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Information quality assessment framework: case of the national safety net program single registry system

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Declaration

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Approval

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Abstract

The primary goal for IS applications is to deliver information which is accurate, timely, and relevant information to managers. Information quality is viewed as an essential element in measuring information system success. Assessing information quality and understanding areas of improvement is important to ensure that information systems are performing optimally.

This research seeks to identify a means to assess information quality for the National Safety Net Program Single Registry System with the aim of improving the information it generated. This research proposed a three-phase framework that is iterative – information quality assessment, improvement, and proactive information quality management. This framework is anchored on the fact that continuous improvement is vital when ensuring in quality information. Nonetheless, assessment is the essentially the first phase to establish the status of information quality within an organization. For organizations that have already established this status, identifying the areas for improvement is the place to start this iterative process. Otherwise the c framework for proactive management of information quality is a fundamental and a strategic guide for all organizations to consider.

This research took an exploratory approach to understanding the factors that influence information quality. A sample size of 46 was identified from the target population of 84 users of the single registry. A survey was undertaken coupled with key informant interview and desk review to ensure collect data for this research.

The results showed that the information on the single registry was of good reputation and users perceived it to be objective. It is evident that there is need to assess these information quality dimensions from time to time to ensure that the quality is maintained and the goal of the information system is achieved.

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Definition of Terms

Single Registry	The database where information on potential and actual beneficiaries of social protection programmes is compiled (Barca & Chirchir, 2014)
Safety Net	non-contributory transfers generally targeted to the poor (Alderman & Yemtsov, 2014)
Cash Transfer	Provision of support in the form of cash to the poor or to those who face a probable risk of falling into poverty in the absence of the transfer (The World Bank Group, 2009).
Social Protection	Policies and actions, including legislative measures, that enhance the capacity of and opportunities for the poor and vulnerable to improve and sustain their lives, livelihoods, and welfare, that enable income-earners and their dependants to maintain a reasonable level of income through decent work, and that ensure access to affordable healthcare, social security, and social assistance (Ministry of Gender Children and Social Development, 2011)
Information quality	Information quality has been defined as the desirable characteristics of the system outputs (Petter, DeLone, & McLean, 2008)

Acronyms/Abbreviations

AIMQ	Assessment and Improvement Methodology for information Quality
CCTV	Closed-circuit television
CSF	Critical Success Factors
CT-OVC	Cash Transfer for Orphans and Vulnerable Children
FGD	Focus Group Discussion
HSNP	Hunger Safety Net Programme
IPRS	Integrated Population Registration Service
IQ	Information Quality
IQA	Information Quality Assessment
IS	Information Systems
IT	Information Technology
MIS(s)	Management information systems(s)
NIMES	National Integrated Monitoring and Evaluation System
NSNP	National Safety Net Program
OPCT	Older Persons Cash Transfer
PSP/IQ	Product And Service Performance Model For Information Quality
PwSD-CT	Persons with Severe Disability Cash Transfer
TQM	Total Quality Management

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Chapter One: Introduction

1.1. Background of the Study

Computer-based management information systems (MIS) have been used over time to transform the way organizations conduct their business. MIS can be seen as facilitators, agent of change, allowing organizations to make better decisions through visualization of complex situations (Oni, Gonese, & Matiza, 2014). MIS facilitates the acquisition of new knowledge through data analytics and creating an opportunity for a competitive advantage over the competitors through the use of innovative information system products. The advantages of MIS are vast and can be seen in all sectors of business. Some of these benefits may not have a visible fiscal value though they exist and perhaps are major paybacks of improved MIS. Instances of these can include enhanced decision-making; access to broader information; job enrichment; better customer service; and improved presentation of information (Dixon, 1995). From small and medium enterprises to large corporations and government, MIS are critical tools for effective and efficient operation and management. Yet all these gains may be in vain if the information systems do not produce quality information. The main aim of any information system is to generate quality information.

Information quality is regarded as an indispensable component of IS outputs as it defines the level which information is used in organizations (Abugabah & Alfarraj, 2015) Information quality is the calibre of the content of information systems. It is often described as the fitness for use of the information generated by a specific Information System (IS) (Wang & Strong, 1996). "Quality" is often taken as subjective and the quality of information can vary amongst users of the information (Wang & Strong, 1996).

Petter, DeLone, and McLean (2008) define Information quality as the desired features of the system outputs; such as web pages and organization reports. For example, usability, accuracy, understandability, completeness, timeliness, currency, conciseness, and relevance.

Thus, organizations have continued to increase expenditure on information technology (IT) even in the face of probable economic declines (Kanaracus, 2008). This is notwithstanding the uncertainties around economic situations and ever increasing competition that generates pressures to cut costs.

Research suggests that government agencies at all levels have progressively engaged in the use of information systems to harmonize business processes, standardize information sharing, and interoperate with other information systems (Scholl, Kubicek, Cimander, & Klischewski, 2012). This can be construed as government's interest in generating quality information for decision making and for public use. It has been noted that information quality is a key determining factor of public value amid citizens using government websites to participate in open government. Information is the primary goal for information systems (Scott, DeLone, & Golden, 2011).

Through the National Social Protection Policy (NSPP), the Government of Kenya recognized the need to develop a management information system (MIS) – a Single Registry – for social protection in Kenya (Ministry of Gender Children and Social Development, 2011). This has been executed through the development of a Single Registry for the National Safety Net Program (NSNP). The main objective of the NSNP is to improve the well-being of and increase resilience among specific vulnerable groups in order to reduce poverty and vulnerability in Kenya (Social Protection Secretariat, 2013). The Single Registry consolidates information from four cash transfer programs in the NSNP. The main aim of the Single Registry system is to offer a centralized and integrated database which enables oversight and harmonization of multiple programmes (Devereux & Tibbo, 2013). Augmenting information quality is a key ingredient for the success of the NSNP. Quality of information defines the extent to which information is used. (Abugabah & Alfarraj, 2015). The Single Registry enhances the monitoring and evaluation of the National Safety Net Program and has the potential to generate new evidence in support of the social protection agenda by improving the quality of information generated by it. Eventually, the evidence generated can be translated into effective policy for identifying appropriate elements of design and implementation.

The Single Registry has been developed and is currently in use in various counties in Kenya to monitor information on cash transfer programs in the country. It consolidates reporting of social protection programs in Kenya and provides a cross-reporting platform of social protection program activities from different programs.

The Single Registry is an important tool for Social Protection in any country as it provides checks against one beneficiary receiving multiple benefits, ensuring that there is proper and equitable coordination of social protection efforts.

It is also of fundamental significance that the information generated by the single registry is of quality as it also informs the country's planning and budget for social protection. Weak administrative capacity in social safety net programs may be related to poor data quality which in turn may lead to poorer targeting results (del Ninno & Mills, 2015). Research on the impact of poor information quality observed that poor quality has an undesirable financial impact on most organizations, with typical estimated annual losses of $8.2 million. Some organizations even showed annual losses as high as $100 million (Baškarada & Koronios, 2014).

1.2. Problem Statement

Petter, DeLone, and McLean (2013) concluded in their research that a small number of studies have investigated the variables that advance the quality of information despite the fact producing quality information is the main objective of any IS, representing a noteworthy gap in the IS research. Notwithstanding the fact that information quality is one of the key concepts of information systems, there is no common definition for it, or set of recommendations for its appropriate usage and measurement (McNab & Ladd, 2014). Further to this fundamental concerns still abound as to how to define quality and the criteria that should be considered when assessing information quality (Price & Shanks, 2004). Considering the fact that information quality frameworks are often domain-specific such as for a specific information system or field of study (Eppler & Wittig, 2000), it is important to understand information quality in the context of NSNP Single Registry and how this can be measured.

This research seeks to understand how to assess information quality for the National Safety Net Program Single Registry with the aim of developing a framework for future assessment and information quality management.

