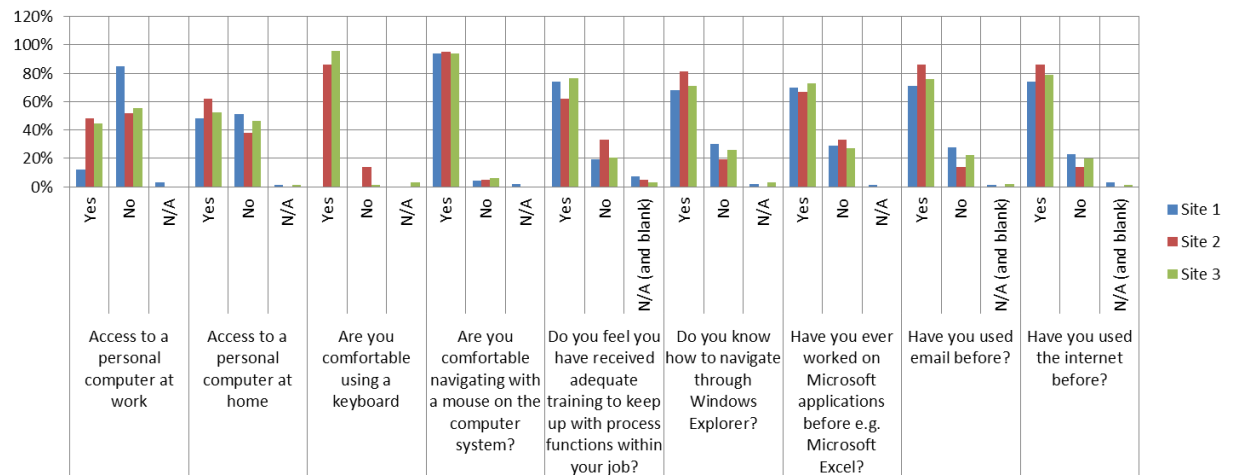


Figure 10: Computer Literacy Graph

When analysing the data in Figure 10 obtained for computer literacy related questions, the results appear to be similar between the three sites on a number of questions. Some notable points however are the reduced access levels to a personal computer at work for site 1 and the slightly higher access to a personal computer at home for staff from site 2.

The former observation is however related to this being identified as a lesson learnt in the preparation for implementations. After the completion of site 1, sites 2 and 3 received PC's to remain onsite for training purposes. The goal was to allow staff to familiarise themselves with the use of PC's and become more comfortable before the system implementation started.

It is apparent that more people, even though only from site 2, identified lower levels of comfort in using a keyboard than a mouse. Site 2 also indicated lower levels of confidence that enough training took place. This question was however not answered by site 1, leaving the results unverified.

It is interesting to note that site 2 is also the outlying site with the highest percentages not comfortable with Windows Explorer and other Microsoft applications such as Excel, but then also the highest comfort levels with email and the internet which would be more common personal uses relating back to their higher home access to a PC.

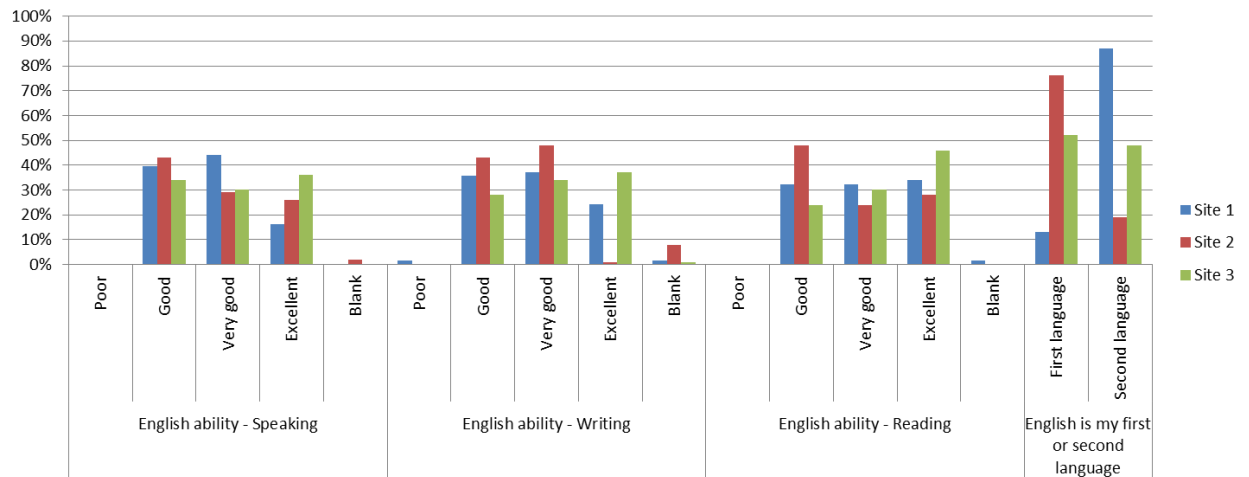


Figure 11: Language Comparison Graph

The electronic cash management application implemented is in English, with no settings for any other official South African languages. Looking at the data for the respondents' languages and perception of own abilities (Figure 11), once again site 2 stands out as an interesting case. Even though site 2 has the highest percentage (76%) of staff with English as their first language, the level of confidence to indicate speaking, writing or reading ability as excellent or very good, does not reflect this in comparison with the other 2 sites.

Site 1 is the only site with an indication of poor ability, albeit a very low percentage of 1%, and this only writing. This would be expected when comparing to the other sites, since it has a considerably higher percentage of staff for which English is their second language. The overall levels of comfort with English seem to be very good among all the sites though.

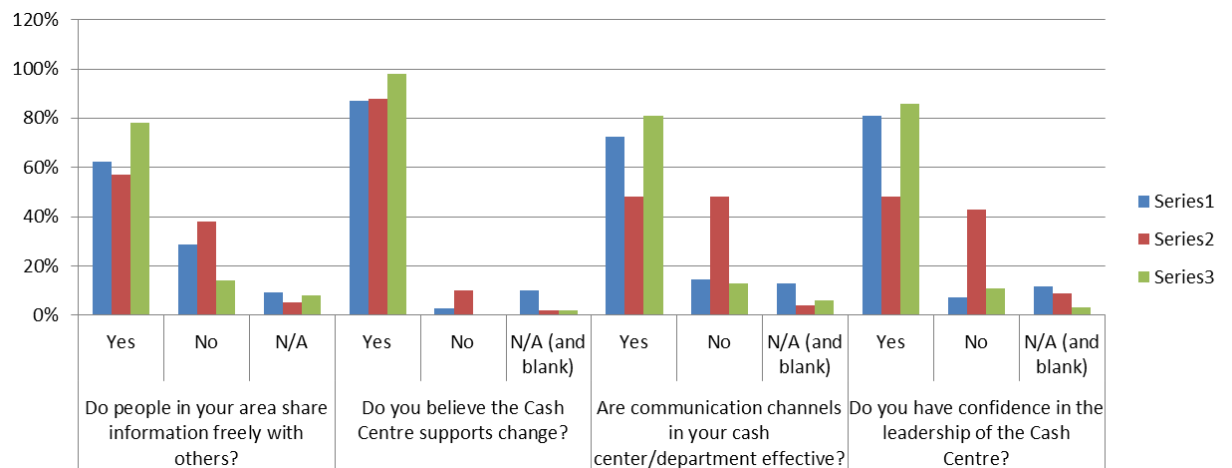


Figure 12: Organisational Culture Comparison Graph

Information gathered on the organisational culture and some related perceptions of the local cash centre management and leadership (Figure 12) revealed some results of interest to this research report.

Site 3 provided the most positive feedback on all the questions, followed by site 1. This is especially noticeable with regards to whether the cash centre supports change. A difference to the other sites on whether information is shared freely among staff can also be seen. Site 2 had the most negative responses on all questions, with the effectiveness of communication channels and confidence in leadership being the worst. Both fields scored above 40% compared to the other sites showing around 10%.

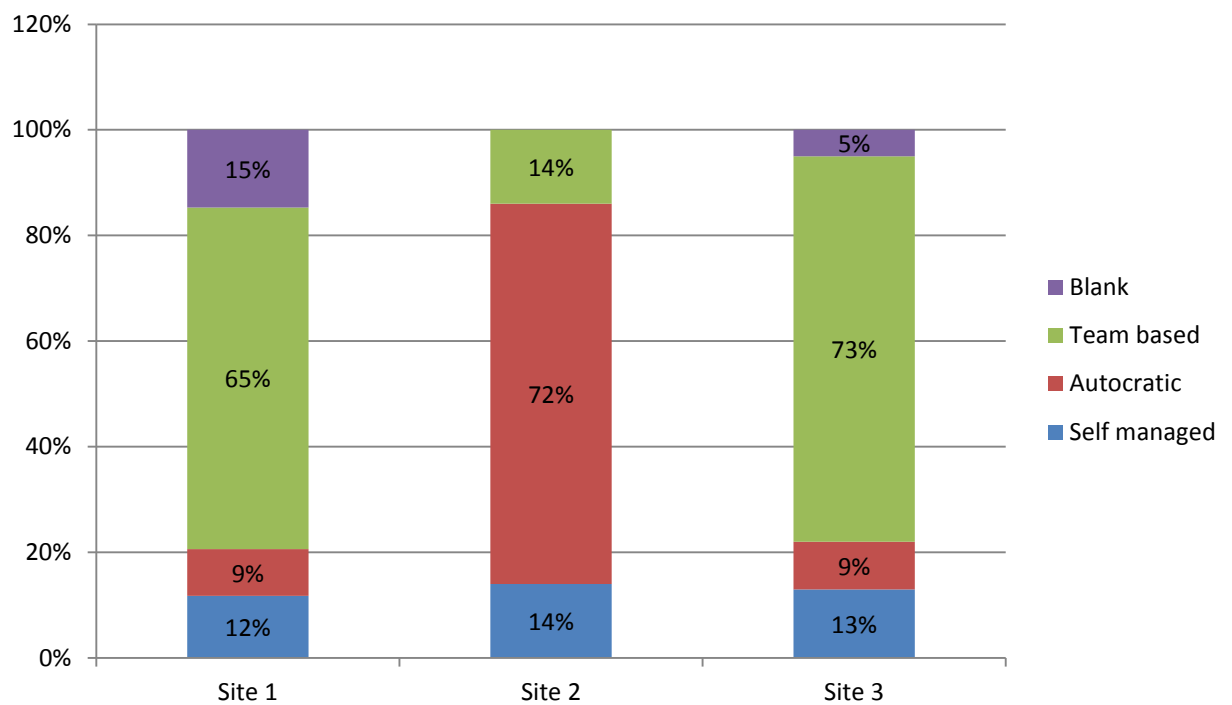


Figure 13: Perceived Management Style Graph

When employees were asked to categorise the management style of their local leadership as either team based, autocratic or self-managed, the results relate back somewhat to the previous data gathered on the organisational cultures (Figure 13).

Site 2 was the only site where the majority (72%) agreed that it is an autocratic style, compared to the other sites which were consistently rated as team based. Similarly, site 3 where the most positive feedback was received on the organisational culture has the highest team based rating of 73%. This is however only because 15% of responses from site 1 were blank, compared to the 5% from site 3.

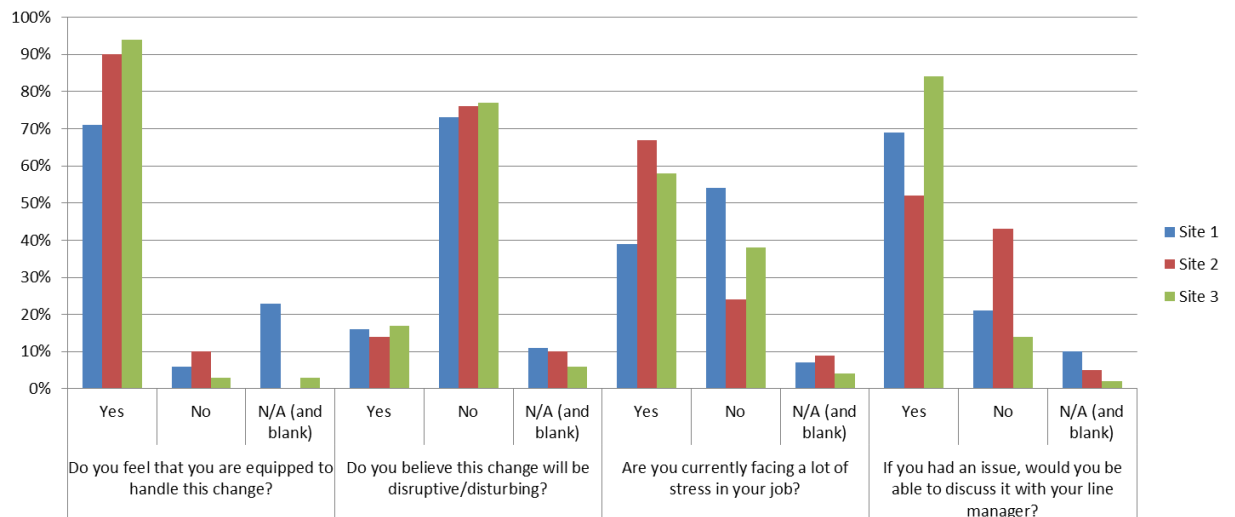


Figure 14: Change Readiness Graph

Taking into account the previous note on blank responses, it is clear that site 1 again had the highest percentage of blank responses in the questions relating to the change readiness of each site as well (Figure 14).

Except for this, site 1 also had the lowest confidence level that they were equipped to handle the change, with barely above 70% of the employees answering positively. Sites 2 and 3 on the other hand both responded in a positive manner, with 90% and above answering “yes” to this question.

When asked if they believed that this change would be disruptive, all three sites indicated that they did not think so, with only 10-20% specifying that this was what they indeed expected.

The last 2 questions in this section relate back to the previous segments dealing with the perception of the environment and culture. Site 1 indicated the lowest stress levels (below 40%) in their job prior to the change and site 2 the highest, with almost 70% feeling stressed, followed by just below 60% at site 3.

More than 40% of the respondents from site 2 also indicated that they are not comfortable raising any issues experienced with their line manager. This number

is 20-30% lower at both sites 1 and 3, with more than 80% at site 3 and nearly 70% at site 1 indicating that they would be comfortable to raise issues.

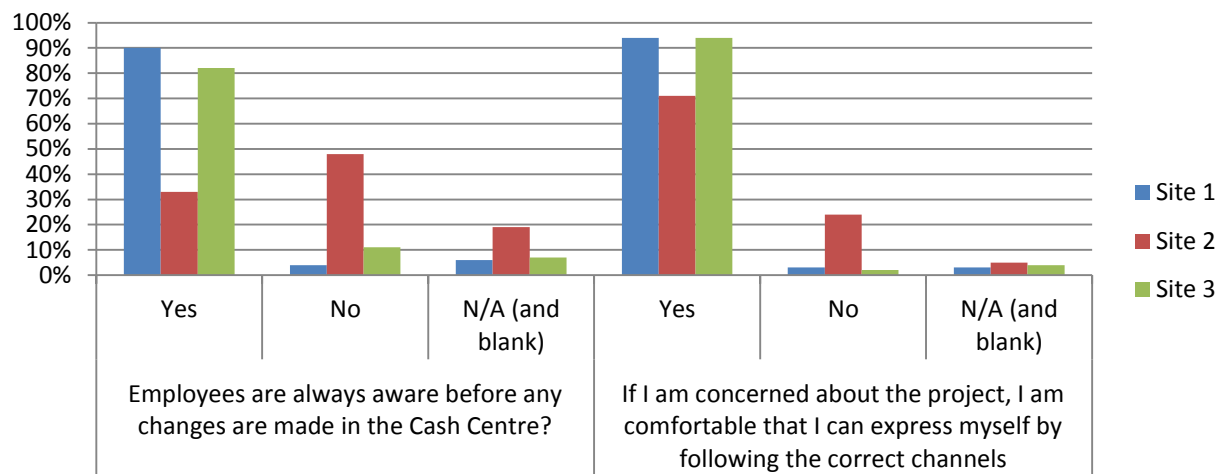


Figure 15: Communication Comparison Graph

Focusing further on communication specifically (Figure 15), almost 50% of site 2 participants stated that they are not always made aware of changes made in the cash centre before they happen. At both sites 1 and 3 on the other hand, above 80% replied that they do know beforehand.

As expected based on the previous communication issues highlighted by site 2 personnel, more than 20% said that they are not comfortable raising project related concerns through the correct channels. Again both sites 1 and 3 indicated very high levels of comfort, close to 100%.

4.2.2. Pre-implementation Open Ended Responses – Content Analysis

From initially reading through the open ended responses collected, the most notable recurring responses across all three sites to the first open ended question on one thing to change in the cash centre, pertained to the following themes (refer to Table 13 in Appendix A for detailed recorded responses):

- The long hours worked and night shifts, which was not preferred
- A desire for the automation and change of certain activities that was expressed

- The need for improved communication, team work and a change in attitudes

When referencing these high level themes identified back to the focus areas of this research report, the hours and shifts worked is acknowledged to play a major role in staff morale and attitude. These working conditions however fall outside of the scope of major human factors focused on in this report. Similarly, the expressed desire for process automation is met in some activities of the project implementations, but is not seen as a direct human factor identified to focus on in this report.

Communication, teamwork and the attitudes of colleagues do however match the focus areas of leadership, communication and culture specifically. These responses mostly indicated a desire for the mentioned areas to be improved. From analysing these relevant responses in more detail per site, it can be seen that some from site 2 included a frustration with leadership and colleagues not trusting each other to do their work and interfering or not listening.

Site 3 mentioned a breakdown of communication specifically between staff and leadership is more than once. Site 3, also had more responses relating to performance measurements and rewards to incentivise performance. Career development and potential further training was also raised.

With regards to the open ended responses to what participants liked the most, the responses that all three sites had in common mostly related back to the people, culture and environment (Table 14 in Appendix A) when firstly reviewing at a high level. This relates directly to the human focus areas that this research aims to analyse. The analysis in more detail however reveals some difference between the sites, but more similarities in the details of responses. Site 1 referred to the trust that exists between people specifically twice. All 3 sites also mention a “family” environment and unity within the teams multiple times.

All three sites mention the opportunities to grow and learn, especially site 3, along with the appreciation of challenges. All 3 also mention the industry and working with money as something that they like.

Site 3 however had the most negative responses to this question between the three, but with more respondents completing these questions it was expected.

4.2.3. *Post Implementation Survey – Descriptive Statistics and Visualisation*

As mentioned in the limitations and approach to this research, by approaching these implementations with continuous learning in mind, this moves away from controlled experiments which are comparable in every way. This is however taken into account when drawing conclusions.

The response rates to the post implementation surveys from sites 1 and 2 were 79.3% and 85% respectively, which were along the same lines as the pre-implementation change readiness assessments.

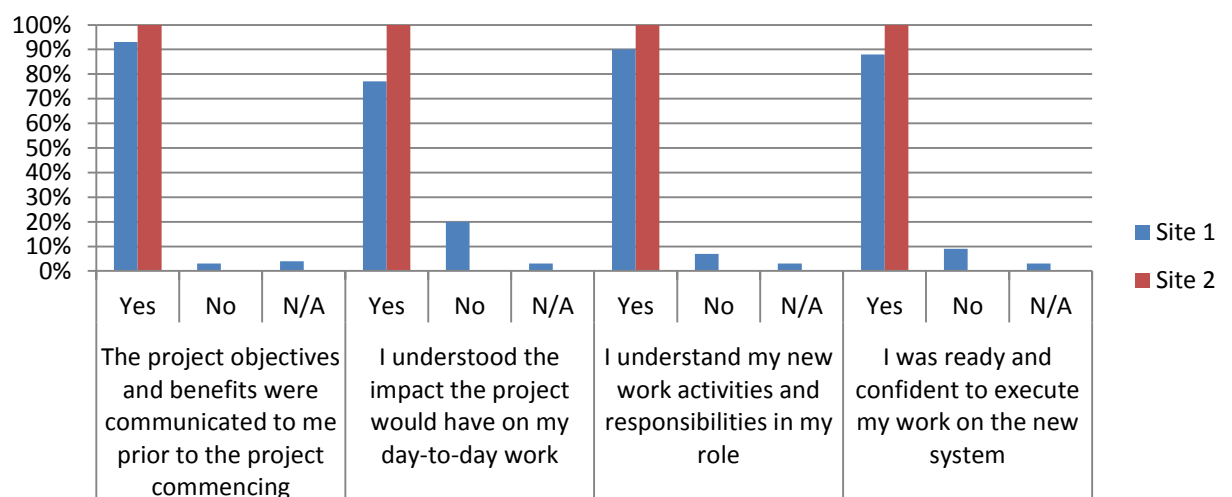


Figure 16: Post Implementation Change Readiness Graph

In the change readiness related questions post implementation (Figure 16) the blank response rate was notably lower than pre-implementation. Site 2 however had a 100% positive response rate to every question, which highlights a potential problem that respondents were coached or uncomfortable to answer truthfully.

Site 1 indicated a much higher level of confidence in their readiness for the change than before, with an increase of more than 15%.

More than 90% of the staff also said that the project objectives and benefits were properly communicated to them prior to the implementation. The lowest positive response was on the question of whether the employee understood the impact of the implementation on their day-to-day work, but this number is in line with the pre-implementation response whether they believed the change would be disruptive.

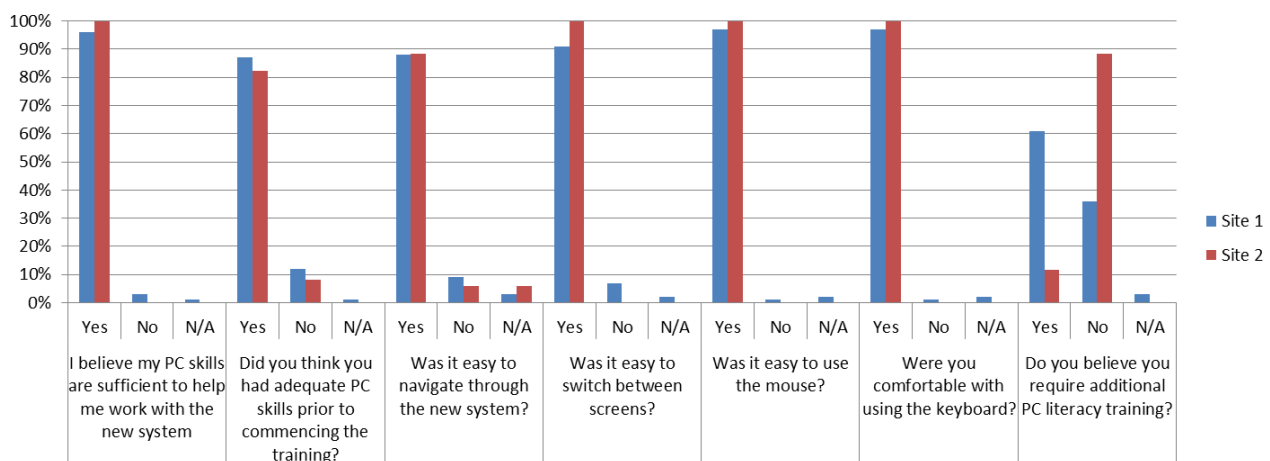


Figure 17: Post Implementation Computer Literacy Graph

The section on computer literacy (Figure 17) shows more favourable results, with site 2 respondents not just showing 100% positive responses. Almost all users indicated that they are comfortable that their PC skills are sufficient to perform their role.

More than 80% from both sites however believed that they were adequately capable before the PC literacy training. An even higher percentage indicated that they are comfortable with both a mouse and keyboard than before. The most notable difference in responses between the 2 sites comes with regards to the view on the perceived need for additional PC training. From site 1 about 60% of users responded that they feel they need additional PC training, while from site 2 almost 90% felt that they do not.

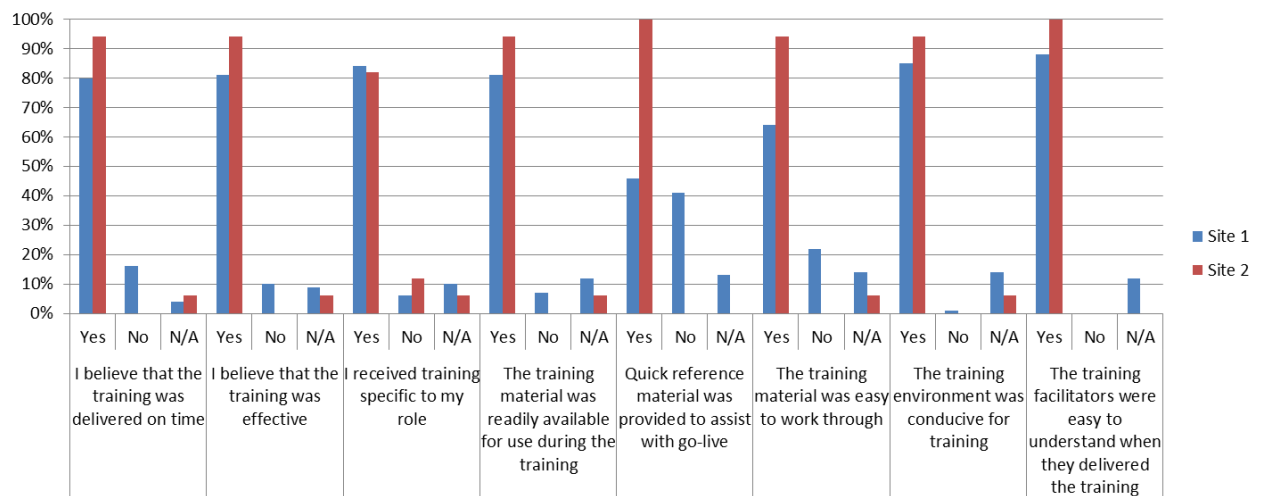


Figure 18: Post Implementation System Training Graph

Looking at further detailed questions asked around the system specific training conducted (Figure 18) once again site 2 had 0% negative responses on all questions except one. The number of blank responses nevertheless varied, being the only possible indication of how much positive feedback was received. The only question where direct negative replies were acknowledged was whether training for specific roles were received. More than 10% indicated that they did not receive training for their specific roles.

On the training timing and type, the responses from site 1 were around 80% positive, but with regards to training material less so. More than 40% showed that they did not receive quick reference guides prior to go-live, but this was due to the limited material available at that point. This was taken as a learning point and more comprehensive and user-friendly material was developed for the rest of the rollout.

More than 20% of responding users from site 1 also stated that the training material was hard to work through. The response from both sites on the training environment and facilitators were very favourable with more than 80% giving good reviews.

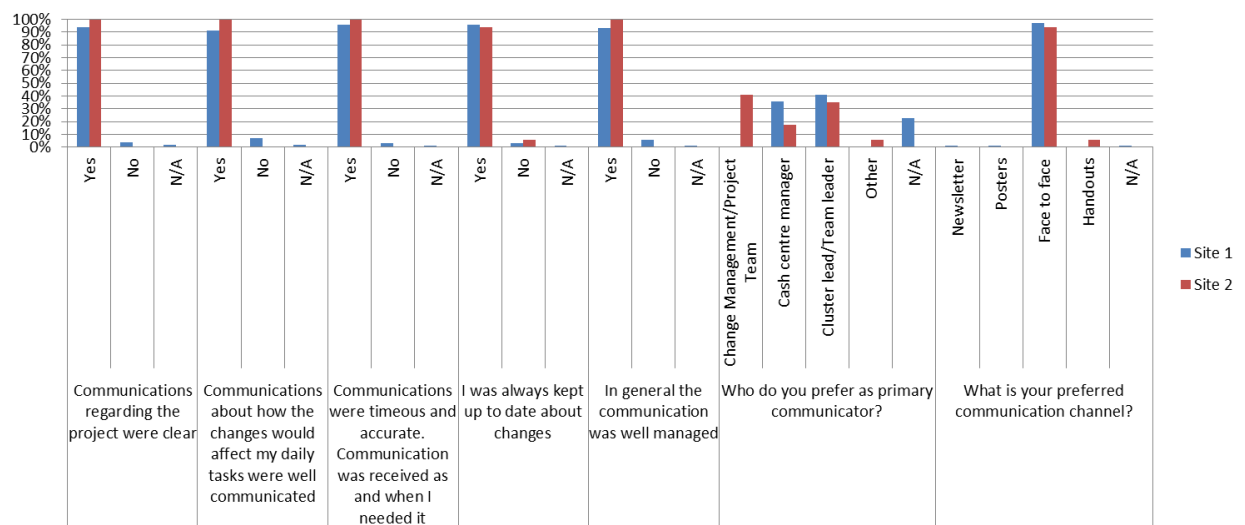


Figure 19: Post Implementation Communication Graph

The feedback received on the project communication (Figure 19) was overall extremely positive and in line with the related change readiness questions discussed previously.

The feedback on the preferred primary communicator however raises more questions with regards to the organisational culture and leadership. 40% of the staff from site 2 indicated that they prefer to receive communications from the project team, more than 30% from direct cluster- or team leaders and less than 20% from the cash centre managers. At site 1 on the other hand, 40% preferred their direct cluster or team leader and about 35% the cash centre manager, with the balance being made up by blank responses.

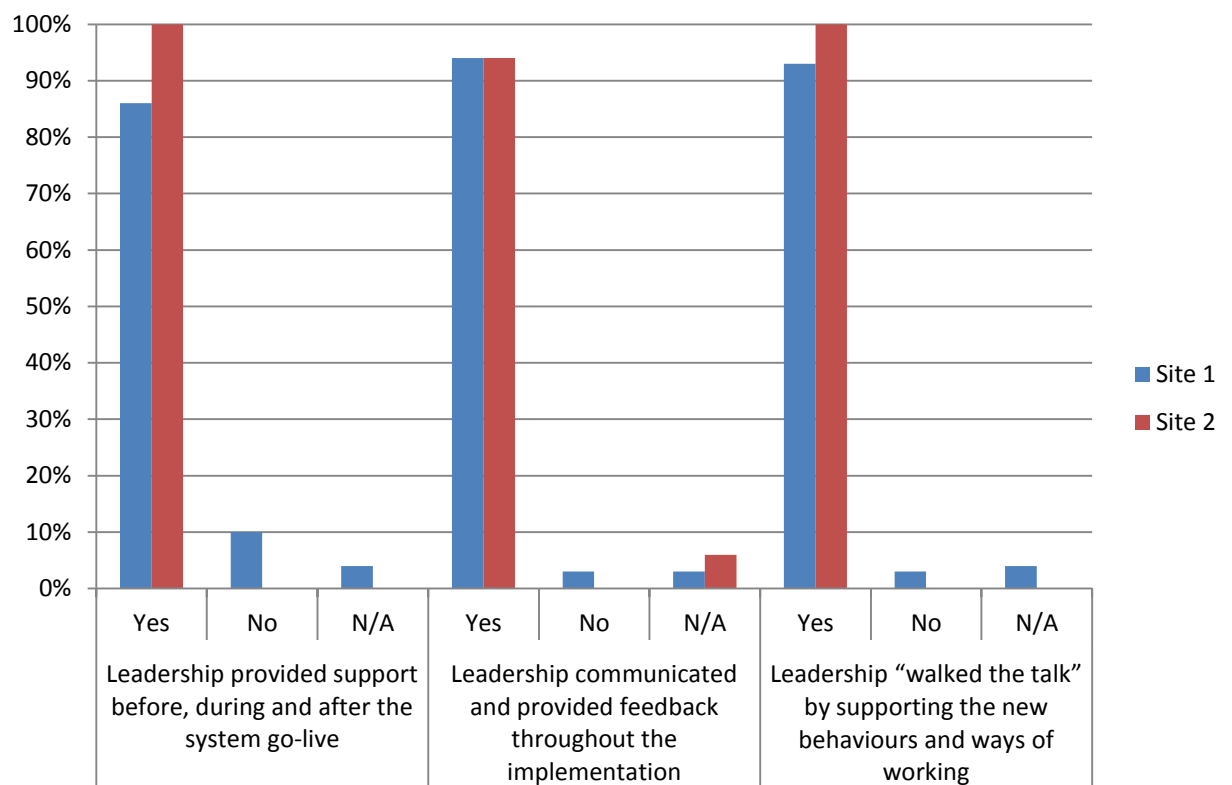


Figure 20: Post Implementation Leadership Graph

When looking more closely at leadership (Figure 20), the responses appear mostly positive. Site 2 did not give any direct negative feedback as before, despite the pre-implementation assessments highlighting doubt in leadership and a perceived lack of communication.

10% of site 1 users did however feel that the leadership did not provide support all throughout the life cycle of the project up until after implementation. 5% of site 2 did give blank responses nonetheless, but only on the issue of communication from leadership.

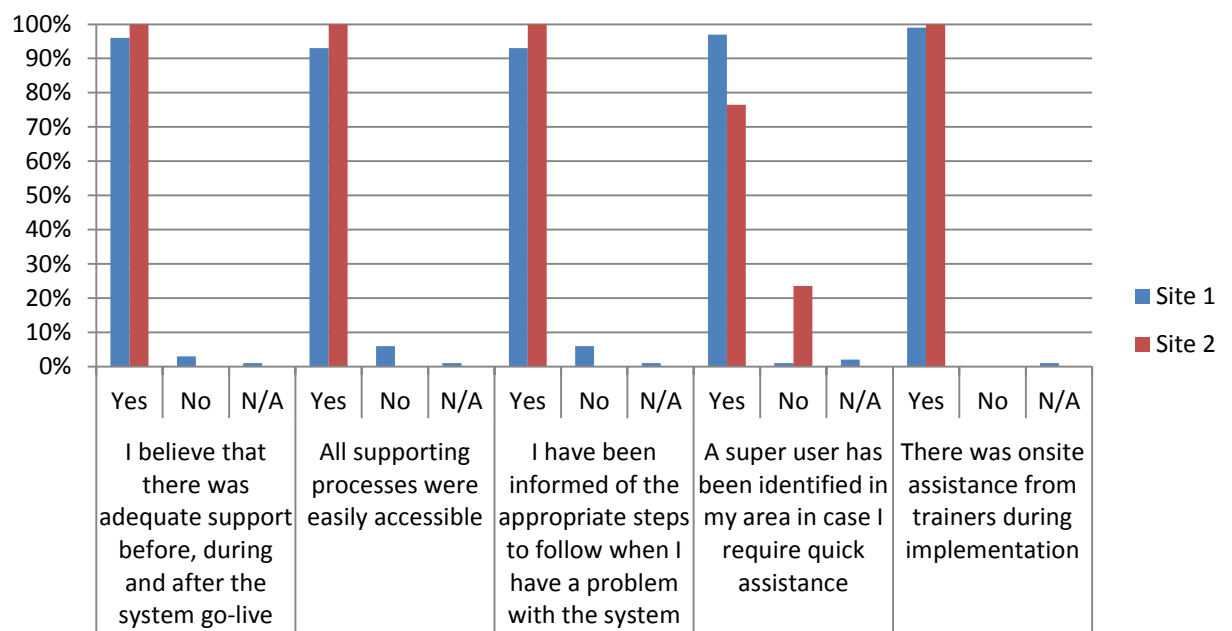


Figure 21: Post Implementation Support Graph

Responses to questions relating to support during the project (Figure 21) were more than 90% positive from site 1. These results consisted of the view that adequate support was provided before, during and after the go-live. This was about 10% higher than the feedback given on the same level of support provided by leadership.

Site 2 gave 100% positive feedback on all questions except whether a super user was identified for each area to assist if someone struggled. More than 20% indicated a direct “no” to this question.

4.2.4. Post Implementation Open Ended Responses – Content Analysis

At each of the survey sections pertaining to readiness, computer literacy, system training, communication, leadership, support and the general section respondents were given an opportunity to voluntarily note any areas of concern, constructive statements or general comments as described in section 3.4.2.

Both sites confirmed their overall feeling of readiness prior to implementation in the multiple choice section of the survey with 71% and 90% positive responses respectively to the question of whether they feel equipped to handle the change. In

the post implementation survey this was followed by 81% and 94% positive responses to whether the training was effective. Issues were however raised in the open ended responses with regards to a perceived lack of preparation following the implementation. At site 1, some staff felt that the training was not sufficient, but this would be expected to be from the minority who responded negatively in the multiple choice sections mentioned.

Staff from both sites felt that they only understood the full extent of the impact after implementation and that only the benefits were sold in the preparation. General responses from site 1 however mentioned the overcoming of obstacles after time more frequently than the others.

At site 1 some staff raised concerns about their colleagues struggling with some basic system functions and felt that the training was compressed over too short of a time to give a holistic end-to-end understanding. This relates back to the abovementioned comments regarding training, especially from site 1. The general concerns raised were mostly focused on system functionality and connection issues at both sites, but with site 2 raising issues on additional training required on hardware as well.

This was partially due to the high staff turnover, also mentioned in the responses. The areas of concern mentioned by respondents specifically included the fact that this resulted in a number of people having to work on the system without receiving any training.

Staff at both sites stated that practical training was preferred and that the user acceptance testing (UAT) as part of the training was very successful. Even though most operators felt nervous initially, they were confident in the training provided and gained more confidence in learning from their mistakes.

Site 2 requested that training be more specialised to focus on each role separately. A high level of interest was furthermore expressed from both sites to attend additional training, especially for supplementary applications.

Site 1 highlighted that communication was clearer when it happened on the floor close to the operations, but the feeling of being listened to and able to give input was appreciated. Noted areas for potential improvement included the frequency of communications. Staff from site 2 did not give any feedback with regards to areas of concern, but indicated that the project team was the preferred communication channels instead of local management. A number of respondents from site 2 also felt that they cannot express their views because of a fear of getting into trouble with management. The communication was rated as clear, stating the impact of the change, timeous, accurate and well managed from sites.

At both sites varying views were raised with regards to whether adequate support was received from their leadership, but the majority of respondents stated that this was indeed the case. At site 2 a number of answers indicated a feeling that the leadership team was not able to act as the super users in supporting and guiding users who experienced problems on the system due to a lack of knowledge of the system and related functionality. The visibility of managers during implementation was praised by staff at site 1 and site 2 noted that the implementation helped staff to better understand the pressure experienced by the management team. Both sites remarked that the relationships between staff and leadership improved over the course of the implementation.

The most notable support issue raised by site 1 was regarding the availability of process documentation, work instructions and busy super users. Contrary to this site 2 felt that the support team left the site too quickly after the date of the system going live.

The general areas of concern raised by staff at site 1 pertained to additional PC training and minor system concerns. Site 2 raised a list of perceived issues with

the system and processes implemented as well as resource capacity, work environment and communication.

The major pre-implementation themes relating to the focus areas from the open ended responses noted that were again prominent in the post implementation, were communication issues, as well as the desire for further training and development in future as mentioned above. The team work and trust concerns raised prior to implementation can be related to the responses more focused around team work from a leadership involvement and support perspective post implementation. The attitudes of colleagues were not as prevalent in post implementation responses compared to pre-implementation, but a certain lack of confidence in their readiness did however become apparent.

Table 4 below shows a summarised comparison of these major themes relating to the human focus areas mentioned.

Table 3: Major Themes from Open Ended Survey Responses

Pre-implementation Themes	Post Implementation Themes
Communication, especially between leadership and staff	Communication – Frequency and channels
Teamwork and trust	Confidence in leadership support
Attitudes	Preparation and readiness
Potential growth and training	Further training and development

4.3. Inferential Statistical Analysis of Survey Data – Correlation Analysis

As described in section 3.7.3, results from the pre-and post-implementation surveys were analysed to establish if any clear probable relationships could be identified between specified human elements.

A quantitative approach was used, performing statistical correlation analysis. If different variable responses followed each other, pointing towards a direct relationship, this is viewed as a strong correlation. The strength of the correlation from the analysis is denoted from 1 being strong to -1 being inversely correlated.

The pre-implementation survey results were focused on, with these factors having an impact on the implementation without changing the implementation execution. They are seen to be more directly related to the existing environment, not necessarily controlled by the actual project implementation.

The detailed responses were analysed to determine the existence of relationships between the identified groupings of survey sections described and justified in chapter 3, in which the research methodology was discussed. These groupings used in the correlation analysis were as follows:

- Environment and demographics
- Leadership and organisational culture
- Communication
- Change readiness

In addition to this the subsection of training as an integral part of change readiness, was also analysed against the overall change readiness.

To perform the quantitative statistical analysis to check for correlation between the identified focus areas the Microsoft Excel Data Analysis add-in was used. The aim of this analysis was to determine the existence of relationships between these factors, to enable further investigation to develop potential theories on how they impact each other. This was done on the level of positive, negative and blank responses to individual survey questions, with the statistical output giving insight into the groupings and their relationships.

Among other points the correlation analysis confirmed the impact of some of these elements as determinants of the value system as described by Hofstede, which in turn impacts organisational relationships as discussed in the literature review (55,57,58).

Table 5 below shows the groupings for which the correlations analysis was performed, along with a high level summary on correlations observed.