1.3. Research Objectives

This research endeavoured to address the following objectives:

i. To identify factors that influence information quality in social safety nets
ii. To identify challenges that affect information quality measure in social safety nets
iii. To review information quality frameworks in social safety nets
iv. To develop a contextual framework for quality information for the NSNP Single Registry
v. To validate the contextual framework quality information for the NSNP Single Registry

1.4. Research questions

This research sought to answer the following questions:

i. What are the factors influencing information quality?
ii. What are the challenges that affect the information quality measure?
iii. How have the available information quality frameworks addressed information quality assessment?
iv. How can an information quality framework for NSNP Single Registry be developed?
v. How can the information quality framework for NSNP Single Registry be validated?

1.5. Justification

The NSNP Single Registry initial prototype was developed in 2012. Since then, the system had continually improved and is currently being piloted in twenty-four (24) counties and three (3) of their sub-counties across the country. It would be of interest to enhance the quality of information generated by this system at this early stage as the goal of the single registry is to link additional state and non-state programs to enhance social protection reporting (Ministry of Gender Children and Social Development, 2011).

1.6. Scope of the Study

This research focused on the National Safety Net Program Single Registry which currently has information from four government cash transfers, namely: Cash Transfer for Orphans and Vulnerable Children (CT-OVC), Older Persons Cash Transfer Program (OPCT), Persons with Severe Disabilities Cash Transfer Program (PWSD-CT) and the Hunger Safety Net Program (HSNP). The research sought to study factors that affect information quality for users of the Single Registry system in the National Offices as well as the twenty four (24) counties and three (3) of their sub-counties across the country.

1.7. Limitations

This research is was undertaken in the period of three months. It is important to note that for an in-depth analysis of the factors that affect the quality of information for social protection, more time may be required. It is also important to note that there is insufficient literature in general on information systems in developing countries. It can also be noted that due to lack of resource and capacity in developing countries, there are no evaluations carried out on information system (Heeks, 2002). However, the researcher made every effort to source for relevant literature at her disposal.

Chapter Two: Literature Review

2.1. Introduction

This chapter will delve into detail on what the single registry is all about and why generating quality information for this system is important. It will also consider the definition of information quality and the various dimensions and characteristics of information quality. This chapter will also try and compare and contrast the various models available for measuring information quality as well as identify the key challenges in measuring and generating quality information.

2.2. Single Registry and its importance to the National Safety Net Program

The main goal of the Single Registry system is to offer a centralized and integrated database which enables oversight and harmonization of multiple programmes (Devereux & Tibbo, 2013). In Kenya, the Single Registry was initially developed for the National Safety Net Program. In future, this Single Registry will extend to other programs in the social protection arena besides the safety nets (Ministry of Gender Children and Social Development, 2011).

The National Safety Net Program Single Registry consolidates information from four cash transfer programs, namely: Cash Transfers for Orphans and Vulnerable Children programme (CT-OVC), the Older Persons Cash Transfer programme (OPCT) and the Hunger Safety Net Programme (HSNP) Persons with Severe Disability Cash Transfer programme (PwSD-CT). Figure 2-1 illustrates the linkage between the Single Registry and the Cash Transfer Programs.

The Single Registry is an important tool for Social Protection in any country as it provides checks against one beneficiary receiving multiple benefits, ensuring that there is proper and equitable coordination of social protection efforts. Countries across the globe that are implementing social protection endeavour to develop a single registry. For instance in Brazil, the gradual introduction of the Cadastro Unico, a single registry for beneficiaries, was a key ingredient for reducing program fragmentation and enhancing institutional coherence. (Banerji & Gentilini, 2013)

Implementing a single registry for social safety nets has been seen to facilitate oversight monitoring of several programs, facilitate the institution of links with other similar services and sectors and increase the efficacy of delivery by reducing duplication of effort and aiding

economies of scale (Department of Foreign Affairs and Trade, n.d.). The Single Registry consolidates reporting of social protection programs in Kenya and provides a cross-reporting platform of social protection program activities from different programs.

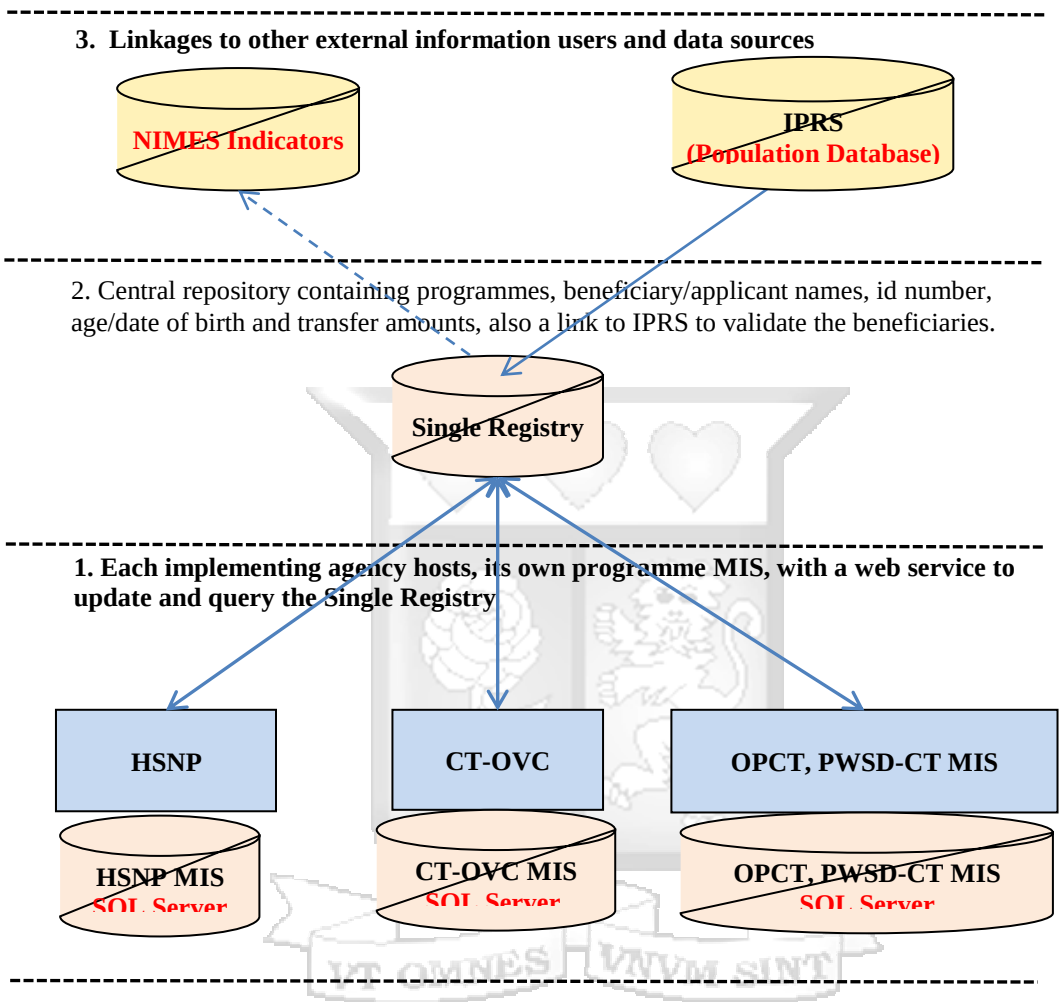

Figure 2-1: The National Safety Net Program Single Registry

Lal and Soares (2012) notes that the information available on the Single Registry can be used in the expansion, integration, and reform of the social protection programs. This includes ensuring that there is intercommunication between the specific program MIS to avoid duplications and inclusion errors. The Single Registry can be used as an important data sources in the process and impact evaluations of the programs with results that can feed a continuous process of redesign and reformulation of different programs' purposes.