Table 4: Correlation Analysis Summary

First grouping	Second grouping analysed against	Correlation relationships
Environment and demographics	Leadership and organisational culture	Older and more experienced respondents have more positive perceptions of whether information is shared and change is supported. Younger respondents also view leadership as more autocratic compared to the team based of older respondents.
Environment and demographics	Communication	Younger respondents feel more strongly that communication channels are not effective.
Environment and demographics	Change readiness	Older respondents feel more equipped and ready for change, also viewing training as more adequate.
Leadership and organisational culture	Communication	Strong relationships are seen between confidence in leadership, whether the cash centre supports change and the effectiveness of communication channels. Perceptions of leadership style as

		autocratic correlates with a lack of confidence in leadership, while the invers is seen for a team based style.
Leadership and organisational culture	Change readiness	Higher levels of comfort to raise issues with line managers correlate with the view of training being adequate and feeling equipped for the change.
Communication	Change readiness	Clear understanding of communications correlate with the feeling training being adequate.
Change readiness	Training	Access to a PC and training do correlate with feeling equipped, but existing skills and prior access seem to changes these perceptions.

4.3.1. Correlation analysis of environment and demographics against leadership and organisational culture

When looking specifically at age, number of years in position and how these correlate with organisational culture and the perception thereof, strong correlations can be seen.

As expected a strong correlation is present between age and the number of years a person has been in their current position. An especially clear relationship can be seen between the number of people aged 50 and higher and the number of people that have been in their current positions more than 6 years. These include the different brackets of 6-10 years, 11-20 years and more than 20 years.

When comparing the responses to the question of whether people share information freely with others and if the cash centre supports change over the abovementioned brackets of experience levels, a strong negative correlation can

be seen with people that have been in their current position for less than a year. A similar, but less strong relationship can be seen for the same experience level in responses to the effectiveness of communication channels and their confidence in leadership. The number of people with 1-2 and 2-5 years' experience on the other hand, only has a strong correlation with the blank responses on the first 3 of these questions mentioned. A strong positive correlation can then be seen for brackets of people with more than 6 years' worth of experience with regards to information sharing and belief in the cash centre supporting change.

The progression is clear with the increased experience, but the question needs to be asked whether this is a change in perception or if people tend to learn to share more freely as they gain experience. The fact that the same progression can be seen to an extent in the other questions mentioned leads one to believe that it is potentially an attitude or perception change developed with age or years of experience.

The other possible explanation would be that the majority of these people with more than 6 years' experience have more senior positions in their respective teams. More senior team members would possibly be more prone to respond positively as a reflection on the state of their area in the cash centre to try and look good.

This latter notion is however contradicted by the same positive trend not seen to the same extent in relation to the effectiveness of communication channels or the level of confidence in leadership. There is however a visible inverse correlation to the number of blank responses to confidence in leadership. Subsequently the correlation between the perceptions of if the cash centre supports change and whether information is shared freely is subsequently also clear.

The experience level bracket of 1-5 years', mentioned to align with blank responses, also aligned strongly with blank responses to the classification of leadership style and inversely to the classification of being self-managed. This

seems to indicate that this might tend to be an uncertain time in general for cash centre staff in their careers, where they feel more dependent.

In the classification of the leadership style, the number of staff aged 19 and younger correlate significantly with the view that leadership is autocratic and just as strong inversely to team based.

The first conclusion to be reached naturally is that this supports the common notion that younger generations tend to be more rebellious and struggle to relate to authority in a healthy way. It could however also be due to their lack of experience causing their input to not be valued as much, creating a feeling of disconnect, especially from leadership.

Site 2 and 3 are seen to be at opposite ends of the spectrum with regards to age and experience in the teams, with site 3 having the benefit of senior team members with a wealth of experience.

4.3.2. Correlation analysis of environment and demographics against communication

The same age group of 19 and younger mentioned above, with the strong correlation to the view of leadership as autocratic, is also in strong correlation with the negative responses to the effectiveness of communication channels. This group likewise has a considerably strong inverse correlation to the positive responses. As would be expected based on the correlation noted, this ties in with the experience in their positions as well, as mentioned above.

4.3.3. Correlation analysis of environment and demographics against change readiness

The strongest correlation to a specific age bracket, when analysing the question of if respondents felt that training was adequate for their job functions, is seen in the age group of 19 and lower. A strong inverse correlation is seen with positive responses and a strong direct correlation with negative responses. This same age

bracket similarly has a strong direct correlation with negative responses to the question of whether respondents feel equipped to handle the change. The second highest age bracket, 40-49 years old, had the strongest direct correlation to positive responses to this question and the strongest inverse correlation to blank responses.

A similar trend is seen when analysing the number of years respondents have been in their current positions. A strong direct correlation is seen between not feeling equipped to handle the change and having less than a year experience. The opposite is seen with a strong inverse correlation to the same negative response in the bracket of 11-20 years of experience in current roles. Negative correlations can be seen to different degrees against positive responses for all experience brackets below 5 years, while all brackets above 6 years show positive correlations even though these are not as strong.

These relationships give some indication towards respondents being more confident to face change as more experience is gained. As mentioned earlier these years of experience in current roles have a relationship to age brackets, as was expected.

4.3.4. Correlation analysis of leadership and organisational culture against communication

Negative responses stating that the cash centre does not support change align closely with likewise responses to the effectiveness of communication channels and the level of confidence in cash centre leadership. This aligns with literature emphasising the importance of communication and support from leadership (56,60,67,76).

The positive responses on the cash centre supporting change however do not show such a strong correlation, but a much stronger inverse correlation with the blank response to confidence in leadership.

It would seem that people tend to be much clearer and more bold when it comes to negative responses, but this could also indicate that people who believe that the cash centre supports change tend to be less uncertain about their feelings towards leadership, even though divided.

The level of confidence in leadership is related to the perceived style of management; with perceived autocratic leadership resulting in less confidence while team based styles seem to inspire more confidence. The inverse could possibly be just as plausible due to no clear time order indicated. People might feel more positive about team based management styles which involve them more and get their input and buy-in, resulting in more confidence in leadership based on better team morale (47,56,66,76).

This latter notion is backed up by the observation that there is an exceptionally high association between the confidence in leadership and the perceived effectiveness of communication channels. This effectiveness of communication channels also correlate with a team based management style and inversely with an autocratic style (47,56,66,76).

The frequency of blank responses to the effectiveness of communication channels seem to also be inversely related to the opinions of being self-managed. This was in response to the multiple choice question on whether people perceive the leadership style as self-managed, autocratic or team based and could point towards people who function more independently being less worried or opinionated on communication channels. Alternatively it could be an indication of communication not forming such a big part of their specific functions.

A correlation is seen between blank responses to the multiple choice question on the leadership style and the blank responses to whether information is shared, if the cash centre supports change and the effectiveness of communication channels. This further supports the former deduction to a degree of blank responses being

related to people not having strong opinions on certain matters or being uncomfortable to freely and openly share them.

These opinions are seen to be strong again with the inverse correlation between blank responses to the sharing of information and the perception of leadership style to be self-managed or autocratic.

The same clear correlation is however surprisingly not seen with blank replies relating to the confidence in leadership. This clear cut distinguishing between autocratic and team based is again seen in the correlation of the responses to the effectiveness of communication channels as would be expected. This same trend in the stated styles continues with regards to the confidence in leadership as mentioned.

In summary, strong relationships are confirmed between the perceptions of leadership, communication and the organisational culture as proposed by literature.

4.3.5. Correlation analysis of leadership and organisational culture against change readiness

The inclination towards discussing any issues experienced with direct line managers correlates with the perception of training sufficiency. This could possibly be attributed to a general perception and level of comfort with the course of the project and a trust in management as well as project resources.

A feeling of not being able to communicate these issues experienced with direct reporting lines also correlated strongly with the feeling of not being properly equipped. This confirms the expectation that the perceptions of these issues are related, with a negative view of the one influencing the other.

4.3.6. Correlation analysis of communication against change readiness

Access to a PC at work also correlated with the perception that the change implemented through the project would not be disruptive, despite the heavy expectation from experienced project resources already at that point that it would be. This could possibly be apportioned to the possibility that some resources thought that having access to a PC at work was about as big a change and disruption as they could fathom at that stage prior to implementation.

Contrary to this, the sentiment of having received adequate training correlated with the belief that the expected change would be disruptive and the same correlation is seen with the view of whether issues can be discussed with line managers.

This seems to be linking the clear understanding of the project and expectations with the training provided and involvement in communications. Managers with closer open relationships with their staff would be expected to involve them more in communications and also seem more approachable when issues arise as proposed in literature (47,56,76).

4.3.7. Correlation analysis of change readiness and training

Further correlation analysis was done between computer literacy and change readiness with regards to the details surrounding training and hardware access. Even though training is not a human perception factor on its own, the requirement as part of preparation for such an implementation was noted from the literature (5,12,22,9).

A few weeks before the go-live dates PC's were introduced at certain sites to give personnel access to basic PC training. The aim of this was to increase the levels of comfort with computers and the general readiness for implementation.

One of the basic PC skills this allowed staff to exercise was navigating on the computer with a mouse. From the survey, the access to a computer at work seemed to be inversely correlated with the comfort of navigating with a mouse

though. Access to a personal computer at home did however correlate to these comfort levels significantly.

This could possibly be due to people with access to a computer, only for the limited time at work, still learning the skill of using a mouse. The result would be expected to be an increased feeling of uneasiness among these people, especially when seeing other staff members that were already comfortable with such tasks.

The strong correlation between this use of a PC at work and the level of stress perceived in jobs tends to support this theory. Likewise having a personal PC at home also seemed to accompany levels of stress experienced in jobs, but potentially for the very different reason of more senior staff being more likely to have this at home. Stress that comes with responsibility and pressure to perform are generally part of more senior roles as well.

This is further confirmed by the same correlation seen to the use of email and internet, which is also something more often provided to more senior roles.

However, having a computer at work looked as if it was still related to the feeling among staff of being sufficiently equipped to handle the change despite this correlation with stress experienced.

Equally interesting, access to a PC at home was inversely correlated to the feeling that the training provided was adequate. This could be due to people with knowledge of the basic skills sometimes feeling that the training covering these skills was insufficient based on an expectation of more advanced training.

This theory is somewhat established further when seeing the inverse correlation between the feeling of having received adequate training and being comfortable with the different functions on the computer, such as Windows Explorer, email and internet.

There is however a direct correlation between having used Microsoft applications like Excel before and the feeling of having received adequate training, possibly contradicting this theory. This could point toward a differing expectation of what type of computer skills would be required to operate the new system, whether more internet based compared to locally-installed known applications. Even taking this into account, there is still however a direct correlation as expected between not feeling equipped to handle the change and the feeling of training being inadequate.

As would be expected, respondents who have a PC at home correlated with respondents having used Windows Explorer, email and the internet before. The latter two functions are related and correlated as well as per expectations.

Similarly there is a strong correlation between the comfort levels of using different hardware such as a mouse as well as software like Windows explorer, the internet and email. This can be logically attributed to the general comfort levels with using a computer before. Similar to the observations though, when it comes to Microsoft applications such as Excel, this correlation was challenged.

4.4. Comparison of Project Team Observations – Content Analysis

During the implementation and pre-implementation activities conducted, such as training and sessions to support change management and awareness of the project, qualitative observations were made by the project team. These pertained to the identified factors investigated in the survey, as well as other variables on each site. Members of the project team noted these observations on an informal basis as they were made individually. They were then consolidated after discussions with the project manager. The purpose of these was to mainly serve as input and lessons learnt for the next site implementations to follow.

These observations were categorised as depicted in Figure 22, in accordance with main themes identified at the time of observation:



Figure 22: Site Observation Categories

From the observations made by the project team in table 24 with regards to the operational background, found in Appendix B, site 1 can be separated from the others in terms of shift structure and support availability. Site 1 has more shifts running and being the only site within driving distance of less than a day, direct support can be given from the head office on a request basis without resources having to travel excessively.

Further background information revealed that site 2 is the newest site among these and also has a lower average age among staff members. In addition to this lower age, a higher turnover of staff was observed during the time of the implementation.

A lack of management presence onsite and visibility of leadership was also observed at site 2, with multiple sites not part of the implementation at the time in the region sharing the same manager. Except for this, the leadership style here also seemed more negatively focused, driving performance through a fear driven culture. The delegated authority to team leaders and second line management

seemed to not be trusted completely and there was a case where a senior team leader was suspended during the implementation for a mistake that was made.

The duration allowed for each implementation was 10, 5 and 2 weeks for sites 1, 3 and then 2 respectively. There was however a need to return to site 2 at a later stage for refinement and again thereafter for fraud investigations into the misuse of the system.

Site 3 was the only facility where the layout and flow was designed with the new process and system in mind. This was after site 1 served as the pilot, where external consultants played a major role and followed a more agile implementation approach. At site 1 the system implementation was preceded by first implementing non-system related operational efficiencies or “quick-wins” as they were referred to. Internal business resources played a more prominent role at the implementation of sites 2 and 3, where the project plan and schedule was less flexible and not agile.

4.5. Site KPI Comparison – Descriptive Statistics

Data was gathered on key performance indicators identified by the bank, already forming part of business as usual, as explained in section 3.6 where these KPI measurements are defined as well. These were in the form of monetary values and figures of sensitive nature. Due to these characteristics, it was decided to not include the raw data, as per the mentioned agreement with the bank in the Ethics Considerations chapter (section 3.8) of this research report and consent letter from the bank, included in Appendix E.

A degree of descriptive statistics and visualisation methods, as described in section 3.7.2, was used to present the raw data graphically without divulging sensitive numbers.

Data gathered on these KPI's were also reviewed for the period prior to implementation, commissioning and post implementation, in order to investigate

if trends were affected by the implementations. This was done to verify if certain conclusions could also be drawn on the state of operations at certain sites from these trends.

Other sites where the project was not implemented yet were also included, to take into account seasonal trends inherent to the business and not directly caused by the implementations per se. The average of these sites were taken as a benchmark and the risk of this being influenced by extreme outliers and external factors accepted, with the implementation cases also acknowledged as being susceptible to the same factors and becoming extreme cases.

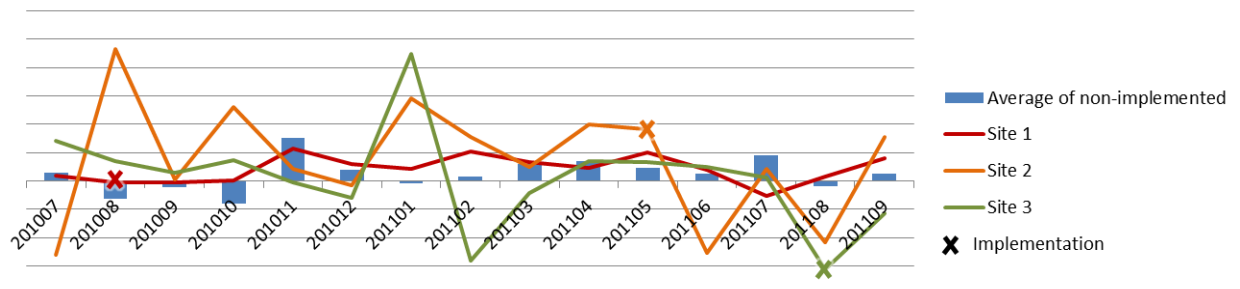


Figure 23: KPI's - Controllable irrecoverable ratio

The controllable irrecoverable ratio (controllable irrecoverable / total cash deposits) gives an indication of losses that could potentially have been prevented through proper processing and visibility, as described in section 3.6 (Figure 23).

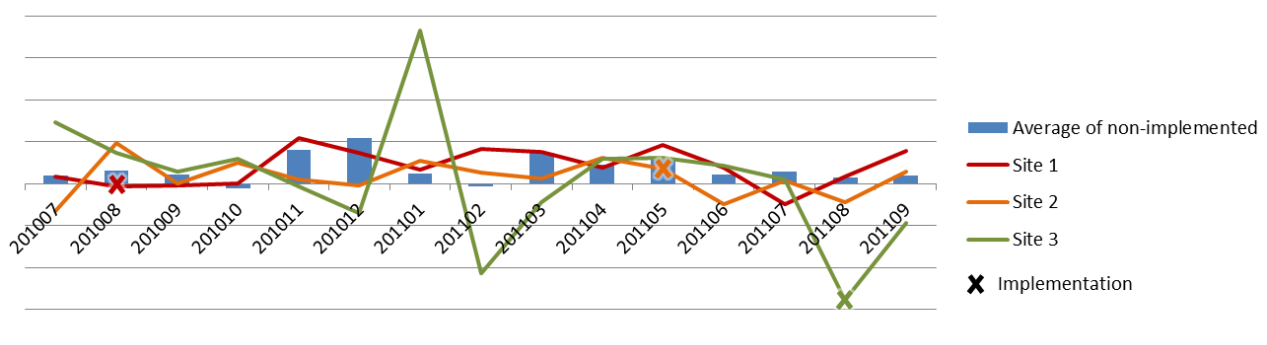


Figure 24: KPI's - Controllable irrecoverable value

The controllable irrecoverable Rand value (Figure 24) is linked to the abovementioned controllable irrecoverable ratio, but gives the actual monetary value. It was expected to be directly dependant to the Rand value of the total cash in (therefore total irrecoverable ratio is measured). The possibility was identified

that this could be further affected by the pressure and workloads experienced by staff.

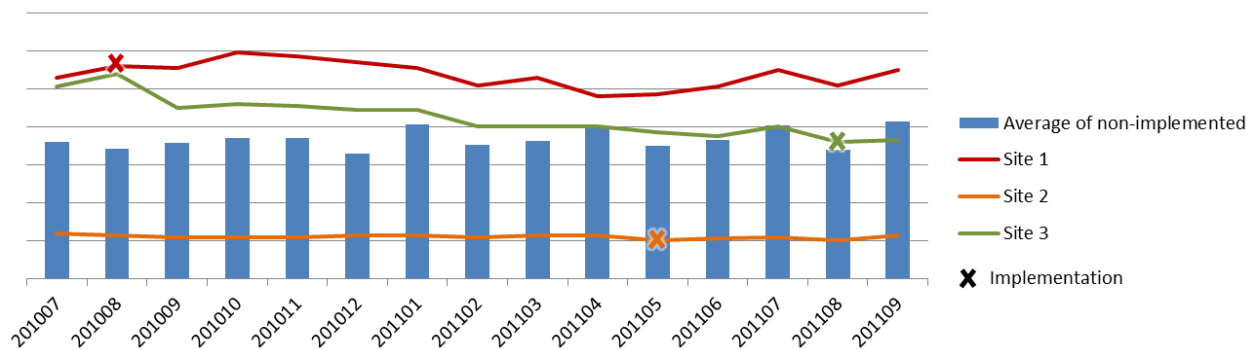


Figure 25: KPI's - Staff headcount

The staff headcount (Figure 25) was expected to be consistent, with no noticeable change to pre-implementation patterns. It is however interesting to note that all 3 implemented sites experienced a decrease in staff headcount, despite the overall trend for other sites being an increase for the same period.

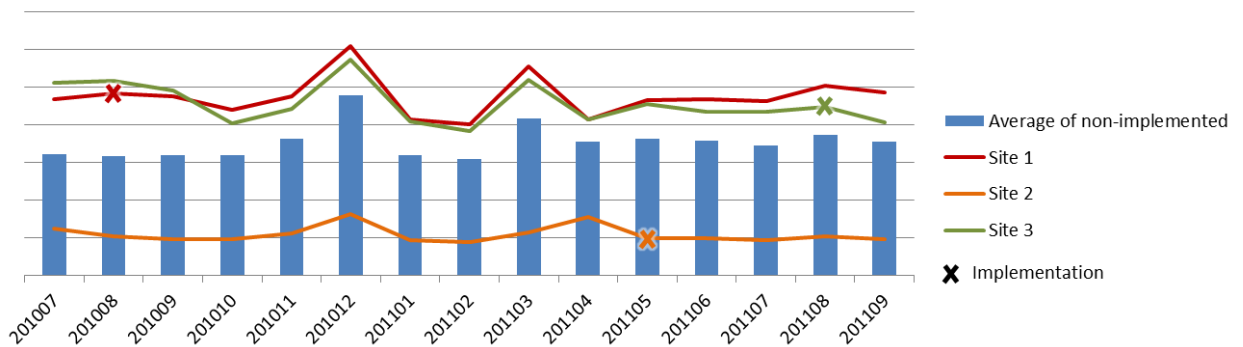


Figure 26: KPI's - Cash deposited

The total cash deposited, which is the inbound volumes counted, increased slightly over the time of the implementations across all sites with noticeable seasonal peaks at the end of the year and again around Easter weekend (Figure 26). This is a known trend in the industry which coincides with these major shopping seasons for retailers. There is also a clear slump in between these two peaks, but these volumes were however not influenced by the project implementations.