A well-designed and implemented single registry can greatly improve coordination across safety net programs. Furthermore, a registry helps administrators to disseminate information, and improves efficiency. Thus a registry should be considered as an important component in

deciding where to invest time and resources in order to improve targeting procedures and performance for the safety net programs (del Ninno & Mills, 2015).

2.3. Definition and importance of Information Quality

DeLone and McLean (1992) identified six dimensions of Information System (IS) Success. These are: System Quality, User Satisfaction, Information Quality, Organizational Impact, Use and Individual Impact. These dimensions were later revised to: Intention to Use, System Quality, Information Quality, User Satisfaction, Service Quality, and Net benefits (DeLone & McLean, 2003). The Information quality can be defined as the desirable features of the system outputs; such as, web pages and management reports. For example: timeliness, relevance, understandability, conciseness, currency, completeness, usability, accuracy, and (Petter, DeLone, & McLean, 2008).

Wang and Strong (1996) have defined information quality as information that is fit for use by consumer. Research suggests that information quality has a blend of innate (correctness) and realistic (usefulness) qualities (McNab & Ladd, 2014). Kahn, Strong, and Wang, (2002) observe that quality has been described in one of four general ways: as value, excellence, meeting or exceeding consumer expectations, or conformance to specifications. They also note that Excellence and Value may be subjective means to described quality. This is due to the fact that excellence is biased and offers no concrete direction for enhancing quality and may involve high cost to achieve it whereas value requires trade-offs between excellence. In their conclusion, it is more realistic to describe quality in terms of, conformance to specifications, or meeting or being over and above consumer expectations as these are measurable.

For this study, the researcher adopted the definition of information quality as that which conforms to specifications and meets or exceeds the consumer expectation. The researcher has also used information quality and data quality interchangeably as is the case in other researches on the same topic (Baškarada & Koronios, 2013).

A foremost goal for information systems is to provide managers with timely, accurate, and relevant information; consequently information quality is an essential element of a system's success. Furthermore, information quality is also a significant element in assessing user satisfaction (Petter, DeLone, & McLean, 2008). Researchers have also observed the critical part played by the information quality in this knowledge-based, data-intensive economy,

subsequently increasing awareness and interest on how to improve information quality (Madnick, Wang, Lee, & Zhu, 2009)

In a survey to estimate the impact of poor quality of information, it was observed that poor quality has an adverse financial impact on most organizations, with approximate annual losses of $8.2 million. Some organizations even showed annual losses as high as $100 million (Baškarada & Koronios, 2014). Keeton, Mehra and Wilkes (2009) in their research note that a poor information quality can lead to poor decisions and disastrous effects, which can include increased costs, system outages, as well as lost revenue.

Organizational losses related to poor information quality and increased reliance of on information systems by organizations has shifted management attention toward enhancing quality of information (Gorla, Somers, & Wong, 2010)

2.4. Factors influencing information quality

Naumann & Rolket (n.d.)suggest that information quality is influenced by three aspects: the information itself, the perception of the user, and the process of accessing the information. Quality is subjective and is dependent on who is focusing on the information at the moment, eventually the user is the one who decides whether information is of quality. The source of information defines the characteristics that can be used to measure quality, such as completeness of data, whereas the process of retrieving the data also provides useful dimensions to check on quality such as the response time. To increase data quality, it is essential to recognize the meaning of data quality to those who use data, that is, data consumers (Wang & Strong, 1996).

Research suggests that information quality can be assessed in three related areas: *information content* - whether information is accurate, relevant, valid, current, secure, and complete; *information format* - its format, design, and links; and *physical environment* - a customer's ease of accessing the information (Jeonga & Lambert, 2001).

Table 2-1: Summary Factors influencing information quality

Author	Factors influencing Information Quality
(Naumann & Rolket, n.d.)	i. Perception of the user ii. information source iii. retrieval process
(Jeonga & Lambert, 2001)	i. information content ii. information format iii. physical environment

Further to identification of factors influencing information quality, several researchers have recognized characteristics of information quality differently. These are also referred to as the dimensions of information quality. Literature provides different dimensions to be considered, it is however evident that most are similar across board with a few being dichotomized as will be seen later in this chapter. Table 2-2 summarizes some of these Dimensions of information quality.

2.5. Challenges that affect Information Quality measure

Features of quality information can vary depending on the environment in which the data is to be used, thus it needs to be assessed within the context of its production and intended use. Defining what information quality is within any context is subject to whether dimensions are being identified for systems used for information storage and maintenance, the producers of information, or for the searchers and users of information (Knight & Burn, 2005)

Petter, DeLone, & McLean (2008) note that there are tendencies to consider only the user satisfaction dimension as a substitute measure of information system success. This overlooks the key aspects of information system that determine its success, such information quality, service quality.

Table 2-2: Summary of dimension of Information Quality

Information Quality Measure/Variable employed	Author	Title
Completeness, Believability, Objectivity, Accuracy, Reputation, Value-added, Ease of understanding, Timeliness, Appropriate Amount of data, Accessibility, Interpretability, Representational consistency, Relevancy, Concise representation, Access security	(Wang & Strong, 1996)	Conceptual Framework for Data Quality
Free-of-error, Objectivity, Concise representation, Relevancy, Understandability, Completeness, Consistent representation, Interpretability, Timeliness, Appropriate amount, Security, Ease of operation, Believability, Reputation, Accessibility,	(Kahn, Strong, & Wang, 2002)	PSP/IQ Model
Completeness, Ease of understanding, Personalization, Relevance, Security	(DeLone & McLean, 2003)	E-commerce Success Metrics
Availability, Usability, Understandability, Relevance, Format, Conciseness	(Sedera, Gable, & Chan, 2004)	Validated measure for IS Success
Relevance, understandability, accuracy, conciseness, completeness, currency, timeliness, usability.	(Petter, DeLone, & McLean, 2008)	Updated DeLone and McLean IS Success Model
Accurate, free of error, easy to access, complete, appropriate amount of information, presented in the same format, relevant, availability, and easy to understand.	(Al-Mamary & Aziati, 2013)	-

2.6. Information Quality Frameworks

This section will review some of the information quality frameworks that have been developed. There are over ten information frameworks according to literature. This research narrowed to a few that are specific to information quality as an independent measure and not as a subset of information system quality or information system success measure. While diverse in their method and use, the frameworks have a number of similar features as regards their categorizations of the dimensions of quality (Knight & Burn, 2005). A review of these frameworks is summarized in Table 2-5: Review of Information Quality Frameworks.

2.6.1. Conceptual Framework for Data Quality

Wang and Strong's (1996) motivation in the development of this framework was that consumers of data have a broad conceptualization of quality than information system professionals (Wang & Strong, 1996). Thus the focus of developing this framework was to capture the aspects of data quality data consumers consider as important. They recognize that high-quality data should be contextually apt for the task, intrinsically good, accessible to the data consumer, and clearly represented. Key to note is that the authors of this framework use data and information interchangeably.

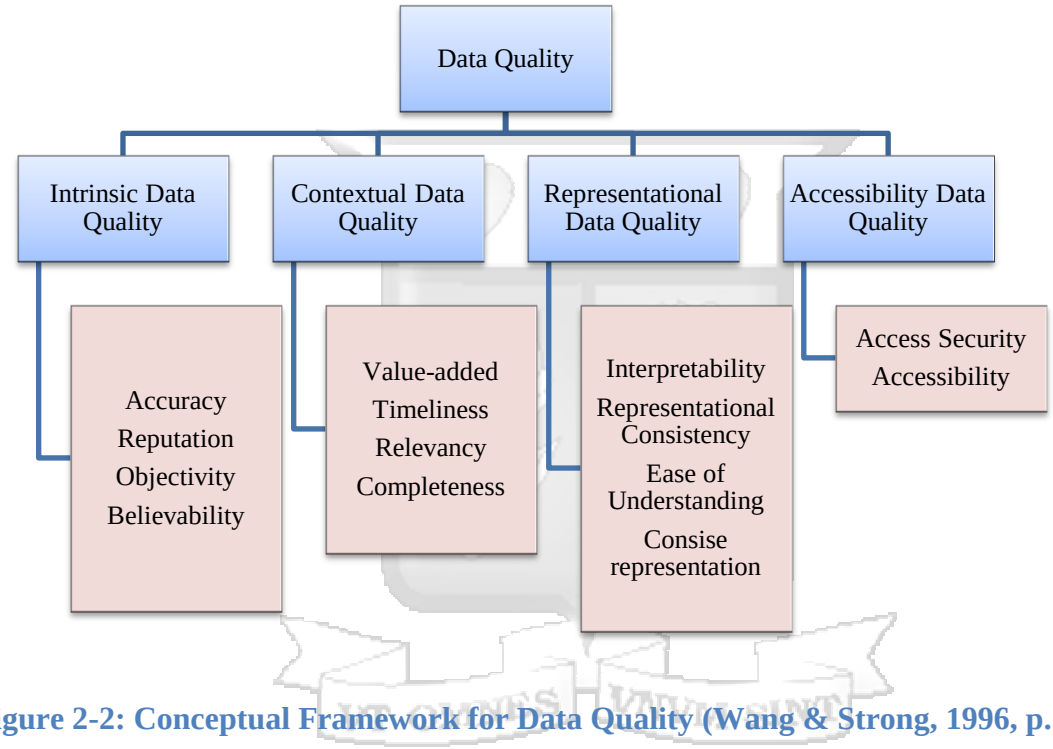

Figure 2-2: Conceptual Framework for Data Quality (Wang & Strong, 1996, p. 20)

This framework is focused on the features of the quality of data in use, as well as of those in production and storage. The results of this framework have been used successfully in industry and government the U.S. Navy and with several Fortune 100 companies using it to identify and assess potential areas of data insufficiencies, and subsequently improve data quality along these measures. Figure 2-2 outlines the categories and dimensions of this framework.

Intrinsic Data Quality implies that data has quality in its own right. Here, it is noted that data quality does not only include objectivity and accuracy but also believability and reputation should be inherent. Contextual Data Quality indicates that data quality is dependent on the context at hand.

Considering that the tasks and their circumstances vary across data consumers and time, the research challenge normally is attaining high contextual data quality. To attend to this, the authors propose that for each task, parameterization of contextual dimensions be done so that the appropriate contextual parameters for that task and type of task is being performed can be specified by the data consumer (Wang & Strong, 1996). Representational Data Quality focuses on the meaning of data, that is, ease of understanding, and interpretability; and the data format, that is, consistent and concise representation. This suggests that for data to be concluded that it is well represented, it must not only be consistently represented and concise but also easy to understand and interpretable. Earlier research presumed data as accessible due to its availability on a hard-copy report. This is not the case; however, accessibility is an important factor in determining the quality of information. This is the focus in Accessibility Data Quality category.

2.6.2. Product and Service Performance Model for Information Quality

The product and service performance model for information quality (PSP/IQ) integrates information quality dimensions from the conceptual framework to provide a basis of information quality benchmarks and assessment within the context of information as a service and as a product (Kahn, Strong, & Wang, 2002). PSP/IQ model combines the information quality dimensions into four quadrants: dependable, useful, usable, sound and information as seen inTable 2-3: Aspects of the PSP/IQ Model

Kahn et. al. (2002) argues that information is a product since there are activities that need to be in place to have and maintain data in the database. This process resembles the product enhancement. Information as a service centres on obtaining and using information stored as an end-product in a database. Information service quality addresses the underlying product features that become obvious during use, such as whether information can easily be aggregated and manipulated and if it is easily available (Yoruk & Ercan, 2006).

Table 2-3: Aspects of the PSP/IQ Model (Kahn, Strong, & Wang, 2002, p. 185)

	Conforms to Specifications	**Meets or Exceeds Consumer Expectations**
Product Quality	*Sound Information*: The features of the information provided meets IQ standards	*Useful information:* The information provided meets information consumer task needs
Service Quality	*Dependable Information:* the process of transforming data into information meets standards	*Usable Information:* The process of transforming data into information exceeds information consumer needs

The researcher further mapped key information quality attributes to the PSP/IQ Model, providing a means to measure information quality as a product and a service. Table 2-4 illustrates the four quadrants and their key information quality attributes.

Table 2-4: Mapping Information quality dimensions into the PSP/IQ Model (Kahn, Strong, & Wang, 2002, p. 188)

	Conforms to Specification	**Meets or Exceeds consumer expectation**
Product Quality	*Sound Information:* • Free-of-error • Completeness • Concise representation • Consistent representation	*Useful information:* • Appropriate amount • Understandability Relevancy • *Objectivity* • *Interpretability*
Service Quality	*Dependable Information* • Security • Timeliness	*Usable Information* • Believability • Ease of manipulation • Accessibility • Value-added • Reputation

The authors of this framework further expound on each of the quadrants as follows. The information quality dimensions in the *Sound Information* quadrant are noticeable and measurable against a specification; this is generally independent of task and decision. A consumer of information desires information that is well represented and error free. Missing information can result in poor decisions and incorrect interpretations. Consumers need to know the conventions used to represent data, for instance if a date field of 05/03/98 represents March 5, 1998 using European conventions or May 3, 1998 using American date conventions. Representational consistency ensures a minimum level of understandability and interpretability is attained. *Dependable Information* is secure, current, and timely to support the task at hand. The information quality dimensions in the *Useful Information* quadrant are task dependent features. The information is pertinent to the consumer's task and appropriate to support decision making. Information consumers have more confidence using objective data. The dimensions in the *Usable Information* quadrant differentiate one service from another. This is assessed from the point of view of the data consumer and is centred on the

task or decision at hand. Data consumers must be able to access information to use it and modify it to their needs. All these are determined by the computer systems in place between the stored data and the consumer. Consumers can use the information when it is reputable and believable, as well as beneficial. Benefits are often difficult to measure and intangible but are important when delivering high-quality information (Kahn, Strong, & Wang, 2002).

The PSP/IQ model categorizes the key information quality dimensions so that significant decisions can be made on how to improve information quality. More significantly, these dimensions are developed from the perception of information consumers and, therefore, are a reasonable choice (Lee, Strong, Kahn, & Wang, 2002).

2.6.3. Methodologies for Assessment Improvement of Quality

The methodology for assessment improvement of quality (AIMQ) is an integrated PSP/IQ Model developed to form a foundation for information quality benchmarking and assessment (Lee, Strong, Kahn, & Wang, 2002). The basis of the AIMQ methodology is a set of information quality dimensions that consider aspects that are essential to information consumers and a model. As illustrated in Figure 2-3, the AIMQ has three components: the PSP/IQ model; the Information Quality Assessment (IQA) instrument; Information Quality (IQ) Gap Analysis techniques.

The IQA instruments are designed in two sections; for demographics and for information quality dimension assessment. Besides the standard demographic information requirements for a survey, of particular interest is the role of the respondent in the information system, either as an information collector, consumer or an IS Professional. The next section incorporates sixty-five (65) IQA items to assess information quality along all dimensions.