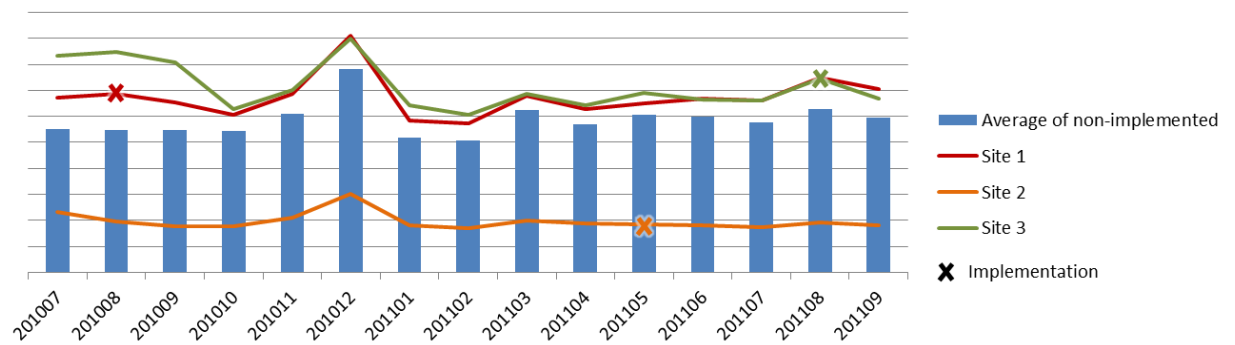


Figure 27: KPI's - Retail cash deposit transactions

The same observations are made when looking at the number of retail deposits in terms of deposit transactions from retail customers (Figure 27), as a specialised portion of this inbound volume, which is subject to the same seasonal factors as discussed above with regards to cash deposited.

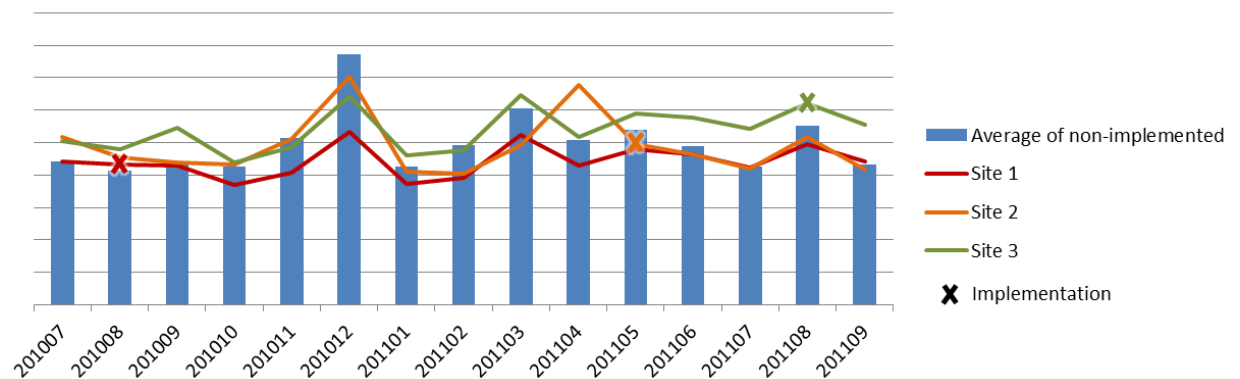


Figure 28: KPI's - Turnover per head

The turnover per head (Figure 28) is a measurement of resource productivity in the processing centre. This measurement was expected to drop slightly after implementation while the comfort levels with the new system were still low, but to increase again over time due to the described benefits realised as discussed in sections 3.3.1 and 3.3.2.

Site 3 had a higher turnover per head from before the implementation, while sites 1 and 2 were comparable to each other. All 3 sites mostly followed seasonal trends seen throughout, except for site 2 which had a peculiar spike just before implementation when the other sites all experienced a drop.

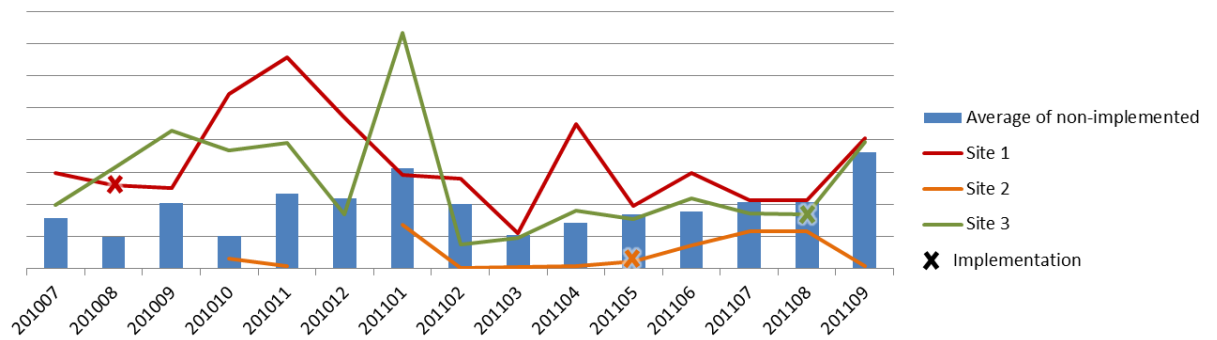


Figure 29: KPI's - Overtime

When investigating the overtime worked, some pockets of missing data can be seen prior to implementations (Figure 29). The inconsistency of overtime increases is a concern for all sites, with no clear seasonal trends across. This issue is further emphasised when compared to the consistency of total cash deposited over the same period.

5. Discussion of Results and Analysis

5.1. *Introduction to Discussion*

The purpose of this chapter is to evaluate and discuss the results and subsequent analysis performed (Chapter 4. Data and Analysis) as pertaining to the purpose set out for this research project.

With acceptable response rates achieved at all 3 sites for the pre-implementation surveys, as justified in section 5.2.1, a descriptive statistics analysis approach was applied to investigate the results as noted in the Research Methodology set out in chapter 3. For this reason results were graphically depicted in the analysis to assist with comparisons and pattern matching. A quantitative statistical analysis was also performed on this same data. These analyses documented were studied in detail before consolidating notes from the graphical comparisons, correlation analysis and qualitative feedback.

The surveys however collected large amounts of data, not only with this study in mind. For this reason only data from the analysis showing results relevant in contributing to either challenge or confirm certain theories are highlighted and discussed in detail.

The human factors serving as focus areas described in the methodology were used to organise this chapter. Based on the analysis it was difficult to separate the culture and leadership though, as being interrelated and affecting each other directly. For this reason these were combined and then the environment was still discussed on its own to cover detail on the background and demographics.

The subsections are therefore set out as follows in this chapter:

- Environment and demographics
- Leadership and culture
- Communication
- Change readiness

A number of risks and limitations were identified at the start of this research project, but the impact of these as well as other potential shortcomings was deemed worth revisiting.

5.2. Shortcomings and Limitations

5.2.1. Sample Size and Response Rates

As planned, the full population of each cash centre was selected to participate in the surveys for data collection, meaning that the sample size should be equal to the population. Response rates from sites 2 and 3 were at acceptable levels above the 80% guideline noted in section 3.7.1 and the response rate of 79.3% accepted. With no theories formulated only from the survey responses of site 1, this decision to accept the variance of 0.7% below the guideline (which was also noted to be above the acceptable minimum from other sources) set is justified.

It was however stated early on that the small number of cash centres, being the units of analysis studied, the findings could not potentially be interpreted as proof of any new theories developed. The literature study beforehand aimed to review existing theories for the study to serve as confirmation to a degree or indication of potential areas where these could be challenged. In the case of the latter, additional focused research and investigation would be required into these areas.

The reason for this number of units analysed, is the time required to plan, execute and monitor the implementation projects as part of on-going business activities with shifting priorities.

5.2.2. Monitoring Time Constraint

Due to this time constraint mentioned the benefits achieved and sustainability of the implementations could not be monitored over a longer period either. Therefore the measurement of KPI's and the success over the short term is anticipated to be indicative of the expected trend for the longer term future.

Likewise the issues encountered during implementation and shortly thereafter are interpreted to be the matters of significance. Stabilisation was expected over the longer period though, in accordance with the J curve of change mentioned in sections 2.2.2 and 3.6 as well.

5.2.3. Survey Design and Usage

The surveys used for data collection, were setup as part of the change management activities for the project implementations by the business. The design and execution was done with continuous improvement and learning in mind. The focus areas of these surveys were however compared to literature findings and confirmed to be relevant to the study at hand.

The bank also gave permission for this data to be used as secondary data with certain details not to be made available due to the potential risk to the business and people involved. For this reason numbers were reflected graphically for the purposes of comparisons and as percentages of the total instead of the actual numerical values. Detailed information with regards to the business, locations and staff were also not disclosed for the same reasons.

A personal learning from this study and approach was that the mixed method approach was more complex than a direct quantitative or qualitative approach. This was done in part to increase the validity of the findings and also because of the type of data used. By not using the secondary data and instead designing a survey and limiting the scope and focus of the research more upfront based on the literature review, a more simplified approach could have been used. This could

potentially be easier to follow and repeat, increasing the judged reliability of the approach.

5.2.4. *Loss of Data*

The data collected post implementation from site 3 was not available to be included in this study at the time of writing this research report. This impacts the level of verification and certainty for conclusions drawn.

The post implementation data for the other 2 sites, as well as pre-implementation data, project team observations and KPI's for all 3 sites were nonetheless available. This context and additional information to examine theories and findings was judged as acceptable for verification.

5.2.5. *Biased Survey Responses*

When comparing the post implementation survey results collected for site 2 with the other sites and pre-implementation data for the same site, a level of bias was noticed. This was interpreted as potential intimidation or coaching from management to influence the responses and subsequent view of the cash centre and its environment as described in section 4.2.3.

This unfortunately impacts the validity of the results for the post implementation survey data collected for site 2, but nevertheless gives valuable insight into the management style and cultural environment. With leadership, communication and organizational culture being key focus areas identified, this was viewed as an opportunity to investigate what is viewed as a negative environment compared to the principles found in literature (56,60).

For this reason, these results were still included and interpreted as valuable insight into the organizational culture and leadership at site 2.

5.2.6. *Post Implementation Data*

Due to the mentioned loss of post implementation data collected for site 3 and the suspicion of coaching in the post implementation data collected for site 2 the post implementation data was not analysed in depth or quantitatively against pre-implementation data. It still served as an indicator of the cultural environment as stated above for site 2 though.

5.2.7. *Measurement of Implementations' Success*

The decision made to use the existing business KPI's as an indicator of the success of implementations has certain constraints to be taken into account. These KPIs were not developed specifically to measure the success of the implementations, but business as usual and do not cover all aspects that would be considered as success for the project at hand independently.

This is however accepted with the implementation being part of business as usual. Post implementation survey feedback and project team observations were also taken into account to determine the success or failings of implementations respectively.

Prior to implementation there might also be other factors influencing these KPIs measuring the business objectives and not separating the project as an experiment to be monitored in isolation. Isolating these factors would be near impossible in an open, real world environment, but they were accepted due to the nature of the research as being based on a real problem and the nature of human factors as being complex and subject to influencing.

5.2.8. *Qualitative Analysis as Interpretive*

As mentioned in section 1.5, it was accepted when choosing the qualitative research approach and methodology, that a certain level of interpretation would be involved. This highlighted the potential risk for biased interpretation, based on the researcher's own frame of reference.

Even though the researcher's own opinions were intentionally excluded and focus placed on not allowing these to cause bias, it is acknowledged that it cannot be removed completely. As a participant observer special focus was placed on not raising theories based on opinions without any data from the sources mentioned to substantiate such claims.

For this reason, additional sources of information were combined, such as the project team observations to support or confirm the survey results and the quantitative analysis to determine the relationships between different influential factors. These additional sources were found to give more insight into the culture and perspectives at the various sites respectively. In conclusion, despite this constraint, the chosen method was justified to be reliable and repeatable.

Another personal lesson learnt relates to the collection of the project team observations as qualitative data. If the data collection was planned for research purposes instead of using secondary data, the observational protocol could have been defined upfront. This would again, similar to the survey as primary data collection method, improve on the reliability and repeatability of the study as a whole.

5.3. Summary of Validity and Reliability

Despite these shortcomings and limitations, the research was strengthened through the use of multiple data sources and combining different approaches to the analysis as described in chapter 3 and revisited above.

The reliability was also addressed by setting out the methodology and process in detail for repeatability of the study. The detailed response tables for surveys and output of statistical analyses is also included in the appendix and referenced in the appropriate sections for the same reason.

5.4. Environment and Demographics

The demographics seen in Figure 8 are relevant as contextual background, as mentioned in the literature review, even though age was not identified up front as

one of the major focus areas (54). Based on this background stating that lower age groups and groups with higher levels of education showed the most positive results when responding to technology (54), sites 1 and 2 was expected to have a somewhat more openness to the acceptance of technology compared to site 3, albeit not a significant amount.

When looking at the number of years in current positions or roles in the cash centres (Figure 9: Number of Years in Position Graph), this relates back to the age demographics observed. These levels of experience can further give people a sense of loyalty to “the old way” of doing things or the people who trained them in this, giving further reason to resist change. (28). The high percentage of people with more than 20 years of experience combined with the low percentage of staff with less than a year experience suggests a very stable environment to work in.

Along with the highest number of employees in the youngest age bracket, site 2 also had the most employees who have been in their roles for less than a year. This is sometimes interpreted as a possible first indication of a less stable environment with more changes in the form of a higher staff turnover, but could also possibly be due to growth and a recent recruitment cycle.

5.5. Leadership and Culture

In Figure 12 the negative responses from site 2 outweigh those of the other sites, especially the perceived effectiveness of communication channels and confidence in the cash centre’s leadership.

These results potentially point towards existing tensions in the relationships and an unhealthy cultural state, which would be expected to be further increased by the added stress of the change involved in a project implementation. This stress is one of the major risks identified by Vaughan to be taken into account with system implementations (27).

This theory is further confirmed from the analysis of existing stress levels as shown in Figure 14, with site 2 being the highest. The high staff turnover at site 2 is one factor that can contribute further to this, but also be a result of this environment. This was mentioned by respondents as part of the areas of concern in the post implementation survey as also resulting in some new employees starting on the system without dedicated training.

The rating of the management style at site 2 as autocratic (Figure 13) gives further confirmation to the theories on the cultural environment at site 2, compared to both the other sites which were rated as team based management by the majority of respondents. This is interpreted as a negative response and not the type of management style conducive to successful change, as pointed out in the literature reviewed (47,48,56,76).

From the post implementation open ended responses a number of employees from site 2 also expressed that they are not comfortable raising their views and concerns, fearing that they would get into trouble with management.

In Figure 20 a noticeable number of respondents from site 1 rated the level of support provided by leadership as not sufficient throughout the project life cycle. Figure 21 shows 10% more respondents indicating that the overall support levels provided throughout the project was adequate. This reveals something about respondents' view of the support from leadership, but is still perceived as positive compared to the concerns raised for site 2.

In the open ended responses site 1 employees also stated an appreciation for the visibility and involvement of the cash centre's management during the course of the project, while the project team raised concerns over the absence of management presence at site 2 during the implementation.

The most notable support issue raised by site 2 respondents in the open ended responses was that some employees felt that the support team left the site too

quickly after the date of the system going live. The shorter onsite was however justified with site 2 being the smallest among the 3 implemented sites. This concern raised is however acknowledged as having a potential impact on the issues encountered and possibly amplifying problems further.

After the withdrawal of the project team and operational handover, additional costs and further support was required at this site in the form of some team members returning to the site to rectify mismanaged processes cluttering up the system with non-existing inventory.

Site 2 provided mostly 100% positive responses to the post implementation survey, but a question where respondents gave some negative responses was with regards to the unavailability of a super to assist when users were struggling. This was one of the major requirements raised from implementations in the medical industry as well and acknowledged as a potential cause of future problems (5,9).

5.6. Communication

The low percentage of respondents expecting the change to be disruptive in the pre-implementation survey (Figure 14) could be reflective of a number of factors. It could either point to an overly positive ambitious attitude, a level of naivety surrounding the nature and scale of the change or a general misinterpretation of the question. This relates back to the emphasis placed on communication and leadership's role in ensuring understanding (47,56,76).

The significant positive responses from site 1 post implementation that the project objectives and benefits were properly communicated to them beforehand points towards effective communication from this level (Figure 16). It was highlighted in the open ended responses that this was experienced as most effective when it happened close to the floor.

Close to 20% of resources from site 1 however acknowledged that they did not fully understand the impact of the implementation on their role, confirming that

the communication could have been clearer on the day-to-day impact. This same response came out in the open ended free responses to general change readiness at both sites 1 and 2 as well.

The statement made by some that only the benefits were sold was however contrary to the general feeling expressed and thus interpreted as isolated responses. These could possibly be based on additional stress experienced in the “teething” process after implementation resulting in a need for participants to vent their emotions.

This notion of the potential failings in communication, especially from a leadership perspective, is further boosted by nearly 50% of site 2 participants stating that they are not always made aware of changes in the cash centre before they occur. This is very high, compared to 4% and 11% at the other sites respectively (Figure 15).

More than 20% of employees at site 2 also indicated that they are not comfortable raising project related concerns through the correct channels. This statement is interpreted to be a result of the existing tension, lack of confidence in leadership and perceived inefficiencies in communication channels. Both sites 1 and 3 on the other hand indicated very high levels of comfort, close to 100%. In the open ended responses from site 1 a feeling of gratitude was also conveyed for being able to give input and to be “listened to”. This was also noted by a number of authors as crucial for fully utilising the people as a company’s most important asset and essential for buy-in into changes (11,14,47,49,60,62,74).

More employees from site 2 likewise indicated in the post implementation survey results analysed in Figure 19, that they prefer to receive communication from the project team rather than their direct line reports or cash centre management. This could point toward a lack of openness in communication channels, which is viewed as essential (47,48,56,76).

5.7. *Change Readiness*

As mentioned, from Figure 10 it is seen that site 2 had a generally lower level of confidence in their ability to use computer hardware and software except for email and internet, which are not connected to the new system and its use. They also indicated the highest number of responses feeling that not enough training was given to perform their relevant functions.

This was despite the same training program and material used in the implementation of site 3 and more material developed from lessons learnt during the implementation of site 1. At site 1 the change readiness improved in the post implementation results analysed nonetheless, after a lack of confidence that they are equipped also noted prior to implementation (Figure 16).

Similar concerns were however raised by some individuals from site 1 in the post implementation survey, on colleagues struggling with the system and a feeling that training was done over too short a time, but seems to have been to a lesser degree, not showing as clearly in the overall results.

As mentioned the post implementation results for site 2 were not analysed due to suspected persuasion from the site's management, with 100% positive responses to the issues of change readiness post implementation. These results do not correlate with the pre-implementation responses, which would have been shared with management as part of the preparation and readiness for the implementation.

From the analysis of the first languages and staff's own perceived speaking, writing and reading ability in Figure 11, a similar lack of confidence can be seen in site 2 despite the highest percentage having English as a first language compared to other sites. This correlates with the same lack of confidence noted in computer literacy.

The results for whether employees felt equipped to handle the change, as depicted in Figure 14, also shows site 2 with the highest negative response rate but to a

lesser degree compared to the confidence in language and leadership. The high percentage of blank responses from site 1 in this regard cannot be explained fully, but brings their confidence level to an even lower level than seen for site 2. This is in stark contrast with the much higher percentage of more than 80% from both sites who according to the post implementation survey believed that they were adequately capable even before the PC literacy training.

A higher percentage also indicated their comfort levels with PC hardware, indicating a degree of success in training either developing resource skills or confidence in own ability. This is further confirmed by the majority positive responses to the training facilitators and environment, with site 1 only noting that the material was difficult to work through. This learning was taken away from the first implementation and improved on (Figure 18).

The post implementation analysis of computer literacy results (Figure 17) however shows more favourable results, with almost all respondents from both sites 1 and 2 indicating that they are comfortable that their PC skills are sufficient to perform their role. These results for site 2 are however viewed knowing that the reason for inaccurate 100% positive responses on other questions could have played a role in the responses to this question as well even though it's not a 100% biased response.

5.8. Success of Implementations based on KPI's

In the analysis of the existing site KPI's to investigate the impact that the implementations at the respective sites had on these, the average across the non-implemented sites was taken as a benchmark to take seasonal trends into account as mentioned in section 4.5. This gave more context and insight into trends outside of the impacted implementation environment, but also impacting the 3 implementation sites. As the sites differ in size and processing volumes, up and down movements in the measurements of values are of more interest than the actual values in the purpose of identifying trends and the impact of the implementation events.

The full comparison table with expected trends can be viewed in Appendix C including notes on observations compared to expectations and site benchmarks. Elements that were interpreted as worth discussing in more detail were highlighted in green and yellow as confirming or challenging theories or expectations respectively.