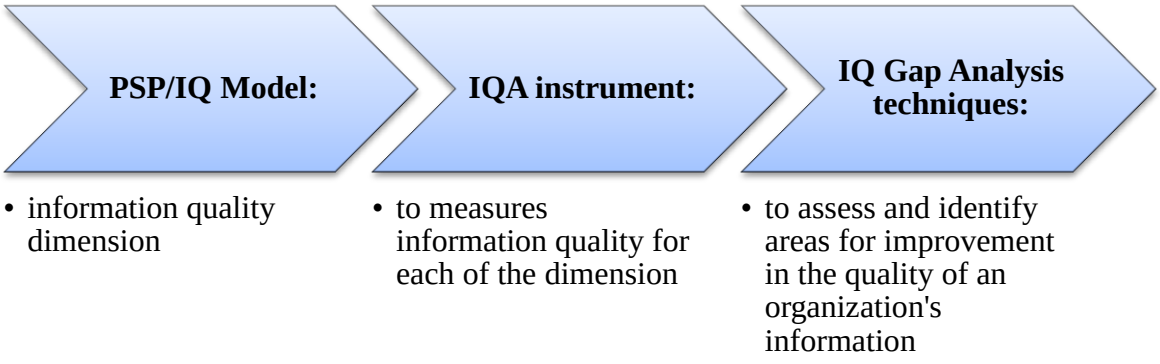

Figure 2-3: AIMQ Framework (Lee, Strong, Kahn, & Wang, 2002)

The IQ Gap Analysis Technique considers two areas of analysis; IQ Benchmark Gaps and the IQ Role Gaps to identify information quality problem areas. The Benchmark Gap Analysis measures how well an organization is doing relative to other similar organization. The comparison is done against industry leaders or competitors or even sources of best practice (Lee, Strong, Kahn, & Wang, 2002). Key considerations to factor when undertaking the benchmark gap analysis is first, the size of the gap area – a significant gap between the best practice and the organization under assessment denotes room for improvement in the dimension under review. The other considerations are the location of the gap, the different size gaps over the x-axis and its placement on the y-axis.

Role Gap Analysis compares the information quality assessment from the respondent in the different organizational roles, whether they are consumers or IS professional. The assessment and comparison of roles facilitate the identification of information quality problems and lays a foundation for information quality improvement. Key considerations when analysing role gap are the size of the gap area – a larger gap between the consumer and the IS professional suggests that the two do not agree on the level of the information quality dimension under review. The location of the gap on the y-axis, a high location suggests high-quality information, regardless of the gap in the role. The direction of the gap, which is considered positive when the IS professional assess the level of the information quality higher than the information consumer.

2.6.4. Critical Success Factors Framework for Information Quality Management

The Critical Success Factors (CSF) Framework was developed to provide a comprehensive guide on how organizations can develop effective information quality management strategies (Baškarada & Koronios, 2014). Borrowing from the Critical Success Factors of total quality management, Baškarada & Koronios (2014) identified ten factors that are fundamental in effective information quality management. Figure 2-4 illustrates these ten critical success factors.

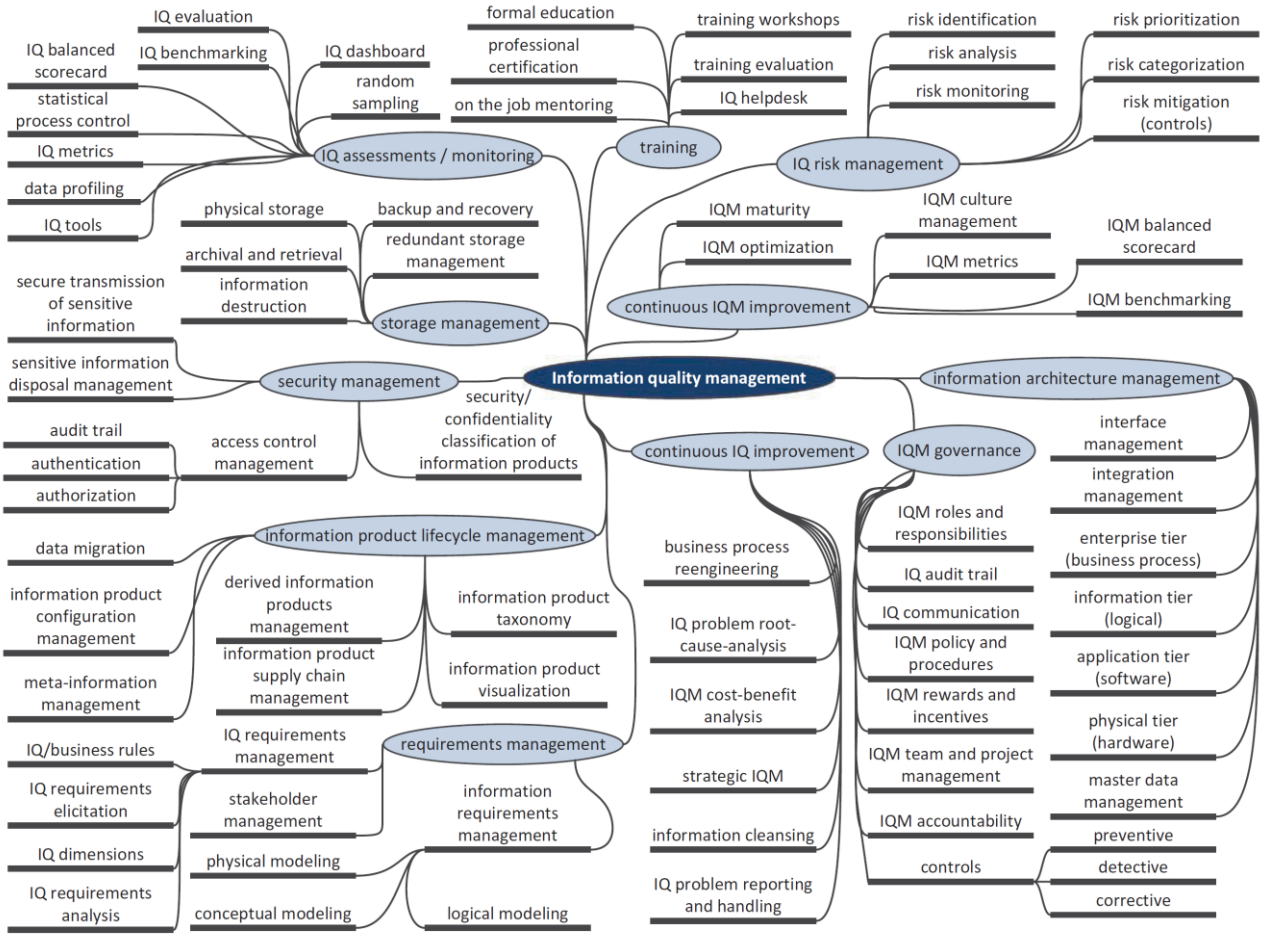

Figure 2-4: CSF Framework for Information Quality Management (Baškarada & Koronios, 2014, p. 7)

The ten CSF for information quality management are: information architecture management; requirements management; information quality management (IQM) governance; information product lifecycle management; continuous information quality improvement; information security management; storage management; training; information assessment/monitoring and information quality risk management. These CSF can be mapped to the information quality dimensions and is an important guide for an organization that is keen on developing effective strategies as a proactive approach to addressing information quality for there IS.

The CSF considered critical information technology (IT) policy proposals and IT management techniques to ensure that the IS can produce quality information. Some of these proposed include effective information security policies for authenticating the users access the system. Establishment of audit trails that provide governance framework information, which also are part of effective information security controls. Disaster recovery policy and back-up policy

are other proposals in the CSF framework which, if implemented can ensure accessibility of information at all times. Preventive, detective, and corrective IT controls are another suggestion to ensure quality information governance. Standard configuration management process is also proposed as part of the information lifecycle management (Baškarada & Koronios, 2014).

Table 2-5: Review of Information Quality Frameworks

No	Author	Framework	Description/Dimensions	Merits	Deficiencies
1.	(Wang & Strong, 1996)	Conceptual Framework for Information Quality	**Intrinsic DQ** Accuracy, Objectivity, Believability, Reputation **Accessibility DQ** Accessibility, Security **Contextual DQ** Relevancy, Completeness, Value-Added, Timeliness, Amount of Info **Representational DQ** Interpretability, Concise Representation, Ease of Understanding, Consistent Representation	Emphasis is on consumers' view of information quality, not the IS developer	Lacks a means to assess information quality and identify areas of improvements
2.	(Kahn, Strong, & Wang, 2002)	PSP/IQ Model	**Product Quality:** *Sound Information:* Free-of-Error, Completeness, Concise, Representation, Consistent Representation *Useful Information:* Appropriate Amount, Understandability, Objectivity, Relevancy, Interpretability, **Service Quality:** *Dependable Information:* Timeliness, Security, *Useable Information:* Believability, Ease of Manipulation, Value-Added Accessibility, Reputation,	Focus of information quality as product and as a service	Lacks a means to assess information quality and identify areas of improvements

No	Author	Framework	Description/Dimensions	Merits	Deficiencies
3.	(Lee, Strong, Kahn, & Wang, 2002)	AIMQ	• PSP/IQ model; • IQA instrument; • IQ Gap Analysis techniques: Benchmark Gap Analysis and the Role Gap Analysis	Incorporates an instrument and techniques to assess an organization's information quality and identify areas of improvement	No clear guideline for factors to consider when planning for information quality improvement.
4.	(Baškarada & Koronios, 2014)	Critical Success Framework for information quality management	This is a management guide to proactive management of information quality within and organization. The ten CSF proposed: i. information security management; ii. information architecture management; iii. requirements management; iv. information product lifecycle management; v. information quality management (IQM) governance; vi. storage management; vii. information assessment/monitoring; viii. continuous information quality improvement; ix. training; and x. information quality risk management	Comprehensive guide for organization to consider when managing information quality	Not specific on criteria information quality assessment

Chapter Three: Research Methodology

3.1. Overview

This study employed an exploratory research design to assess the factors influencing information quality for the NSNP Single Registry System. A blend of quantitative and qualitative research methods was used in this study. This research was cross-sectional focusing on the users of the single registry at a specific point time (Study Designs, n.d.). The sample population was drawn from users of the NSNP Single Registry System. This chapter will discuss in depth the research techniques and methodology used.

3.2. Target Population and Sampling Design

This research focused on the users of the NSNP Single Registry. The cumulative population of users of the single registry was yet to be established as the System is web-based and with access to anyone with internet connection. However, there are officers from ten counties and two sub-counties within the counties who had been trained on how to use the single registry as part of a pilot project.

Thus, the target population for this study was drawn from the total number of these officers who had been trained on the Single Registry; this added up to eighty-four (84) officers. Considering that the target population is not homogeneous, the researcher used stratified random sampling to identify respondents of the survey.

The researcher used the Yamane's Formula (Yamane, 1967) on a 90% confidence level to calculate the sample size. Thus, the sample size for this research is 46.

$$n = N/1+Ne^2$$

n = sample size; N = Population; e = error

Equation 1: Yamane's Formula

Table 3-1: Sampling Frame

No	Officers	Number of Officers	% of population	Proportion of Sample Size
1.	County Coordinators	20	24	11
2.	Sub-County Officers	57	68	31
3.	MIS Working Group (Developers, IS Professionals)	7	8	4
	Population	**84**	**100**	**46**

3.3. Data collection Methods and Tools

The researcher collected primary data from the users of the NSNP Single Registry through a survey. Secondary data was collected from systematic desk review on the information quality.

3.3.1. Survey Method

A survey was undertaken to gather primary data on factors influencing information quality. The independent variable for this research Gender, Level of education and Role on the Single Registry, whereas the dependent variables are; user perception; completeness; accessibility; believability; appropriate amount; ease of operation; concise representation; interpretability; free of error; consistent representation; objectivity; reputation; relevancy; timeliness; security and understandability. Table 3-2: Dependent Variables adapted from (adapted from Wang & Strong, 1996) provides a summary of the dependent variables and their description.

3.3.1.1. Survey Tool

A questionnaire was designed as a tool to gather information the respondent opinions regarding the variables mentioned above. The questionnaire was designed with three sections to collect data. Section A collects demographics of the respondent key among them being the level of education and the role of the user on the single registry system. Section B had a 5-point Likert scale to collect user perceptions on the fifteen variables with 1 being *strongly disagree* and 5 *strongly agree*. Section C allows the respondents to provide additional comments regarding information quality and the single registry. The sample questionnaire is provided for in Appendix A. The questionnaire was designed and submitted through Google Forms online, due to the diverse locations of the respondents and the limited time to undertake the survey.

A pre-testing questionnaire was sent out to a portion of the respondents. Pre-testing is an important step in the administration of the survey as it facilitates the development of better questions and survey instruments (Collins, 2003)

Table 3-2: Dependent Variables adapted from (adapted from Wang & Strong, 1996)

NO	Variable	Description
i.	Accessibility	Data are quickly or easily retrievable and available.
ii.	Appropriate Amount	The quantity or volume of available data is appropriate.
iii.	Believability	Data are accepted or regarded as credible, real, and true.
iv.	Completeness	Data are of sufficient depth, breadth, and scope for the task at hand.
v.	Conciseness	Data are compactly represented without being overwhelming.
vi.	Consistency	Data are compatible with previous data and are always presented in the same format
vii.	Ease of Operation	Data is easy to manipulate, combine with other data for analysis and interpretations.
viii.	Free of Error	Data are correct, accurate, reliable and certified free of error.
ix.	Interpretability	Data definitions are clear and are in appropriate language and units.
x.	Objectivity	Data are impartial and unbiased (unprejudiced).
xi.	Relevancy	Data are helpful and applicable for the task at hand.
xii.	Reputation	Data are trusted or highly regarded in terms of their source or content.
xiii.	Security	Access to data can be restricted and hence kept secure.
xiv.	Timeliness	The age of the data is appropriate for the task at hand.
xv.	Understandability	Data are easily comprehended and clear without ambiguity.

3.1.1. Key Informant Interview

The researcher conducted key informant interviews with the MIS Officers to acquire more information to supplement data that was obtained from the questionnaire. This method of data collection was selected due to the fact that key informants provide an expert source of information (Marshall, 1996). The questions were mainly on the measures put in place to enhance the quality of data including human resource capacity. The researcher further considered some key characteristics in the identification of the key informants. The characteristics considered were: the role of the respondent in the organization; their

knowledge, willingness to share their knowledge, ability to communicate, and finally their ability to remain objective (Marshall, 1996). The researcher, therefore, identified two MIS officers to respond to the key informant interview questions.

The researcher used unstructured interviews, which are informal, to explore further the management of information quality within NSNP. There was no pre-set list of questions to conduct these interviews, however, a key informant interview guide was developed to ensure that the researcher was guided and maintained focused on the goal of the interview (see Appendix B: Key Informant interview guide).

To ensure the accuracy of this data collection method (Homburg, Klarmann, Reimann, & Schilke, 2012), the researcher validated the responses through triangulation with desk review as well as observations made.

3.1.2. Desk Review Method

The researcher undertook a desk review of available published and unpublished literature to collect secondary data on the subject. The published literature sources included journal articles, books, policy report, as well as conference proceedings. Unpublished literature included theses documentation from past students.

3.2. Data analysis

The researcher employed the use of statistical analysis methods to analyse the feedback from the survey. Multivariate analysis method was used as there is more than one variable under investigation. This method made use of all variables simultaneously and deal with the simultaneous relationship among variables (Saccenti, Hoefsloot, Smilde, Westerhuis, & Hendriks, 2013).