When specifically analysing the results with time order in mind, to look at an identified cause producing a specific effect, it's difficult to be able to make any definitive conclusions immediately. The implementations were marked as discreet events on the timeline of the graphs to allow a view of what followed and if it differed from the average trends seen.

A number of existing conditions, perceptions and issues can however be identified before implementation, but none of these can be seen as a direct cause. The age, perception of leadership, operational and communication issues, etc. cannot be isolated to a specific event in order to analyse a direct consequence that follows closely in time.

For this reason the survey feedback and project team observations are also taken into account as additional context to validating theories based on the perceived trends in performance at sites.

5.8.1. Controllable Irrecoverables

The controllable irrecoverable ratio (controllable irrecoverable / total cash deposits) gives an indication of losses that could have been prevented through proper processing and visibility (Figure 23). This ratio was expected to rise temporarily after implementation due to commonly experienced teething problems such as human error with the new system and processes. It was further expected to decline over a longer period of time, with increased traceability and visibility due to the electronic system enabling the recovery of certain costs incurred.

The trend of this generally increasing is a sign of operational problems, fluctuating significantly. Site 1 showed no abnormally sharp increases or decreases that can be attributed to implementation or otherwise, with a consistency seen throughout. Site 2 shows a sharp decline right after implementation and site 3 likewise during implementation. Even though both these declines are in line with seasonal trends seen among other sites, they seem to be somewhat magnified in the mentioned implementations compared to the average benchmark of non-implemented sites. The extreme fluctuations seen in site 2 are also interpreted as an indication of a lack of control and stability to a certain degree in this regard.

The controllable irrecoverable Rand value (Figure 24) is linked to the abovementioned controllable irrecoverable ratio, but gives the actual monetary value. It was expected to be directly dependant to the Rand value of the total cash in (therefore total irrecoverable ratio is measured), maybe even exponentially due to pressure and workloads. No abnormalities were expected because of implementation, with an initial upward spike followed by a steady downward trend similar to the anticipated trend for the previously mentioned ratio.

As expected this trend is related to the total cash deposits trend at peaks. The significant drop, even to a negative value, for site 3 is indicative of recovered costs due to increased visibility of implementation. A similar extreme drop is visible for site 3 earlier, but this follows an even bigger spike, suggesting that what was deemed as irrecoverable were then recovered the following month.

5.8.2. Headcount and Productivity

The staff headcount (Figure 25) was expected to be consistent, with no noticeable change to pre-implementation patterns. It is however interesting to note that all 3 implemented sites experienced a decrease in staff headcount, despite the overall trend for other sites being an increase for the same period.

This can possibly be attributed to the introduction of efficiencies, increasing productivity over the longer period and reducing the manpower requirement. The increase after implementation experienced by site 1 seems to be corrective action from management to counter the lower productivity levels to still meet demand before the same decrease in headcount was seen. Other than this, no immediate impact can be seen from the implementations on the headcount.

The turnover per head (Figure 28) was expected to drop slightly after implementation while the comfort levels with the new system were still low, increasing over time due to efficiencies introduced. As expected a slight drop was experienced after implementations, but considering that this was still close to trends for other centres, it once again leads one to believe that staff were well prepared beforehand. This further supports the theories mentioned on the staff headcount trends observed.

Site 3 had a higher turnover per head from before the implementation, while sites 1 and 2 were comparable to each other. All 3 sites mostly followed seasonal trends seen throughout, except for site 2 which had a peculiar spike just before implementation when the other sites all experienced a drop. This could possibly have been due to excitement created with the change management campaign beforehand or a backlog of work caught up from the Easter peak which past just before this.

The turnover per head followed the same seasonal trends as volumes and retail transactions mentioned above, indicating an increase in productivity when required and possible excess capacity in normal periods.

When investigating the overtime worked, some pockets of missing data can be seen prior to implementations (Figure 29). The inconsistency of overtime increases is a concern for all sites, with no clear seasonal trends across. This issue is further emphasised when compared to the consistency of total cash deposited

over the same period. It is believed that this overtime was also used to achieve the higher productivity levels mentioned.

Overtime was expected to increase at implementation and to steadily decrease back to normal levels over a longer period, with the hope of possibly even being reduced to a lower steady state. The expectation was realised to a degree, which means that staff count could have been adjusted, if deemed necessary and temporary increased costs justified. This notion however does not coincide with the headcount trends discussed earlier.

5.8.3. Volumes Processed and External Factors

The total cash deposited, which is the inbound volumes counted, increased slightly over the time of the implementations across all sites. Seasonal peaks at the end of the year and around Easter are noticeable (Figure 26). There is also a clear slump in between these two peaks, but these volumes were however not influenced by the project implementations. The same observations are made when looking at the number of retail deposits (Figure 27), as a specialised portion of this inbound volume, which is subject to the same seasonal factors.

5.8.4. Overview of KPI Discussion

Based on the short term analysis of the available KPI data, the benefits derived from the system implementations become apparent, but are expected to increase over a longer period, as the sites stabilise following these changes. As noted in literature review of benefits achieved in similar implementations, increases in throughput and a reduction in headcount was seen. The increased control and visibility confirmed is also in line with qualitative benefits described in similar implementations.

A number of these indicators responded as per expectation, but longer term monitoring would be required to confirm the sustainability of changes. A higher level of instability could also be seen at site 2, compared to other sites.

5.9. *Summary of Discussion and Graphical Framework*

From the observations and performance measures discussed, sites 1 and 3 are deemed to be more successful implementations. Based further on these observations noted and survey data, the prevalence of the identified human factor focus areas from literature were seen in its various forms at each implementation site respectively. This was discussed in more detail in sections 5.4 to 5.7.

These focus areas of leadership, communication, environment and culture as well as change readiness were concluded to all have an impact on each other and the success of the implementations of this electronic system to replace manual paper-based processes. This is in agreement with the literature reviewed beforehand. This degree of impact could however not accurately be measured from this research, but the focus was rather on the confirmation of these human factors that have relationships with each other as well.

Due to the limited nature of the research, as mentioned in the assumptions and limitations documented, a complete framework to detail all human factors critical to the success of electronic system implementations cannot be proposed. Only the factors confirmed as relevant were organised into a framework based on the initial graphical depiction (Figure 4) of the focus areas as discussed in section 2.3.1. As mentioned, this framework aims to summarise and visually present the focus areas identified up front, as confirmed human factors impacting the successful implementation of electronic systems. These factors were re-arranged accordingly in the framework to summarise the findings.

Building on and confirming elements of Weisbord's six box organisation model, the research agrees that leadership is at the centre of an organization and any change to be brought about (11). With leadership at the centre as the driving force of the organization, effective communication should be established in order to facilitate a healthy organizational culture along with training to support change readiness. These were found to have an impact on each other and these types of implementations.

The impact of the environment as an external factor, including demographics, was also confirmed to an extent especially on communication and the sharing of information.



Figure 30: Proposed diagram based on Figure 4

6. Conclusion & Recommendations

6.1. *Introduction*

In conclusion to this research this chapter will consolidate and summarise the findings, also relating them back to the original purpose of the research. These are then depicted in a graphical diagram as a framework, followed by recommendations on further research to be done based on these findings.

6.2. *Summary of Findings*

Site 2 differed from the other sites on a number of aspects as discussed. The perceived shortcomings of site 2 confirms a lot of the theories studied in literature, as the lack of some of these principles and practices is perceived to have resulted in various failings.

Site 2 displayed a certain amount of perceived instability possibly linked to management or operational issues mentioned. This point ties back to some of the observations made such as the management style and culture along with the subsequent high staff turnover. The concerns mentioned with regards to the leadership aspects, cultural environment and issues encountered later on would then stem from this as well and could possibly have been addressed even before the implementation of the project.

The negative perception among staff from site 2 towards the effectiveness of communication and confidence in leadership was very apparent prior to the implementation. The correlation between these perceptions was also confirmed in the statistical analysis, leading to the conclusion that communication needs to form the basis to manage perceptions. This culture of communication should be established by leadership as found in literature, but requires the presence and buy-in of said leadership (47,56,76).

The role of leadership and champions in a broader sense, especially in less mature environments, also became apparent in the correlation analysis and how this

relates to the perception of change, management and everything else. An inclusive team based approach to involve employees also inspired more confidence and effective communication than an autocratic management style. These aspects influenced each other to a noteworthy degree, even to the extent that neglecting any of them had an impact on the others. Neither was identified as the sole root, but communication still as the basis to build confidence in leadership through involving all stakeholders confirming theories from literature.

Based on these observations the softer aspects seem very relevant and worth focusing on instead of just the technical aspects of skills development and training on systems. Neglecting these is still however believed to be detrimental to any project. The effect that this had on the expectation and understanding of the project from a user perspective is clear from the correlation analysis relationships shown with the feeling towards training provided. From this the conclusion can also be made that training forms an important part of the communication basis and change readiness to be established early on in the project.

The analysis of the KPI's for the implementation sites show that these were well planned and executed, with factors such as overtime responding as expected. The resulting benefits from the implementations, such as the reduction of losses and increase in productivity, seem more apparent in sites 2 and 3, but overall not as significant over such a short time period as one might have expected. The assumptions related to how these short term observations were expected to be indicative of longer term trends were however noted early on in the study.

Based on the KPI's as indicators, the presence of certain practices at site 1 and 3 and lack thereof at site 2 did not have a clear immediate impact on the benefits and short term success of the implementation. This statement is made taking into consideration the state of affairs prior to implementation at each site. The impact of these issues are however seen in the indicators prior to implementation and continued thereafter.

The lack of control and management presence is however interpreted to have contributed to the later need for an internal fraud investigations due to unwanted workarounds employed by staff in certain positions below management. The KPI's are also expected to be influenced by these workarounds, which means that a case might be made that the benefits shown were not actually necessarily achieved at site 2 due to this manipulation of data on the system.

As seen with the additional information from the project team on site 2, the factors identified have an influence on the implementation and achievement of the mentioned benefits.

The perceived fear driven culture at site 2 also did not encourage openness as was confirmed from the survey response that staff were not comfortable to share any concerns or uncertainties with their reporting lines or the local cash centre management. The low levels of confidence in respondents' own abilities at site 2 were interpreted to be related to this culture. Site 1's low confidence in being equipped and readiness for change prior to the implementation improved afterwards.

It seems that at least a portion of the benefits experienced through the implementation of an electronic system and subsequent automation of some reporting is the peace of mind experienced by upper management. This is based on the perception that reporting will be more consistent and accurate, being not as prone to human intervention or error. Audit logs allow any errors or discrepancies to be traceable and visible, supporting such investigations as mentioned for site 2.

6.3. Conclusion

The research question formulated initially as part of this research was: "*What are the major human factors that influence the implementation of electronic systems to replace their manual paper-based counterparts, if any?*" The planned process as described in the methodology was followed to meet the stated objectives in answering this question.

The following human factors of importance were identified from literature and similar implementations plus studied for the sites that were implemented:

- Leadership and culture
- Communication
- Environment and background
- Change readiness and training

The presence and influence of these factors were evaluated and confirmed through quantitative data analysis techniques such as descriptive statistics and visualisation applied to survey results collected and site KPI comparisons. An inferential statistical analysis, in the form of a correlation analysis, was also conducted to confirm the existence of relationships between these different factors.

The influence of age and experience as part of background and demographics were seen on all the major focus areas evaluated. The perception of leadership was also found to be directly related to the culture of sharing information and feeling that the cash centre supports change. A strong relationship with communication was also confirmed, which in turn was also related to change readiness and training.

In addition to the quantitative analysis, the qualitative data analysis approach of content analysis was also applied to the open ended sections of the surveys, as well as the consolidated project team observations. The feedback from the project team confirmed the significant role that leadership and management play in the outcome of implementations.

Based on the subsequent study of the outcomes and estimated success of each implementation these were confirmed to be relevant and thus the major human factors that influence implementations such as in the case study.

6.4. Recommendations

The limitations of the research and data were documented in section 5.2, Shortcomings and Limitations, as well as the assumptions made upfront in section 1.5 (Limitations and Assumptions in the Research).

Based on these limitations and the findings and conclusion, further research on the identified human factors of significant influence for successful sustainable implementations is proposed respectively.

This recommendation would be to firstly confirm the findings of this research, by increasing the number of units for analysis and using methods designed to focus only on the identified areas. One possibility would be to use an experimental approach on control groups in order to isolate the different variables (20).

Controlling certain variables which have an impact but are not tested in the study to remain constant would be suggested. These include other factors identified to possibly have an influence on the outcome, such as site 2 being the smallest, newest site with the youngest least experienced team of users. These demographics were seen to have an impact on the major focus areas, such as the perception of leadership.

The aim would then also be to confirm the findings that were based on inherent factors and observations, not only data collected and to shed light on any potential impact that the noted missing and manipulated data could have.

More details are also required to confirm the influence of these major human factors over longer periods as well as the specific elements pertaining to these that are more relevant. A more in depth study would be required to achieve this.

As the research has confirmed the theory of these human factors influencing the success of such implementations, this can be used to expand the evaluation of sites before initiating the project implementation at each. Using the change readiness

assessments as a tool to establish the state of a site, especially with regards to leadership, communication and the overall culture, initiatives to improve this prior to the project implementation can be put in place. Leadership training and development to enable the effective communication and management of people can also be deployed.

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8. Appendix A

8.1. Change Readiness Assessment Survey

Background of the project

The current Cash Centre processes are predominantly manual, time consuming and error-prone. This results in poor productivity and relatively high processing costs.

The implementation of the electronic system solution will increase productivity, improve accuracy of information, reduce bottlenecks and will present the bank with an opportunity to successfully weather the competitive storm around cash processing.

The qualitative benefits include risk reduction, minimised losses as a result of process breakdown, improved use of existing capacity and manpower, improved client service and increased accuracy as well as visibility of information.

The project is planned to take place over three phases with the last phase fully implemented in less than two years. Phase 1 is the most intensive and requires the most effort from business. It is also the phase that requires to be implemented with the most direct impact on the operations, and with the largest overall operational benefit. A pilot of the solution has been implemented in the first site and has afforded business the opportunity to learn and plan before rolling out to the remaining Cash Centres.

The project is yet to be branded so please keep an eye out for communication updates on this exciting project and how **you will** benefit from it.

Purpose of this questionnaire

The project team would like to learn more **about you and how ready you feel** about this change. Your input is essential and invaluable to us. This is an opportunity for you to be involved in this change. By collecting your feedback, we will tailor our approach to meet your individual needs.

Background Information (place an X over the applicable block)

Name (Optional)						
What is your age?	19 or under	20 – 29	30 – 39	40 – 49	50 or over	
Gender						
Region						
Department / Cluster						
Current position						
Number of years in position	Less than 1 year	1 – 2 years	2 – 5 years	6 – 10 years	11 – 20 years	Over 20 years

Kindly answer the following questions as honestly as possible. The information you provide will be valuable in executing the change management strategy for the project.

Please answer the questions on the next few pages by doing the following:

- Read the question / statement
- Indicate your answer by placing a cross (X) in the appropriate score box
- Please give only one answer per question. Make sure you answer all the questions, only leaving it blank if it does not apply to you

Example:

I have access to a Personal Computer (PC) at work

Yes

~~No~~

The questionnaire responses will be handled confidentially.

COMPUTER LITERACY AND TRAINING NEEDS					COMMENTS
1.	Do you have access to a Personal Computer (PC) at work?	YES	NO	N/A	
2.	Do you have access to a PC at home?	YES	NO	N/A	
3.	Are you comfortable using a keyboard?	YES	NO	N/A	
4.	Are you comfortable navigating a computer system with a "mouse"?	YES	NO	N/A	
5.	Do you know how to navigate through Windows Explorer?	YES	NO	N/A	
6.	Have you ever worked on Microsoft applications before e.g. Microsoft Excel	YES	NO	N/A	
7.	Have you used email before?	YES	NO	N/A	
8.	Have you used the internet before?	YES	NO	N/A	
9.	Do you feel you have received adequate training to keep up with process functions within your job?	YES	NO	N/A	

TRAINING DELIVERY				COMMENTS
Please rank the training delivery methods according to your preference; Rank – 1 (First Choice) – 4 (Last Choice)				
10.	Classroom Based Training (Instructor led)	Training Workshops (Interactive, facilitated training sessions)	One on one training (Personal Learning)	Self-paced learning (Working from an instructive manual)

LEARNING STYLE				COMMENTS
11.	Please select how you like to learn.	See	Listen	Do
12.	Would you like to have access to the system before it goes live so you are able to practice?	YES	NO	N/A

LITERACY				
Please rate your English ability in terms of the following:				
13.	Speaking	Poor	Good	Very good Excellent
	Writing	Poor	Good	Very good Excellent
	Reading	Poor	Good	Very good Excellent
14.	English is your:	First Language		Second Language
15.	If English is not your first language; what is your first language?			

AWARENESS AND UNDERSTANDING				COMMENTS
16.	Have you heard about the system and project to implement it?	YES	NO	N/A
17.	Do you understand the reasons for introducing a new system and process into your area of work?	YES	NO	N/A
18.	Are you looking forward to the introduction of this new system?	YES	NO	N/A
19.	Do you believe this change will benefit you?	YES	NO	N/A

ORGANISATIONAL CULTURE				COMMENTS
20.	Do you understand the bank's vision and values?	YES	NO	N/A
21.	Do you understand the Cash Centres vision?	YES	NO	N/A
22.	Do people in your area share information freely with others?	YES	NO	N/A
23.	Do you believe the Cash Centre supports change?	YES	NO	N/A
24.	Are communication channels in your department effective?	YES	NO	N/A
25.	Do you have confidence in the leadership of the Cash Centre?	YES	NO	N/A
26.	Rate the management style in your department.	Self-managed	Autocratic	Team based

CHANGE READINESS				COMMENTS
27.	Do you feel that you are equipped to handle this change?	YES	NO	N/A
28.	Do you believe this change will be disruptive / disturbing?	YES	NO	N/A
29.	Are you currently facing a lot of stress in your job?	YES	NO	N/A
30.	If you had an issue, would you be able to discuss it with your line manager?	YES	NO	N/A

COMMUNICATION				COMMENTS
31.	Employees are always made aware	YES	NO	N/A

before any changes are made in the Cash Centre?

32. If you are concerned about the project, are you comfortable that you can express yourself by following the correct channels? YES NO N/A

I prefer to be communicated with in the following way: Please rank your preference from 1-4 (1 = first choice, 4 = last choice)

33. Notice Board
Meetings / Presentations
Posters
Memos / Newsletters
Other: Please specify

OTHER

34. If there is one thing that you were able to change in the Cash Centre relating to your role, what would it be?

35. What do you like most about the Cash Centre or your role specifically?

36. Do you have any other burning questions, concerns, comments or suggestions you would like to share with the project team?

Thank you for taking the time to assist us in identifying issues and assisting us in our preparations for successfully implementing the system.