A Kruskal-Wallis H Test was administered to discover if there is a relationship between the level of education and the dependent variables (information quality dimension). Research suggested that some assumptions must be put into consideration to administer the Kruskal-Wallis H Test (Statistics, 2013). These assumptions include:

i. That the dependent variable should be measured at the continuous level or ordinal (i.e., interval or ratio). In the case of this research, the dependent variables are using a 5-point Likert Scale where 5 is “Strongly Agree” and 1 is “Strongly Disagree”.
ii. That the independent variable consists of two or more categorical, independent groups. In this case, the highest level of education is categorized into three groups, post-graduate, undergraduate and diploma level.

The Mann-Whitney U-test was used to compare differences between two independent groups – the role of the respondent on the Single Registry and the independent variables. The condition for using this test is that the dependent variable is either ordinal or continuous, but not normally distributed (Statistics, 2013). In this case, the dependent variable had used a 5-point Likert Scale. The independent variable should have at least two categories, of which the role of respondent on the Single Registry has two categories, MIS Officer and Consumer of Information.

The researcher used SPSS to apply the statistical methods to analyse the results of the questionnaire.

3.3. Research quality

Quality research is important in producing quality evidence and new knowledge in a subject matter. Research quality is measured by validity and reliability. Reliability is the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects, or the consistency of a measurement.

The researcher used the Cronbach's alpha to measure the internal consistency of the questions in the survey conducted (UCLA, n.d.).Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the "underlying construct." (Santos, 1999). The questionnaire feedback was subject to the Cronbach' Alpha. Table 3-3 presents the reliability statistics. The Cronbach's alpha indicated a high level of internal consistency at 0.937.

Table 3-3: Cronbach's Alpha Reliability Statistics

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.937	.949	45

Validity defines whether the research has truly measured what it was intended to measure or how honest the research results are (Golafshani, 2003). Validity was measured through triangulation of information while conducting the research. Triangulation is a quest for convergence among multiple and diverse sources of information to form themes or categories in a study (Creswell & Miller). Golafshani (2003) further notes that triangulation may include multiple methods of data collection and data analysis.

Chapter Four: Presentation of Research Findings

4.1 Overview

This chapter presents the outcomes of the survey and the subsequent data analysis. Presentation of these findings was illustrated through tables, charts and graphs.

The questionnaire was divided into three sections as follow: Section A: Demographics, B: information quality dimensions and C: Additional comments.

4.2 Demographics

The questionnaire was administered to forty-six (46) respondents out of which thirty-one (31) responses were received. The respondents' distribution was 52% male 48 % female. Table 4-1 outlines the respondent's feedback on the highest level of education.

Table 4-1: Highest Level of Education

High	Respondents	Percentage
Post Graduate	12	39%
Under Graduate	15	48%
Diploma	4	13%

The analysis indicates that 31 respondents, who represent 68% of the whole population, responded to the questionnaire and were analysed. The analysis shows that 12 respondents, who represent 39% of the respondents, stated that they had reached post-graduate level as their highest level of education. 15 respondents, who represent 48%, indicated that they had reached the undergraduate level as their highest level of education. 4 respondents, who represent 13%, indicated that they had Diploma as the highest level of education. Figure 4-1 illustrates the percentage of respondents on the highest level of education.

Hence, it is evident that the highest level of education for the majority of officers accessing the single registry is the undergraduate degree which is a knowledge requirement for most cadres of officers working in the implementation of the NSNP.

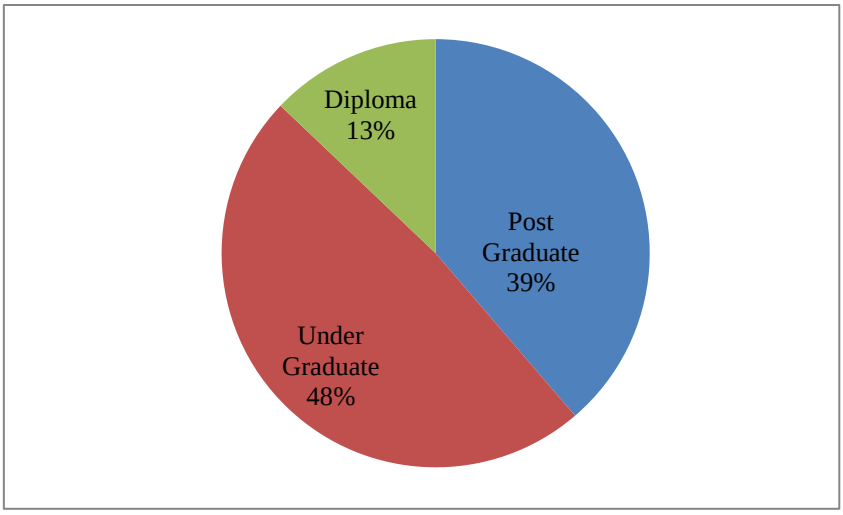

Figure 4-1: Highest Level of Education

Wang and Strong (1996) note that order to improve data quality, it is important to comprehend what data quality means to those who use data. This research sought to identify the different roles that the users of the single registry have. Two main roles were identified as the consumers of information and the MIS specialists or officers. Analysis indicated that out of the 31 responses received, 87% of respondents were consumers of information. 13% of the respondents were MIS Officers from the NSNP. Figure 4-2 illustrates the percentage the respondent base on their role on the Single Registry.

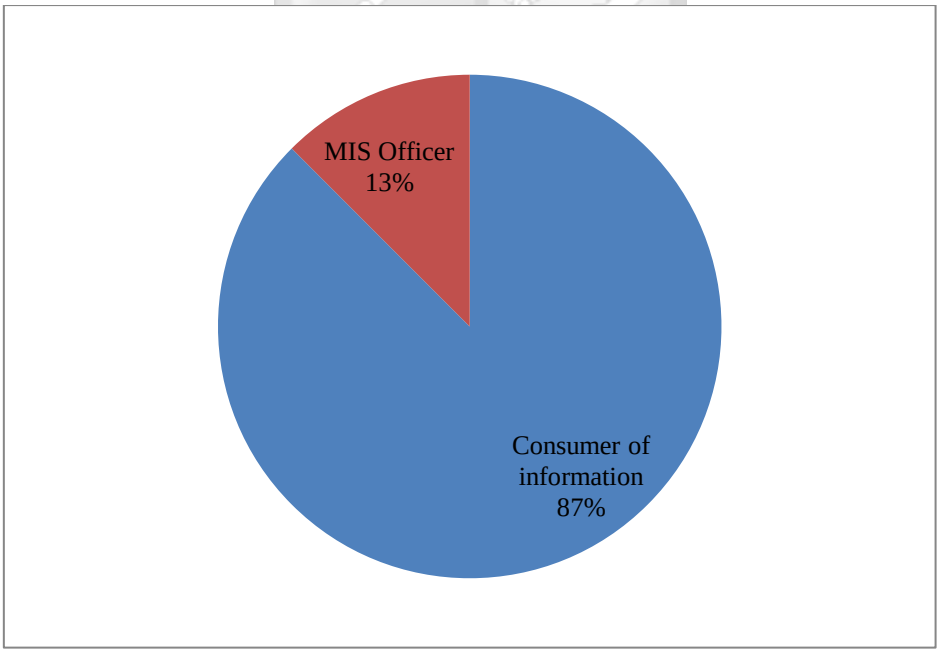

Figure 4-2: Role of Respondent on the Single Registry

4.1 Level of Information Quality Variable

This research sought to establish the level of information quality for the single registry. Through the survey, most respondents had a positive response towards the level of quality of information presented on the single registry and the information quality dimension presented in the questionnaire. A few of the responses are sampled in this section to show the feedback that was received from the respondents.