8.2. Pre-implementation Survey Results

Table 5: Background information pre-implementation

		Site 1	Site 2	Site 3
	Total respondents (as % of site's headcount)	79%	88%	82%
Age	19 or under	0%	4%	0%
	Age 20-29	75%	67%	51%
	Age 30-39	20%	15%	25%
	Age 40-49	5%	14%	13%
	50 or over	0%	0%	8%
Gender	Male	N/A	43%	43%
	Female	N/A	57%	55%
	N/A	N/A	0%	2%
Department	Bulk cluster	20%	N/A	N/A
	Cash/cash floor	16%	N/A	N/A
	Small & dirty	18%	N/A	N/A
	Coin cluster	6%	N/A	N/A
	Finance	10%	N/A	N/A
	Payroll	6%	N/A	N/A
	Teller	12%	N/A	N/A
	Treasury	10%	N/A	N/A
	ATM recycling	4%	N/A	N/A
Position	Acting controller	2%	0%	0%
	Admin assistant/balancing	0%	5%	5%
	Change teller	0%	5%	2%
	Coin master	2%	5%	0%
	Controller	5%	10%	6%
	Note verifier	0%	0%	9%
	Prepper (teller)	18%	0%	0%
	Receiving	0%	10%	0%
	Runner (teller)	15%	10%	0%
	Smart teller	2%	5%	3%
	Team leader	7%	0%	5%
	Teller	39%	24%	44%
	ATM packer	2%	0%	3%
	ATM teller	3%	0%	0%
	Treasury custodian	7%	19%	5%
	Service & quality officer	0%	0%	2%
	Regional manager	0%	0%	2%
	Client liaison manager	0%	0%	2%

	Cash centre coordinator	0%	0%	2%
	Branch automation	0%	0%	9%
	N/A	0%	10%	5%
Number of years in position	Less than 1 year	34%	43%	7%
	1-2 years	25%	19%	21%
	2-5 years	39%	24%	27%
	6-10 years	0%	0%	19%
	11-20 years	2%	5%	6%
	More than 20 years	0%	0%	9%
	N/A	0%	10%	10%

Table 6: Computer literacy and training pre-implementation

		Site 1	Site 2	Site 3
Access to a personal computer at work	Yes	12%	48%	45%
	No	85%	52%	55%
	N/A	3%	0%	0%
Access to a personal computer at home	Yes	48%	62%	52%
	No	51%	38%	46%
	N/A	1%	0%	1%
Are you comfortable using a keyboard	Yes	N/A	86%	96%
	No	N/A	14%	1%
	N/A	N/A	0%	3%
Are you comfortable navigating with a mouse on the computer system?	Yes	94%	95%	94%
	No	4%	5%	6%
	N/A	2%	0%	0%
Do you feel you have received adequate training to keep up with process functions within your job?	Yes	74%	62%	77%
	No	19%	33%	20%
	N/A (and blank)	7%	5%	3%
Do you know how to navigate through Windows Explorer?	Yes	68%	81%	71%
	No	30%	19%	26%
	N/A	2%	0%	3%
Have you ever worked on Microsoft applications before	Yes	70%	67%	73%
	No	29%	33%	27%

e.g. Microsoft Excel?	N/A	1%	0%	0%
Have you used email before?	Yes	71%	86%	76%
	No	28%	14%	22%
	N/A (and blank)	1%	0%	2%
Have you used the internet before?	Yes	74%	86%	79%
	No	23%	14%	20%
	N/A (and blank)	3%	0%	1%

Table 7: Learning style and training delivery pre-implementation

		Site 1	Site 2	Site 3
How do you prefer to learn?	See	4%	29%	12%
	Listen	3%	10%	11%
	Do	48%	57%	57%
	See and do	7%	0%	8%
	See, listen and do	29%	0%	12%
	Blank	9%	5%	0%
Would you like to have access to the system before it goes live so you are able to practice?	Yes	96%	100%	97%
	No	0%	0%	2%
	Blank	4%	0%	1%
Training delivery preference	Classroom based training/instructor led	1st	2nd	2nd
	Training workshops (interactive, facilitated training sessions)	2nd	1st	1st
	One on one training (personal training)	3rd	3rd	3rd
	Self-paced learning (working from an instruction manual)	4th	4th	4th

Table 8: Literacy pre-implementation

		Site 1	Site 2	Site 3
English ability - Speaking	Poor	0%	0%	0%
	Good	40%	43%	34%
	Very good	44%	29%	30%
	Excellent	16%	26%	36%
	Blank	0%	2%	0%
English ability - Writing	Poor	1%	0%	0%
	Good	36%	43%	28%
	Very good	37%	48%	34%
	Excellent	24%	1%	37%
	Blank	1%	8%	1%
English ability - Reading	Poor	0%	0%	0%
	Good	32%	48%	24%
	Very good	32%	24%	30%
	Excellent	34%	28%	46%
	Blank	1%	0%	0%
English is my first or second language	First language	13%	76%	52%
	Second language	87%	19%	48%
	Blank	0%	5%	0%
First language	Afrikaans	18%	38%	
	Isizulu	10%		82%
	Northern Sotho	8%		
	Ndebele	12%		
	Tsonga	6%		
	Portuguese	2%		
	Southern Sotho	2%		3%
	Sepedi	4%		
	Setswana	16%		
	Sotho	6%		3%
	Tshivenda	12%		
	Tswana	2%		
	Xhosa	2%	56%	12%
	Blank	0%	6%	0%

Table 9: Awareness and understanding pre-implementation

		Site 1	Site 2	Site 3
Have you heard about the Vault Management System / Cash Centre Project?	Yes	96%	95%	95%
	No	4%	5%	5%
	N/A	0%	0%	0%
Do you understand the reasons for introducing a new system and process into your area of work?	Yes	97%	100%	98%
	No	0%	0%	2%
	N/A	3%	0%	0%
Are you looking forward to the introduction of this new Inventory Supply Accounting (ISA)?	Yes	97%	100%	100%
	No	0%	0%	0%
	Blank	3%	0%	0%
Do you believe this change will benefit you?	Yes	94%	95%	98%
	No	2%	5%	2%
	N/A (and blank)	4%	0%	0%

Table 10: Organisational culture pre-implementation

		Site 1	Site 2	Site 3
Do you understand the bank's vision and values?	Yes	97%	100%	97%
	No	0%	0%	3%
	N/A (and blank)	3%	0%	0%
Do you understand the Cash Centres vision?	Yes	100%	95%	100%
	No	0%	5%	0%
	N/A (and blank)	0%	0%	0%
Do people in your area share information freely with others?	Yes	62%	57%	78%
	No	29%	38%	14%
	N/A	9%	5%	8%
Do you believe the Cash Centre supports change?	Yes	87%	88%	98%
	No	3%	10%	0%
	N/A (and blank)	10%	2%	2%
Are communication channels in your cash centre/department	Yes	72%	48%	81%
	No	14%	48%	13%

effective?	N/A (and blank)	13%	4%	6%
Do you have confidence in the leadership of the Cash Centre?	Yes	81%	48%	86%
	No	7%	43%	11%
	N/A (and blank)	12%	9%	3%
Rate the management style in your department?	Self-managed	12%	14%	13%
	Autocratic	9%	72%	9%
	Team based	65%	14%	73%
	Blank	15%	0%	5%

Table 11: Change readiness pre-implementation

		Site 1	Site 2	Site 3
Do you feel that you are equipped to handle this change?	Yes	71%	90%	94%
	No	6%	10%	3%
	N/A (and blank)	23%	0%	3%
Do you believe this change will be disruptive/disturbing?	Yes	16%	14%	17%
	No	73%	76%	77%
	N/A (and blank)	11%	10%	6%
Are you currently facing a lot of stress in your job?	Yes	39%	67%	58%
	No	54%	24%	38%
	N/A (and blank)	7%	9%	4%
If you had an issue, would you be able to discuss it with your line manager?	Yes	69%	52%	84%
	No	21%	43%	14%
	N/A (and blank)	10%	5%	2%

Table 12: Communication pre-implementation

		Site 1	Site 2	Site 3
Employees are always aware before any changes are made in the Cash Centre?	Yes	90%	33%	82%
	No	4%	48%	11%
	N/A (and blank)	6%	19%	7%
If I am concerned about the project, I am comfortable that I can express myself by following the correct channels	Yes	94%	71%	94%
	No	3%	24%	2%

	N/A (and blank)	3%	5%	4%
I prefer to be communicated with in the following way	Meeting and presentations	1st	1st	1st
	Posters	2nd	4th	3rd
	Notice board	3rd	3rd	2nd
	Memos and newsletters	4th	2nd	4th
	Other	N/A	SMS Email Suggestion box	SMS Email

8.3. Pre-implementation Open Ended Questions

8.3.1. “If there is one thing that you were able to change in the Cash Centre relating to your role, what would it be?”

Table 13: Open ended responses - One desired change in environment

Site 1	Site 2	Site 3
Working late shifts / night shifts	Sorting - wish there will be no sorting at all, because I have to come early to fine sort all the deposit slips and it takes 30 min to an hour	Automate the numerous returns that we submit
Opportunity for growth across departments	Working with a prepper that doesn't care	Make everyone a team. If someone still has work, give to others (distribution of deposits still to be processed at the end of a shift)
Security by introducing scanners, so we are no longer required to take off shoes	The prepping part - I wish we could run everything out of bags	The shift we are working on, especially the night shift
Manual hand over of work (recon) / paper based record keeping	The working hours (maybe more working) the time we leave because of transport home	Management can be fair and see them as equal
Automate cash connect queries	To stop doing 2 peoples' jobs eg: prepping and running, rather do 1 thing and master it	Make sure that everyone is happy so that we will have a happy team
Deliver quality service to our customers	To stop doing other peoples' duties	Change the normal working hours
Teamwork and attitude of colleagues	The peoples' mind sets	Reduce paper work and get information as quick as possible
	To change the peoples' (workers) attitude towards the work and to work together	The time that we work
	Peoples' attitude	Proper measuring of tellers' stats
	Control of my growth, freedom to express my views, communication	Permanency

	To be able to change peoples' passions about their work, to have a positive attitude	Communication skills between workers and team leaders
	For my colleagues to listen and act on it when I ask for something, because it makes my life difficult when dealing with couriers	I would like us to have a start time and a finish time
	Stop listening to negativity	People to have a better understanding in whatever they are doing
	I would appreciate it if we were treated the same way that the cluster is treated	Time management, as in finishing and starting times
	To work, or rather do my job undisturbed and make decisions on my own rather than be told by my team leader and management what to do, especially if I know my way or my idea will work better in that certain time	Less paper
	I would love to work normal hours and get paid for my overtime and not get time off	Hours of working
	I would love my manager to have faith in me in such a way that she does not interfere with my work in a sense that she only asks me the deadlines, not telling me how to do my job, because she feels like ordering me around	I will make sure that we do have the exact time of finishing as we have the starting time. Any means that can be made to get rid of the night shift
	I would like to change the fact that there is someone over your head, telling you what and what not to do, and you must do it faster. And the perception of people I work with, once you have a certain qualification they treat you differently	I would like to work day shift only. I would change management
	I would like to change the fact that controllers must walk up and down the stairs to sign in work at receiving. I would like to be able to be more	Getting the rest of the other people in the Cash Centre who doesn't know about capturing to teach about each other's work

	productive in the cluster where people need me the most	and how to do it
		Long working hours
		Management must advise the customers of how to make change requisition orders on a daily basis, because they make / place small amounts of cash and the next day a big amount which causes confusion where you won't be able to fulfil the customer's expectations
		Tellers need to be trained properly and also be refreshed so they understand what's expected. Accuracy, speed and understanding the business as a whole is protocol to success in any business. Why are long-service people not moving in the business or enabled to move?
		Reduce the working hours
		I would like to learn more CI other department
		I will change the working time and hours to work in the morning until afternoon, like 8.00 - 17.00 (I mean working hours)
		Working hours
		Time management (straight shift)
		I would basically change the counting machines because they are always giving us problems

		Paperless and electronic communication
		Working hours
		The time frame for the cut off should change. Our hours at the Cash Centre should change. More training is needed
		I will change the working hours, at least I would like us to have a starting time and a finishing time
		Less paperwork
		Long hours – teller
		I would like to see changes, like knowing what time I'm starting and finishing. Is what I'm doing acceptable or not? Is everyone happy to do what they are doing?
		The most important thing I can change here is communication. There is a breakdown of communication between the staff and other management in this place
		I would change the odd work hours
		Paperless to be more efficient in time management (controlled)
		I would love to verify the cheques myself to save time and energy
		The old machines
		There will be a starting and finishing time
		Getting new machines the old ones are not accurate
		Not working night shift
		Working hours

		Productivity with the new system. I believe that I can be more productive than I am right now and I'm willing and know that I am able to work efficiently and accurately
		That would be to change the hours of working
		Let the staff finish their work as early as possible and leave for home
		Make working hours for tellers more stable, which would give them a life after work
		The pressure that comes with it
		Being rewarded fairly
		Time of shifts must be set. Not knowing a time to leave impacts my social life

8.3.2. “What do you like most about the Cash Centre and your role specifically?”

Table 14: Open ended responses – One positive from environment

Site 1	Site 2	Site 3
Like the people I work with – like a close knit family and people share with one another	Working in the cash centre as a BA, it's more like a dream come true, because working in the financial institution is my dream, although I am not happy to work in the cash centre	Challenging environment
Developing career, as changes are made at the cash centre	Working with a team	Gives me a lot of experience everyday
Trust and good leadership	I'm applying what I've learned at school, e.g. accounting discipline about money and myself	It gives us a lot of experience and knowing and understanding the procedure of the bank
Work well as teams and there is good trust and respect amongst colleagues	The fact that customers' money is worked with accurately. The service that we give the customer handling their money well	The people that I work with
Experience I have received from the Cash Centre	Interacting with the different people in the cluster and having to deal with one another in a professional manner	I can work with different types of people and learn more and grow up
	That every day is a challenge. Every day is not the same old. Do different things daily	N/a
	We are like a family, I like doing my job because I am enjoying what I do	Because its growing, a shift to the right direction is expected
	We are like a family. I like helping team members. I like doing my job	The environment and the different personalities
	Working and doing my best at work, any work	None
	Nothing	The teamwork that influences a family type

		environment
	I love the people I am working with	It makes me more relevant in whatever I do
	I enjoy working with fellow staff members and enjoy my job. It is always challenging (new challenges every day)	We work together and with team work we have always been rated number 1
	I enjoy the team's uplifting unity, I get to laugh and cry with them	I am busy all the time
	There is no customer watching you while you are busy with his or her deposit, I have only to do my job right then I know I have succeeded in my daily task	I enjoy working together with my team and all our decisions are made as a team
	The staff and the spirit of the team	Well, that it is run in the correct way and that as a team we help each other to grow and that team work makes a dream work
	The fact that I am organising things and then they materialise	Getting the job done and doing it well
	Environmentally friendly, secure and prison like (lol). Management and the fact that I can speak to them any day with issues revolving around the work environment. Communication channels and management responsibility and accountability	I like the fact that we work as a family
	I learned to be more competitive and to do more every day. I also learned to become more involved and to adjust myself to a leadership point of view and to achieve my deadlines and to make the business a huge success. I have the opportunity to make changes	I like my job
		Working with my team members, sharing ideas

		I like it when I'm working with my team because we solve problems together and share information and have lots of fun
		The way it is running, the management is super – excellent
		I enjoy my job, but looking forward to learning new things
		There is not much to like at the moment but the future is important as it holds a big change that promises a better future. Being a young person employed for 7 years now. I feel there is more I can do but have not been able to
		I mostly enjoy receiving money. I am the one receiving work. I really enjoy working with money
		Experience of handling cash
		Enjoy my job, but like to learn new things or move forward
		What I love about my role is that communication is key
		I deal with people
		I enjoy my job
		I play an important role. I enjoy my job, without me, customers' deposits won't get done
		When I work here I am happy and I know that I will learn new things, especially the system that is coming. I believe we will be able to go home early so we can perform well at work
		Everything

		We are team based and help one another
		Everyone is given a chance to work everywhere so that we know what other departments are doing. Flexibility
		Nothing
		I like working in a team, because we work as a team which allows for sharing of ideas
		Learning about banking and experiencing new things about banking
		To attain customer satisfaction through service delivery
		Nothing at the moment
		Team work
		My position
		Customer satisfaction
		I got to learn more about banking
		Team work
		Everything - I love and enjoy being a teller and would like to go up the ladder and explore the banking career
		That everyone works as a team
		New systems that will be implemented and more training for staff
		People – challenges
		Having to work as a team to achieve our goals
		The people and my ability to engage with others

8.4. Post Implementation Assessment Survey

As a valued cash centre stakeholder, we take this opportunity to thank you for your participation in the project's Post Implementation Assessment. As a user, this gives you an opportunity to express your views regarding the new system, before we begin to roll out to the other cash centres. Your input will assist the project team in designing the required performance support and other necessary actions, in order to successfully roll out the system.

Please note that the questionnaire responses will be handled confidentially, for this reason we would appreciate it if you would be completely honest in your response.

Thank you for your participation and openness.

QUESTIONNAIRE (Please place an X over the appropriate box)

Cash Centre					
Name (Optional)					
What is your age?	19 or under	20 – 29	30 – 39	40 – 49	50 or over
Gender					
Current position					
Team Leader					

READINESS					COMMENTS
1.	The project objectives and benefits were communicated to me prior to the project commencing.	YES	NO	N/A	
2.	I understood the impact the project would have on my day-to-day work.	YES	NO	N/A	
3.	I understand my new work activities and responsibilities in my role.	YES	NO	N/A	
4.	I was ready and confident to execute my work on the new system.	YES	NO	N/A	
5.	Is there any additional input to readiness that you would like to share?	Comment:			

COMPUTER LITERACY					COMMENTS
6.	I believe my PC skills are sufficient to help me work with the new system.	YES	NO	N/A	
7.	Did you think you had adequate PC skills prior to commencing the training?	YES	NO	N/A	
8.	Was it easy to navigate through the new system?	YES	NO	N/A	
9.	Was it easy to switch between screens?	YES	NO	N/A	
10.	Was it easy to use the mouse?	YES	NO	N/A	
11.	Were you comfortable with using the keyboard?	YES	NO	N/A	
12.	Do you believe you require additional PC literacy training?	YES	NO	N/A	
13.	Is there anything you have struggled with when navigating the new system?	Comment:			

ECM TRAINING					COMMENTS
14.	I believe that the training was delivered on time.	YES	NO	N/A	

15.	I believe that the training was effective.	YES	NO	N/A
16.	I received training specific to my role.	YES	NO	N/A
17.	The training material was readily available for use during the training.	YES	NO	N/A
18.	Quick reference material was provided to assist with go-live.	YES	NO	N/A
19.	The training material was easy to work through.	YES	NO	N/A
20.	The training environment was conducive for training.	YES	NO	N/A
21.	The training facilitators were easy to understand when they delivered the training.	YES	NO	N/A

COMMUNICATION					COMMENTS
22.	Communications regarding the project were clear.	YES	NO	N/A	
23.	Communications about how the changes would affect my daily tasks were well communicated.	YES	NO	N/A	
24.	Communications were timeous and accurate. (Communication was received as and when I needed it.)	YES	NO	N/A	
25.	I was always kept up to date about changes.	YES	NO	N/A	
26.	In general the communication was well managed.	YES	NO	N/A	
27.	Who do you prefer as primary communicator?	Team leader	Cash centre manager	Change management team	Other:
28.	What is your preferred communication channel?	Face to face (presentations and sessions)	Posters	Hand outs (mouse pads, survival kits)	One-on-one meetings Other:

LEADERSHIP					COMMENTS
29.	Leadership provided support before, during and after the system go-live.	YES	NO	N/A	
30.	Leadership communicated and provided feedback throughout the implementation.	YES	NO	N/A	
31.	Leadership “walked the talk” by supporting the new behaviours and ways of working.	YES	NO	N/A	
32.	Is there any additional input regarding leadership that you would like to share?	Comment:			

SUPPORT					COMMENTS
33.	I believe that there was adequate support before, during and after the system go-live.	YES	NO	N/A	
34.	All supporting processes were easily accessible.	YES	NO	N/A	
35.	I have been informed of the appropriate steps to follow when I have a problem with the system.	YES	NO	N/A	
36.	A super user has been identified in my area in case I require quick assistance.	YES	NO	N/A	
37.	There was onsite assistance from trainers during implementation.	YES	NO	N/A	
GENERAL					
38.	Do you have any other burning questions, concerns, comments or suggestions you would like to share with the project team?				

Thank you for taking the time to complete this questionnaire.

8.5. Post Implementation Survey Results

Table 15: Background information post implementation

		Site 1	Site 2
	Respondents	79%	85%
Age	19 or under	2%	0%
	Age 20-29	78%	67%
	Age 30-39	17%	15%
	Age 40-49	3%	14%
	50 or over	0%	0%
	N/A	0%	4%
Gender	Male	33%	43%
	Female	67%	57%
	N/A	0%	0%
Position	Acting controller		
	Admin assistant/balancing		6%
	Change teller		6%
	Coin master	1%	
	Controller		12%
	Note verifier		
	Prepper (teller)	14%	
	Receiving		6%
	Runner (teller)	30%	
	Smart teller		
	Team leader		6%
	Teller	32%	35%
	ATM packer		
	ATM teller		
	Treasury custodian	6%	18%
	Service & quality officer		
	Regional manager		
	Client liaison manager		
	Cash centre coordinator		
	Branch automation		
	N/A	17%	12%
Number of years in position	Less than 1 year	41%	43%
	1-2 years	28%	19%
	2-5 years	27%	24%
	6-10 years	4%	0%

	11-20 years	0%	0%
	More than 20 years	0%	0%
	N/A	0%	13%

Table 16: Change readiness post implementation

		Site 1	Site 2
The project objectives and benefits were communicated to me prior to the project commencing	Yes	93%	100%
	No	3%	0%
	N/A	4%	0%
I understood the impact the project would have on my day-to-day work	Yes	77%	100%
	No	20%	0%
	N/A	3%	0%
I understand my new work activities and responsibilities in my role	Yes	90%	100%
	No	7%	0%
	N/A	3%	0%
I was ready and confident to execute my work on the new system	Yes	88%	100%
	No	9%	0%
	N/A	3%	0%

Table 17: Computer literacy post implementation

		Site 1	Site 2
I believe my PC skills are sufficient to help me work with the new system	Yes	96%	100%
	No	3%	0%
	N/A	1%	0%
Did you think you had adequate PC skills prior to commencing the training?	Yes	87%	82%
	No	12%	8%
	N/A	1%	0%
Was it easy to navigate through	Yes	88%	88%
	No	9%	6%

the new system?	N/A	3%	6%
Was it easy to switch between screens?	Yes	91%	100%
	No	7%	0%
	N/A	2%	0%
Was it easy to use the mouse?	Yes	97%	100%
	No	1%	0%
	N/A	2%	0%
Were you comfortable with using the keyboard?	Yes	97%	100%
	No	1%	0%
	N/A	2%	0%
Do you believe you require additional PC literacy training?	Yes	61%	12%
	No	36%	88%
	N/A	3%	0%

Table 18: System training post implementation

		Site 1	Site 2
I believe that the training was delivered on time	Yes	80%	94%
	No	16%	0%
	N/A	4%	6%
I believe that the training was effective	Yes	81%	94%
	No	10%	0%
	N/A	9%	6%
I received training specific to my role	Yes	84%	82%
	No	6%	12%
	N/A	10%	6%
The training material was readily available for use during the training	Yes	81%	94%
	No	7%	0%
	N/A	12%	6%
Quick reference material was provided to assist with go-live	Yes	46%	100%
	No	41%	0%
	N/A	13%	0%
The training material was easy to work through	Yes	64%	94%
	No	22%	0%
	N/A	14%	6%
The training environment	Yes	85%	94%
	No	1%	0%

was conducive for training	N/A	14%	6%
The training facilitators were easy to understand when they delivered the training	Yes	88%	100%
	No	0%	0%
	N/A	12%	0%

Table 19: Communication post implementation

		Site 1	Site 2
Communications regarding the project were clear	Yes	94%	100%
	No	4%	0%
	N/A	2%	0%
Communications about how the changes would affect my daily tasks were well communicated	Yes	91%	100%
	No	7%	0%
	N/A	2%	0%
Communications were timeous and accurate. Communication was received as and when I needed it	Yes	96%	100%
	No	3%	0%
	N/A	1%	0%
I was always kept up to date about changes	Yes	96%	94%
	No	3%	6%
	N/A	1%	0%
In general the communication was well managed	Yes	93%	100%
	No	6%	0%
	N/A	1%	0%
Who do you prefer as primary communicator?	Change Management/Project Team		41%
	Cash centre manager	36%	18%
	Cluster lead/Team leader	41%	35%
	Other		6%
	N/A	23%	0%
What is your	Newsletter	1%	

preferred communication channel?	Posters	1%	
	Face to face	97%	94%
	Hand-outs		6%
	N/A	1%	

Table 20: Leadership post implementation

		Site 1	Site 2
Leadership provided support before, during and after the system go-live	Yes	86%	100%
	No	10%	0%
	N/A	4%	0%
Leadership communicated and provided feedback throughout the implementation	Yes	94%	94%
	No	3%	0%
	N/A	3%	6%
Leadership “walked the talk” by supporting the new behaviours and ways of working	Yes	93%	100%
	No	3%	0%
	N/A	4%	0%

Table 21: Support post implementation

		Site 1	Site 2
I believe that there was adequate support before, during and after the system go-live	Yes	96%	100%
	No	3%	0%
	N/A	1%	0%
All supporting processes were easily accessible	Yes	93%	100%
	No	6%	0%
	N/A	1%	0%
I have been informed of the appropriate steps to follow when I have a problem with the system	Yes	93%	100%
	No	6%	0%
	N/A	1%	0%
A super user has	Yes	97%	76%

been identified in my area in case I require quick assistance	No	1%	24%
	N/A	2%	0%
There was onsite assistance from trainers during implementation	Yes	99%	100%
	No	0%	0%
	N/A	1%	0%

8.6. *Post Implementation Open Ended Responses*

Table 22: Post implementation open ended responses

Readiness	Site 1	Site 2
Areas of concern	Some users felt confused prior to training and did not feel they had clear direction in terms of fully understanding the system. They felt unprepared for what was to come, making them feel scared. The coin area was not planned for and then the system was implemented without their input. The impact on day to day roles was not clearly communicated and expectations were not addressed. More input from staff should be obtained to understand the skills gaps. Only the benefits were sold – the reality was that there were errors on the system and it meant working additional hours for some staff. Make practical training as real as possible – use real cash during training as it causes problems when we go to the floor. One team were told the system would not affect their area and it did. A few users felt that it was their worst weeks until they got familiar with the system. Some users felt that training was too short. PC literacy was an issue for some users as they felt ill prepared to navigate through the system and felt it slowed them down in the training. Others felt PC literacy should be focused on more in preparation for the system training	With 100% response confirming readiness, respondents reflect they were well communicated to and at that point in time felt ready after undergoing training. Post training, the realisation of the full extent of impact could be reflected upon by those impacted. The statements below reflect this. Some users felt unprepared of what was to come, making them feel scared and nervous. More input from staff should be obtained to understand the skills gaps especially in treasury. Treasury staff felt that only the benefits were sold – the reality was that there is uncertainty on functions within treasury and on the system and it means working additional hours for some staff. Make practical training as real as possible during training as it causes problems when on the floor.

Constructive Statements	Staff felt the change activities like hand painting and survival kits were fun. The staff were excited and looking forward to moving to an automated system. The cash centre manager ensured staff were communicated to and understood.	Staff were excited and looking forward to moving to an automated system as they saw many benefits associated to the implementation. The cash centre management ensured staff were communicated to and understood the project objectives, benefits, impact on day-to-day work, new activities and responsibilities prior to the project commencing. Staff felt the change activities like hand painting and survival kits were enjoyable. This is an important element of change management ensuring participation, involvement in the implementation and gaining buy-in.
Comments	"In the beginning it was difficult until I worked on the system. For us the driver for readiness was the excitement to be working on PC's." "There was no consultation about what would work for the coin area. The system was implemented without our input."	"In the beginning, it was a struggle, but later on I laughed at myself." "I was nervous and excited." "Everything was clear and now I do understand the system well." "Perhaps, I didn't really understand how my role was impacted." Practical training on closures, balancing, running cash offline, common errors, differences and simple troubleshooting should be done with impacted users. A "day in the life of" (DILo) would be most beneficial to users as they will be able to establish a level of comfort before go-live. Treasury staff felt only the benefits were sold, with reality being quite different. Emotion of feeling unprepared, nervous or scared prior to go-live.

Computer Literacy	Site 1	Site 2
Areas of concern	PC literacy was a concern for some users as they observed their colleagues struggling with basic functions. A portion of staff felt that the rules of selection of the scenarios on the system were a challenge. Many staff experienced difficulty with regards to balancing and felt confused when first working with the system. Staff were frustrated with the connectivity speed and felt that some of the hardware was too old.	Majority of respondents reflect that once they had received PC literacy training that their PC skills were sufficient to help them work and navigate on the new system and that they were comfortable with basic computer functions. A portion of staff felt that the rules of the selection of scenarios on the ISA system were challenging in the beginning but that they learnt from mistakes made early on.
Constructive Statements	Some staff were grateful for the challenges and felt that they learnt from their mistakes. Staff stated that further PC literacy and other office application training would be appreciated.	Initially PC literacy was a concern for a few users, specifically in the receiving and treasury area. These users have since gained confidence and are now comfortable with basic computer functions. Although not system related, several respondents expressed interest in attending additional training such as Outlook, PowerPoint, Word, Excel etc.
Comments	"At first there was difficulty, but I adapted as we progressed further." "Balancing on the system is an issue. We do not know why the system shows differences, but manually it is ok." "The rules of the system are important as we made many mistakes. Careful attention should be paid to the selection of scenarios."	"In the beginning it was difficult, but I have learnt to adapt." "The rules of the system are important as we made many mistakes." "We needed a day or two to figure out and play around. Suggestion to have a 'sandpit', rather than be thrown into the deep end."

System Training	Site 1	Site 2
Areas of concern	Training seemed to be crammed over a short period, without the end to end process explained to all users. A portion of staff felt they were not fully ready for the training.	Staff and management believe that the processing of Forex (orders and deposits), ATM orders, management of differences and PCD's as well as balancing areas and the vault require additional training. Unprocessed containers, unacknowledged container transfers and unacknowledged cash transfers are not being managed effectively. This is in part an expected side effect of implementation, but the continuous increase points towards a lack of discipline / understanding from an operational perspective. Staff had not received training on the Glory note counting machine at the time of the post implementation interviews. As a result of high staff turnover, a number of staff had not received system training at the time of go-live. Some staff were unable to participate in awareness sessions, change readiness assessments, user acceptance testing (UAT), refresher training or pre go-live activities.
Constructive Statements	User acceptance testing (UAT) was effective, as staff were able to add suggestions. Most staff felt the training covered the whole spectrum of process, system and practical.	Admin assistant, balancing official and query clerk staff felt that they did not receive training specific for their role, however they did agree that the training they did attend was valuable as they were able to understand the bigger picture. UAT was effective as staff felt they were able to add suggestions. Majority of staff felt the training covered the whole spectrum of process, system and practical. Most of the staff relished the training and commented that the

		facilitator was easy to understand and did a great job.
Comments	"Practical training was better." "The time given for training was not enough. Training was phased per cluster. 99% of the Cash Centre had training but we were not too sure when we were going live and this created excitement only to be let down and have to build it up again." "Training was short, giving us insufficient time to absorb and there were no quick reference cards."	"Practical training was better." "Training not specific for my role, but I understand the bigger picture now. " "The trainer was great and did a good job." "It would be better if we can in future have more time to practice as the training and the production environments are vastly different."
Communication	Site 1	Site 2
Areas of concern	A portion of staff felt that 70% of information about the project was communicated. Staff highlighted communication was clearer when working on the floor.	None raised.
Constructive Statements	Staff felt they were in a comfortable working environment. Staff felt their input was listened to and taken into account.	Staff have indicated that the preferred primary communicator is the change management and project team; however the change management and project team would like to hand over this role and involve the appropriate stakeholders. An operational communication plan will assist in providing direction. Majority of staff preferred face to face communication over any other communication channel. Staff stated that they enjoyed the text messages (consisting of key dates, milestones, important and motivational messages) as well as the survival kits and pre go-live

		refresher sessions.
Comments	"I don't always feel comfortable raising my concerns with cash centre management." "There is room to improve communication in the future, as the communication was not as regular." "They (Cash Centre Managers) did a superb job. They were open for suggestions. They made us feel comfortable to ask questions and made time for us."	"I don't always feel comfortable raising my concerns with cash centre management." "I would like to have control of my growth, freedom to express my views and the communication to improve." "The comments and suggestion boxes don't work. We don't want to put our names in the box, because we will get into trouble later."
Leadership	Site 1	Site 2
Areas of concern	Varying views as some staff felt their concerns or inputs were not taken into account whereas others felt that leadership was fully on board. There were varied views on the support provided by leadership, as it seems most staff believed leadership provided them with the required support whereas others felt that leadership did not give them the support they expected.	Majority of staff believed leadership provided them with the required support and encouragement they needed whereas others felt that leadership did not give them the support they expected. Some staff felt their concerns or input were not taken into account whereas others felt that leadership was fully on board. Staff that believed leadership could have supported them better cited that leadership did not have all the required knowledge (i.e. system or impact on day to day operations). They believed that it placed leadership at a disadvantage as they should be the 'super users' on the system. Leadership are often the people with the most access and authorisation on the system with a view of all operations. Treasury staff strongly believe that they are short-staffed resulting in long hours and low morale within this area. Staff have appealed for additional headcount, but have not been supported by leadership in this view.

Constructive Statements	Staff saw great support provided by management especially during night shift. Staff felt that leadership was visible.	Some staff members felt that relationships between the staff and leadership had improved and that after implementation the staff better understood some of the daily pressures of the cash centre managers, controllers and team leads. Some staff believed that the team started to work together and found unity as a team, as they were all on common ground – the morale had been lifted before go-live by change management initiatives such as the survival kits, pre go-live refresher training, the 'hand painting' team activity and feedback sessions facilitated by the change management and project management teams.
Comments	"Leadership was not as available in our area. They only assisted when we indicated that we needed help. They were not proactive. We found ourselves having to ask for information." "Relationships have improved." "Leadership was supportive during and after implementation. The vendors were more visible on our floor than our leaders." "Survival kits were very positive."	"Thank you to leadership for the support." "We all worked together – like a team!" "It would be best if leaders are well equipped in order to support their staff better." "Team leaders have to be more ready than their staff." "Leadership lack of knowledge can hinder, but we were supported." "Management must start collaborating with staff by listening to suggestions by staff." "Leadership needs to bring more staff – we don't have enough people."
Support	Site 1	Site 2
Areas of concern	Processes were not available, mapped or documented which frustrated staff. These were only explained but most staff preferred to see them documented. No clear instruction of processes to follow if the system does not work. Some staff felt that the	Some staff believed that there are not enough controllers available over weekends to address issues and log calls. Several staff members felt as though support teams were pulled off site too early and that they had to struggle on their own, but eventually became more confident and comfortable

	vendors were getting impatient.	when using the system. Staff requested assistance and further support regarding the system clean-up of unprocessed containers, unacknowledged container transfers and unacknowledged cash transfers.
Constructive Statements	Staff agree that the system is effective. Staff were overwhelming in their response that great support was received from the vendors.	Majority of staff indicated that there was adequate support from the change management and support teams before, during and after the system go-live. Staff are aware of the appropriate steps to follow when they have a problem with the system and are comfortable with the call logging procedure. Most staff believed that 'super users' had been identified in their area and were available for quick assistance when needed.
Comments	"In terms of the super user, there was sometimes a work conflict as the super user was busy with their own work and they now had to assist someone all the time." "Support was only provided when we asked for it. Some of us don't know what we will do in the event there is a system problem."	"The cluster is running well on the system and is getting better every day. The issues come from treasury. We need you guys (support team) to come and help us clean up." "We (treasury) need another pair of hands to balance the load, but they (management) do not want to help us." "The controllers are our super users." "You guys (support team) just left us. We know you are available over the phone, but we needed someone here."
General	Site 1	Site 2
Areas of concern	Staff highlighted that more focus is required on PC literacy. Staff raised the balancing issues.	Unprocessed containers, unacknowledged container transfers and unacknowledged cash transfers are not being managed effectively. Specialised containers that go back into cycle without being despatched are unable to be

		received when a client sends them in again. Processing of Forex (orders and deposits), ATM orders, management of differences and PCD's as well as balancing areas and the vault. Annual leave has a domino effect and as a result is difficult to postpone. This does however have a huge impact, as experienced key staff are not always available during training, readiness activities and go-live. The cash centre has high staff turnover which resulted in new and inexperienced staff on the floor at go-live and during support. Capacity issues specifically around treasury and receiving. Issues regarding team work, style of leadership, hours of work, growth and development as well as rewards and recognition have been escalated to the Cash Operations HR team. These issues question whether there are formal HR processes in place that enable staff members to have knowledge and understand policies and procedures which may result in misplaced perceptions. Majority of staff believed that communication can be improved in the cash centre. Staff in treasury and receiving areas strongly believe that they are understaffed resulting in long working hours, discord amongst team members (treasury) and low staff morale. Staff have appealed to leadership for additional assistance but are not being supported as this would equate to additional costs.
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Constructive Statements	The system has improved the daily life of the user in the cash centre and most staff have become comfortable with the new way of working. Great support received from the vendors.	The system has improved the daily life of the user in the cluster and most staff have become comfortable with the new way of working. Staff reported an improvement in the incident logging and tracking capabilities since implementation. The basic system functions (receiving, prepping / counting, HSTB, coin and transfers) are running very well on the current processes. Great support received from the vendor, application support as well as process support resources. Some staff members felt that relationships between cash centre management and staff had improved after implementation, the team relied on each other for moral support and found unity as a team.
Comments	“BPS note counter to avoid half notes as this causes balancing issues. Communication to the clients must be managed as we get under pressure to learn the new system as well as deliver to the customer.” “It is important to ensure that the resources on the floor are knowledgeable on all aspects of the system. There are still balancing issues.” “Be patient with the team as it is new for all of us.” “We would appreciate if our input was considered.”	Positive Feedback: “No more paperwork. Running a search is easy, no more looking for a bag.” “I have learnt a lot and am confident on the system.” “What was promised was delivered.” “I really liked the push and support they (leadership) offered.” Areas of Concern: “The cluster balances in the evening but when we come in the next day (after treasury), there are major balancing issues and we get in trouble.” “Cluster is working well but there are major issues in treasury.” “Communication to the clients must be managed – just so that they understand.”

9. Appendix B

Table 23: Project team site observations

Category	Site 1	Site 2	Site 3
Background	Closest site to head office (60 minutes' drive)	Remote support from head office or fly resources to site	Remote support from head office or fly resources to site
		Most recently established operation of 3 sites observed	
		Smallest of the 3 sites implemented	
Environment (physical and cultural)	Open plan	2 Levels	New building designed for process
	Revamped to split certain areas	Main operations happen underground	Ergonomics taken into account during design
		Ample space	More colourful and neat
	Well established team structure	Changing team structure and some new appointments	Well established team structure
	Older average age for leadership team and management	Very young average age except for management	Older average age for leadership team and management
Leadership	Emotional and involved management	Fear driven performance	Non-emotional, but still involved management
	Clear delegated authority	Disconnect between staff and management	Respected management
	Trust in second line management and leadership	Absence of onsite management presence and uncertain leadership (later suspended as well for mistake)	Confident leadership team and trusted for the most part
	Positive approach from management in motivating staff, only resolving to negative approach as last measure	Negative approach from management in motivating staff ("perform or else")	Positive approach from management in motivating staff

	Under pressure and stressed	Under pressure and tired	Was put under pressure later when backlog built up, but remained motivated for the most part
	Regional Manager, service and quality manager and 3 team leaders per shift	Regional Manager (shared with other cash centre), service and quality manager (not always onsite) and 1 team leader	Regional Manager, service and quality manager and 4 team leaders
	Management seems to take interest in wellbeing of staff even referring to as children	Management seems to take interest in wellbeing of staff even referring to as children, but in actions applied staff just has to comply with little input or consideration	Management seems to take interest in wellbeing of staff
Approach	10 Weeks onsite project team	2 Weeks onsite project team	5 Weeks onsite project team
	Quick wins and improvements implemented by consultants prior to system implementation and indefinite onsite support along with further improvements	2 Additional weeks of onsite support in follow up by smaller team and a more extensive investigation later	1 Week of onsite support in follow up by smaller team
	Kept existing facility, but changed some of the layout as required	Kept existing facility and layout	Built new facility and planned layout according to new processes
	Pilot site with operational involvement in defining processes	1 st Rollout site	Resources received hands-on experience and tour of implemented cash centre (Site 1) before implementation
	Agile approach of implementing cluster at a time	“Big bang” approach of implementing all clusters	“Big bang” approach of implementing all clusters

		simultaneously	simultaneously
	Consultants planned and managed implementation, with business' own project resources only observing later	Consultants and business project resources worked together from planning until close-out	Business project resources took the lead and consultants assisted and provided guidance when required
Issues encountered	Relationship between operations and consultants flourished, but communication gap occurred between operations and executive management levels	Staff turnover during implementation resulted in additional training required for new staff and increased levels of uncertainty and decreased morale	Extended unsustainable levels of overtime occurred in trying to prevent further backlog and to start catching up with processing
	Volume backlog	Volume backlog	Volume backlog
		Dependant on regular support	Avoidable inefficiencies identified in new layout
		Questionable "workarounds" later developed by staff increased risk of fraud	

10. Appendix C

10.1. Detailed tables of correlation analysis of environment, change readiness, organisational culture, communication and leadership

Table 24: Analysis of environment, change readiness, organisational culture, communication and leadership

		Age					Number of years in position						
		19 or under	Age 20-29	Age 30-39	Age 40-49	50 or over	Less than 1 year	1-2 years	2-5 years	6-10 years	11-20 years	More than 20 years	N/A
Age	19 or under	1.000											
	Age 20-29		1.000										
	Age 30-39			1.000									
	Age 40-49				1.000								
	50 or over					1.000							
Number of years in position	Less than 1 year	0.687	0.844	-0.958	-0.188	-0.973	1.000						
	1-2 years	-0.760	0.494	0.333	-0.972	-0.183		1.000					
	2-5 years	-0.644	0.629	0.176	-0.997	-0.340			1.000				
	6-10 years	-0.500	-0.945	0.866	0.410	1.000				1.000			
	11-20 years	-0.712	-0.824	0.968	0.152	0.964					1.000		
	More than 20 years	-0.500	-0.945	0.866	0.410	1.000						1.000	
Do people in your area share information freely with others?	N/A	-0.423	-0.970	0.819	0.487	0.996							1.000
	Yes	-0.689	-0.842	0.959	0.185	0.972	-1.000	0.052	-0.111	0.972	0.999	0.972	0.948
	No	0.792	0.749	-0.991	-0.032	-0.925	0.988	-0.205	-0.043	-0.925	-0.993	-0.925	-0.888
	N/A	-0.966	0.070	0.708	-0.774	0.260	-0.476	0.902	0.820	0.260	0.507	0.260	0.175
Do you believe the Cash Centre supports change?	Yes	-0.424	-0.969	0.820	0.486	0.996	-0.950	-0.266	-0.419	0.996	0.938	0.996	1.000
	No	0.960	0.458	-0.972	0.333	-0.724	0.864	-0.546	-0.403	-0.724	-0.881	-0.724	-0.661
	N/A (and blank)	-0.500	0.756	0.000	-0.995	-0.500	0.286	0.943	0.984	-0.500	-0.252	-0.500	-0.573
	Are communication channels in your cash center/department effective?	Yes	-0.968	-0.428	0.963	-0.365	0.700	-0.846	0.574	0.433	0.700	0.865	0.700
Do you have confidence in the leadership of the Cash Centre?	No	0.999	0.226	-0.884	0.554	-0.532	0.714	-0.735	-0.615	-0.532	-0.738	-0.532	-0.457
	N/A (and blank)	-0.671	0.601	0.211	-0.994	-0.306	0.078	0.992	0.999	-0.306	-0.043	-0.306	-0.388
	Yes	-0.993	-0.303	0.919	-0.486	0.598	-0.767	0.679	0.550	0.598	0.789	0.598	0.526
	No	0.995	0.094	-0.814	0.660	-0.415	0.614	-0.819	-0.714	-0.415	-0.642	-0.415	-0.335
Rate the management style in your department?	N/A (and blank)	0.223	0.999	-0.681	-0.660	-0.956	0.862	0.464	0.602	-0.956	-0.843	-0.956	-0.978
	Self managed	0.834	-0.384	-0.447	0.935	0.061	0.172	-0.992	-0.959	0.061	-0.207	0.061	0.147
	Autocratic	1.000	0.187	-0.865	0.587	-0.498	0.685	-0.762	-0.646	-0.498	-0.710	-0.498	-0.421
	Team based	-0.992	-0.315	0.924	-0.475	0.608	-0.775	0.669	0.540	0.608	0.797	0.608	0.537
	Blank	-0.761	0.494	0.334	-0.971	-0.182	-0.051	1.000	0.987	-0.182	0.086	-0.182	-0.266
		Share info			CC supports change			Effective communication			Confidence in leadership		
		Yes	No	N/A	Yes	No	N/A (and blank)	Yes	No	N/A (and blank)	Yes	No	N/A (and blank)
Do you believe the Cash Centre supports change?	Yes	0.949	-0.889	0.177	1.000								
	No	-0.865	0.932	-0.855		1.000							
	N/A (and blank)	-0.284	0.133	0.706			1.000						
Are communication channels in your cash center/department effective?	Yes	0.848	-0.919	0.872	0.636	-0.999	0.268	1.000					
	No	-0.716	0.814	-0.956	-0.458	0.969	-0.467		1.000				
	N/A (and blank)	-0.075	-0.079	0.839	-0.387	-0.435	0.978			1.000			
Do you have confidence in the leadership of the Cash Centre?	Yes	0.769	-0.858	0.930	0.527	-0.986	0.395	0.991	-0.997	0.580	1.000		
	No	-0.616	0.730	-0.986	-0.336	0.928	-0.580	-0.940	0.991	-0.739		1.000	
	N/A (and blank)	-0.860	0.772	0.035	-0.977	0.489	0.733	-0.459	0.260	0.573			1.000
Rate the management style in your department?	Self managed	-0.174	0.324	-0.948	0.146	0.645	-0.895	-0.670	0.813	-0.969	-0.764	0.883	-0.352
	Autocratic	-0.687	0.790	-0.967	-0.422	0.959	-0.502	-0.968	0.999	-0.673	-0.993	0.996	0.221
	Team based	0.777	-0.864	0.925	0.538	-0.988	0.383	0.993	-0.996	0.569	1.000	-0.975	-0.348
	Blank	0.053	-0.206	0.902	-0.265	-0.547	0.942	0.575	-0.736	0.992	0.680	-0.819	0.463

		Access to a PC at work			Access to a PC at home			Comfortable with a mouse			Adequate training for job		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A (and blank)
Access to a personal computer at home	Yes	0.785986	-0.7907257	-0.7333777	1								
	No	-0.826232	0.8305474	0.7779355		1							
	N/A	-0.5684421	0.5747635	0.5				1					
Are you comfortable navigating with a mouse on the computer system?	Yes	0.5258484	-0.5323858	-0.455292	0.939174672	-0.91362907	-0.99870494	1					
	No	0.8129535	-0.808443	-0.8574114	0.278948687	-0.34364495	0.016978443		1				
	N/A	-0.9967203	0.9960673	1	-0.73337767	0.777935519	0.5			1			
adequate training to keep up with process functions within your job?	Yes	-0.4250784	0.4320392	0.3504358	-0.89371353	0.861115211	0.986325816	-0.993433	0.1815296	0.3504358	1		
	No	0.6362199	-0.6421448	-0.5717001	0.977040197	-0.9602787	-0.99639157	0.990783	0.067946	-0.5717		1	
	N/A (and blank)	-0.8227233	0.8183196	0.8660254	-0.29521298	0.359539864	0	0.0508767	-0.999856	0.8660254			1
Do you know how to navigate through Windows Explorer?	Yes	0.7473548	-0.7524514	-0.691136	0.998187476	-0.99177908	-0.97146596	0.958141	0.2206508	-0.691136	-0.919093	0.9880912	-0.237179
	No	-0.8398232	0.8439805	0.7931386	-0.99570939	0.99969813	0.924014407	-0.903365	-0.366614	0.7931386	0.848364	-0.953133	0.3823577
	N/A	-0.2678278	0.2752425	0.1889822	-0.80616675	0.764037667	0.944911183	-0.960341	0.3433228	0.1889822	0.9859361	-0.91372	-0.327327
Have you ever worked on Microsoft applications before e.g. Microsoft Excel?	Yes	-0.1082854	0.115941	0.0274825	-0.6997197	0.649486383	0.879439536	-0.902518	0.4908735	0.0274825	0.9458639	-0.835865	-0.476011
	No	0.3014686	-0.3088053	-0.2233211	0.826431228	-0.78620468	-0.95581443	0.9695329	-0.310157	-0.223321	-0.991193	0.9274145	0.2939707
	N/A	-0.9967203	0.9960673	1	-0.73337767	0.777935519	0.5	-0.455292	-0.857411	1	0.3504358	-0.5717	0.8660254
Have you used email before?	Yes	0.8116448	-0.8161211	-0.7617113	0.999089644	-0.99967685	-0.94196788	0.9236685	0.3196615	-0.761711	-0.873761	0.9670618	-0.335703
	No	-0.8490692	0.8531139	0.803534	-0.99396363	0.99912504	0.91727628	-0.895827	-0.38262	0.803534	0.8390986	-0.947768	0.3982515
	N/A (and blank)	-0.0809236	0.0886	0	-0.67982144	0.628344116	0.866025404	-0.890342	0.5146317	0	0.9365868	-0.820463	-0.5
Have you used the internet before?	Yes	0.8479458	-0.8520044	-0.8022686	0.994194283	-0.99921157	-0.91811963	0.896768	0.380658	-0.802269	-0.840251	0.9484431	-0.396303
	No	-0.8281668	0.8324602	0.7800944	-0.99744214	0.999994072	0.931886216	-0.912224	-0.346876	0.7800944	0.8593595	-0.959312	0.3627507
	N/A (and blank)	-0.9683006	0.9701963	0.9449112	-0.91550057	0.940753862	0.755928946	-0.721643	-0.641725	0.9449112	0.6377007	-0.808765	0.6546537
Do you feel that you are equipped to handle this change?	Yes	0.9702592	-0.9683655	-0.9866661	0.612952701	-0.66529474	-0.35238074	0.3043111	0.929739	-0.986666	-0.193326	0.4305405	-0.935857
	No	0.1625797	-0.1701764	-0.0821995	0.737804124	-0.69016364	-0.90419443	0.924754	-0.442411	-0.082199	-0.962223	0.8646796	0.4271211
	N/A (and blank)	-0.99923	0.9995026	0.9927778	-0.80963787	0.847698275	0.600284226	-0.558816	-0.78948	0.9927778	0.4602653	-0.666	0.7997868
Do you believe this change will be disruptive/disturbing?	Yes	-0.2678278	0.2752425	0.1889822	-0.80616675	0.764037667	0.944911183	-0.960341	0.3433228	0.1889822	0.9859361	-0.91372	-0.327327
	No	0.9481044	-0.9456267	-0.9707253	0.548620468	-0.60423835	-0.2773501	0.2281102	0.9559215	-0.970725	-0.115216	0.357895	-0.960769
	N/A (and blank)	-0.5913341	0.5851038	0.6546537	0.033788315	0.034294838	-0.32732684	0.3749769	-0.950332	0.6546537	-0.478579	0.2459459	0.9449112
Are you currently facing a lot of stress in your job?	Yes	0.9715184	-0.9733151	-0.9491561	0.910101684	-0.93618867	-0.74720796	0.7124281	0.6518081	-0.949156	-0.627461	0.8009191	-0.66459
	No	-0.9194505	0.9224525	0.8846154	-0.96577244	0.981184018	0.846153846	-0.817944	-0.518496	0.8846154	0.7467513	-0.888334	0.5329387
	N/A (and blank)	-0.0339422	0.0262416	0.1147079	0.591209929	-0.53496126	-0.80295507	0.8322397	-0.609587	0.1147079	-0.890207	0.7494685	0.5960396
If you had an issue, would you be able to discuss it with your line manager?	Yes	-0.1168136	0.1244615	0.0360609	-0.70582555	0.655988509	0.883492596	-0.906181	0.4833779	0.0360609	0.9486146	-0.840545	-0.468445
	No	0.3627443	-0.3699129	-0.2861428	0.861246819	-0.82467183	-0.97288568	0.9833928	-0.247771	-0.286143	-0.9977	0.9497445	0.2312865
	N/A (and blank)	-0.8954909	0.8920354	0.9285714	-0.42867528	0.489156425	0.142857143	-0.092317	-0.987175	0.9285714	-0.022213	-0.226347	0.9897433
		Navigating Windows Explorer			Worked on Microsoft applications			Used email before			Used the internet before		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A (and blank)	Yes	No	N/A (and blank)
Have you ever worked on Microsoft applications before e.g. Microsoft Excel?	Yes	-0.7414459	0.6306085	0.9868033	1								
	No	0.8588175	-0.7707844	-0.993842		1							
	N/A	-0.691136	0.7931386	0.1889822			1						
Have you used email before?	Yes	0.9947114	-0.9987505	-0.7801914	-0.6686056	0.801659648	-0.76171128	1					
	No	-0.9855596	0.999851	0.7363862	0.617117105	-0.75967165	0.803534022		1				
	N/A (and blank)	-0.7227247	0.6090411	0.9819805	0.999622285	-0.97474493	0			1			
Have you used the internet before?	Yes	0.9859168	-0.9998854	-0.7378208	-0.61878611	0.761050432	-0.80226858	0.9978794	-0.999998	-0.596963	1		
	No	-0.9913326	0.9997768	0.7618117	0.646864393	-0.78407222	0.780094441	-0.999583	0.9992631	0.6256618		1	
	N/A (and blank)	-0.8896293	0.9488011	0.5	0.353171707	-0.5300788	0.944911183	-0.93183	0.9541125	0.3273268			1
Do you feel that you are equipped to handle this change?	Yes	0.5642915	-0.6834369	-0.0266375	0.13558018	0.061696147	-0.98666607	0.6461013	-0.695937	0.1627577	0.6944108	-0.667861	-0.879037
	No	0.77709	-0.6721757	-0.9941916	-0.99849851	0.989803172	-0.08219949	0.7083363	-0.659295	-0.996616	0.6608891	-0.687668	-0.40389
	N/A (and blank)	-0.7728483	0.8604759	0.3054236	0.147206699	-0.33864646	0.992777758	-0.833939	0.8691427	0.119968	-0.868091	0.8495198	0.9773556
Do you believe this change will be disruptive/disturbing?	Yes	-0.840314	0.7479556	1	0.986803299	-0.99938424	0.188982237	-0.780191	0.7363862	0.9819805	-0.737821	0.7618117	0.5
	No	0.4973104	-0.6236328	0.0524142	0.213423561	-0.01734268	-0.97072534	0.5837879	-0.637034	0.2401922	0.6353965	-0.606978	-0.838628
	N/A (and blank)	0.0938738	0.0588393	-0.6185896	-0.73675191	0.590639908	0.654653671	-0.008878	0.0760631	-0.755929	-0.073946	0.0377358	0.3711537
Are you currently facing a lot of stress in your job?	Yes	0.883514	-0.9445421	-0.4885069	-0.34077219	0.518822086	-0.94915606	0.9269509	-0.95007	-0.314806	0.9494057	-0.937393	-0.999913
	No	-0.9484115	0.9856315	0.6250951	0.490456664	-0.6520977	0.884615385	-0.975959	0.9884005	0.4663214	-0.988076	0.981843	0.9885225
	N/A (and blank)	0.6386755	-0.5140418	-0.953821	-0.98987159	0.942694207	0.114707867	0.5562656	-0.499158	-0.993399	0.5009963	-0.532049	-0.216777
If you had an issue, would you be able to discuss it with your line manager?	Yes	-0.7471776	0.6372463	0.9881567	0.999963168	-0.98216411	0.036060922	-0.674963	0.6238478	0.9993496	-0.625506	0.6533858	0.3611883
	No	0.890269	-0.8105262	-0.9949968	-0.96568897	0.997889633	-0.28614285	0.8387835	-0.800295	-0.958187	0.8015658	-0.822719	-0.58402
	N/A (and blank)	-0.3735272	0.510438	-0.1889822	-0.3454941	0.154410609	0.928571429	-0.466827	0.5252062	-0.371154	-0.523399	0.4921567	0.7559289
		Feel equipped to handle change			Believe change disruptive/disturbing			Facing a lot of stress in your job					
		Yes	No	N/A (and blank)	Yes	No	N/A (and blank)	Yes	No	N/A (and blank)			
Do you believe this change will be disruptive/disturbing?	Yes	-0.0266375	-0.9941916	0.3054236	1								
	No	0.9968749	-0.1595863	-0.9348991		1							
	N/A (and blank)	-0.7689578	0.6995586	0.5592383			1						
Are you currently facing a lot of stress in your job?	Yes	0.885263	0.3917607	-0.9800677	-0.48850692	0.845755904	-0.38339758	1					
	No	-0.7969226	-0.5374582	0.9341701	0.62509509	-0.7467118	0.226610886		1				
	N/A (and blank)	-0.2748617	0.9806086	-0.0052967	-0.95382097	-0.34995662	0.826033188			1			
If you had an issue, would you be able to discuss it with your line manager?	Yes	0.1270717	-0.9989319	0.1556905	0.988156693	0.205030757	-0.73182987	-0.348829	0.4979181	-0.988617			
	No	0.1263751	0.9784652	-0.399028	-0.99499684	0.047617048	0.536996801	0.5732372	-0.699949	0.9190394			
	N/A (and blank)	-0.976598	0.2935696	0.8773385	-0.18898224	-0.99053606	0.888458553	-0.764518	0.6483516	0.4752183			

		Age					Number of years in position						
		19 or under	Age 20-29	Age 30-39	Age 40-49	50 or over	Less than 1 year	1-2 years	2-5 years	6-10 years	11-20 years	More than 20 years	N/A
Do you feel you have received adequate training to keep up with process functions within your job?	Yes	-0.986325816	-0.34824	0.936587	-0.44356	0.63589	-0.79707	0.642624	0.509476	0.63589	0.818117	0.63589	0.566558
	No	0.996391569	0.104954	-0.82046	0.651918	-0.42469	0.622471	-0.81252	-0.70691	-0.42469	-0.65	-0.42469	-0.34457
	N/A (and blank)	0	0.981981	-0.5	-0.81088	-0.86603	0.726987	0.649796	0.764753	-0.86603	-0.70202	-0.86603	-0.90613
Do you feel that you are equipped to handle this change?	Yes	0.352380739	-0.8524	0.162758	0.965087	0.634285	-0.43839	-0.87596	-0.94275	0.634285	0.40604	0.634285	0.698946
	No	0.90419443	0.590301	-0.99662	0.182794	-0.82199	0.931378	-0.40974	-0.25595	-0.82199	-0.94378	-0.82199	-0.76951
	N/A (and blank)	-0.600284226	0.671932	0.119968	-0.99982	-0.39249	0.169248	0.975979	0.998417	-0.39249	-0.13397	-0.39249	-0.47078

11. Appendix D

11.1. Performance Measurement Comparison Table

Table 25: Comparison and expectation of KPI's

Measurement	Expectation	Site 1	Site 2	Site 3	Rest of sites
Controllable Irrecoverable Ratio (Controllable Irrecoverable / Total Cash Deposits)	Expected to rise after implementation due to human error with new system and processes, but to decline over a long period with increased traceability and visibility with electronic system	Follow same trend as other sites and remained consistent at implementation, but overall a lot more consistent from start and continued to be	Very inconsistent, but no clear relation with implementation	Follows general trend to a degree and increase at implementation seems to be normal and not necessarily implementation related	Increased in 2011 and end of year peaks
Controllable Irrecoverable Rand Value	Expected to be directly dependant to Rand value of total cash in (therefore Total Irrecoverable ratio is measured), maybe even exponentially due to pressure and workloads, but no abnormalities are expected because of implementation	Seems to slightly hit end of year peak (3 months into implementation) and not fully recover, but close to trend	Slight decrease after implementation, but this coincides with general trend	Follows general peak, but very inconsistent	End of year peak followed by dip, normalising and general decrease through year back to same level
Turnover per head	Expected to drop slightly after implementation while the comfort levels with new system are still low, increasing over time due to efficiencies introduced	Slight dip during/after implementation and follows trend thereafter	Follows trend, but slightly lower but stable after implementation	Followed general trend somewhat, but increasing throughout 2011 and peaking at implementation	End of year peak followed by dip, normalising and general decrease through year

Staff Head Count	Expected to be consistent, with no noticeable change to pre-implementation pattern	Steady increase after implementation, followed by steady decrease	Very consistent with slight long term decrease	General decrease, but consistent at implementation	Generally consistent, with slight increase
Total Cash Deposited (Cash In)	Expected to be consistent, with no noticeable change to pre-implementation pattern (external)	Follows trend	Follows trend	Follows trend	Consistent, with end of year and Easter peaks with slight increase through year
Smart Device	Expected to be consistent, with no noticeable change to pre-implementation pattern (external)	Follows trend	Follows trend	Follows trend, with noticeable decrease at implementation	Consistent, with end of year and Easter peaks
Wholesale Cash - Branch Acquired (ICOM)	Expected to be consistent, with no noticeable change to pre-implementation pattern (external)	Consistent with trend	Seems offline	Seems to have gone offline at implementation	Site 7 seems to only have gone online at Easter peak, so ignored
Wholesale Cash - Branch Issued (ICOM)	Expected to be consistent, with no noticeable change to pre-implementation pattern (external)	Consistent with trend	Seems offline	Seems to have gone offline at implementation	Site 7 seems to only have gone online at Easter peak, so ignored
Retail Cash - Customer Deposits (Transactions)	Expected to be consistent, with no noticeable change to pre-implementation pattern (external)	Slight dip during/after implementation and follows trend thereafter	Very consistent and follows trend	Follows trend	End of year peak and consistent increase from Easter peak after normalise
Retail Cash - Customer Withdrawals (Transactions)	Expected to be consistent, with no noticeable change to pre-implementation pattern (external)	Very inconsistent a month into implementation, jumping and eventually normalising, but not following	Very consistent, following trend with lesser peak	Generally consistent, not following trend too much with lesser peak and decrease at	Yearend dip, followed by Easter sharp increase and consistent increase from there

		trend		implement ation	
Overtime	Expected to increase at implementation and to steadily decrease back to normal levels over time, hopefully even reducing to a lower steady state	Significant increase a month into implementation, steadily decreasing again after a few months	Increase at implementation with steady decrease later	Increase at implementation, but following trend with other cash centres	Semi peak at beginning of year, but very inconsistent

12. Appendix E

12.1. *Consent Letter from Bank*

To Whom it may Concern

Dear Sir/Madam

We hereby confirm that we are aware that Mr Thinus Mentz is busy with his M.SC in Industrial Engineering and that we are in agreement that he can use Data from [REDACTED] in his research provided that it does not reflect actual Cash Figures, Names or Locations and [REDACTED] name is never mentioned but referred to as the bank and Site 1, 2 or 3.

Yours Faithfully

A handwritten signature in black ink, appearing to be "Mentz", is written over a large black rectangular redaction box.
[REDACTED]