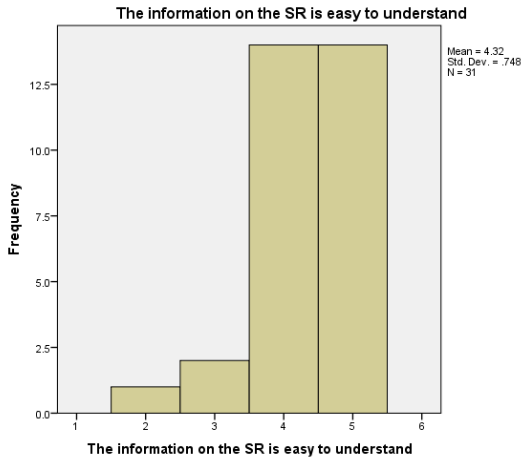

Figure 4-3: Level of Understandability

As seen in Figure 4-3, a majority of the respondents agreed that the information on the Single Registry was easy to understand. Figure 4-4 represents the level of objectivity in the data collection. The majority of the respondents agreed or strongly agreed that the information was objectively collected.

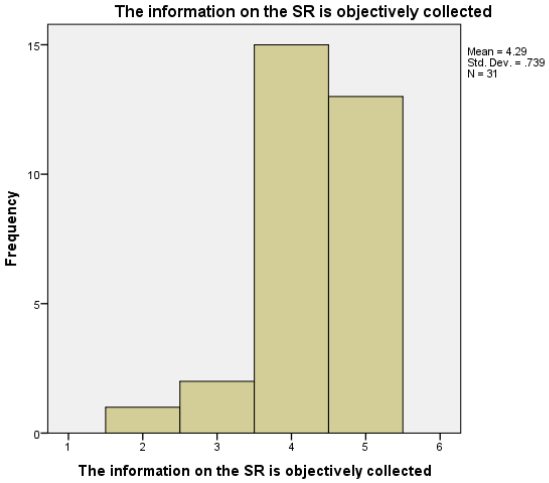

Figure 4-4: Level of Objectivity

Figure 4-5 the response was skewed towards strongly agree, which indicates that amongst the respondents, there is a good reputation of the information on the single registry.

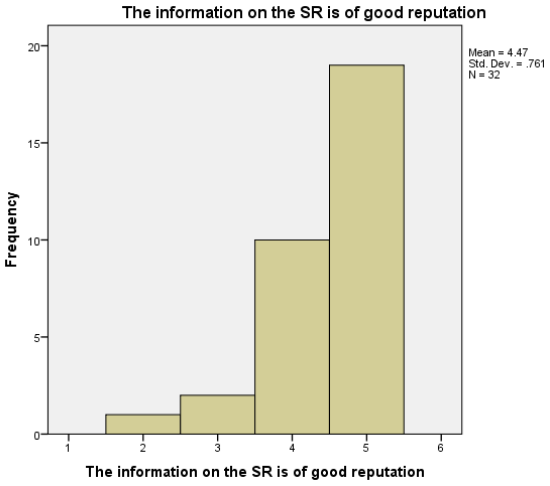

Figure 4-5: Level of Reputation

Figure 4-6 addresses the dimension of security, whether the information on the single registry is being access only by those who should see it. Majority of the respondents agreed whereas others strongly agreed. In the key informant interview, this was confirmed by one of the MIS officers interviewed who noted that there is indeed restricted access to the information on the single registry. The MIS officer also mentioned the presence of a security matrix that defines the users of the Single Registry as well as their roles and what they can access

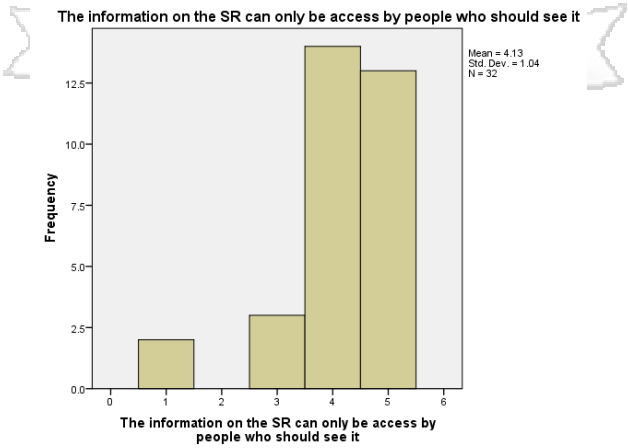

Figure 4-6: Level of Security

4.2 Effects of the Level of Education on the Information Quality Variable

The researcher sought to analyse the relationship between the level of education and the information quality variables. A Kruskal-Wallis H Test was administered on the highest level

of education and the dependent variables. The test revealed that there was statistically no significant difference as most of the information quality variables scored a *p* value of >0.05.

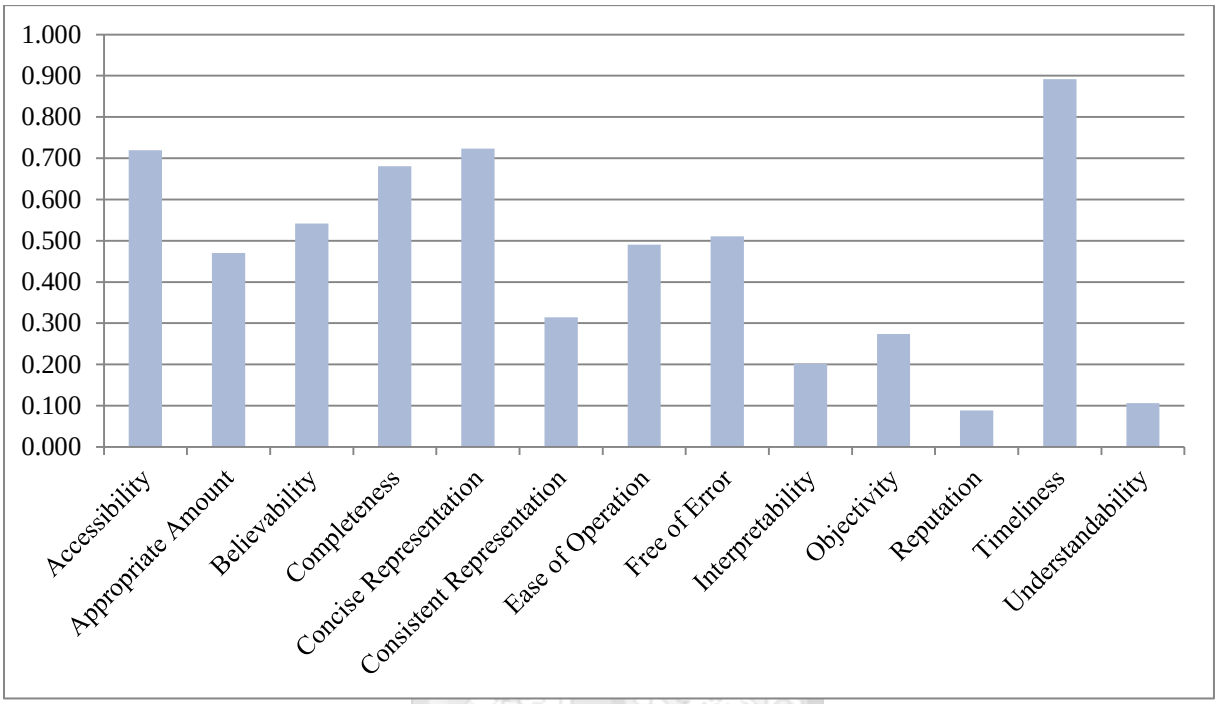

Figure 4-7: Kruskal-Wallis H Test Score

Figure 4-7: Kruskal-Wallis H Test Score outlines the P value score for some of the variables under investigation. Based on the scores, it can be construed that access to the single registry for does not depend on the level of education.

4.3 Effects of the Role of User on the Information Quality Variable

The relationship between the role of the respondent on the single registry and the information quality variables was also investigated. A Mann-Whitney U Test was administered on the dependent (Information Quality Variables) and independent variable (role of the user on the Single Registry). The test revealed that there was statistically a significance difference in between the role of the respondent and timeliness (*p*-value = 0.048). Figure 4-8 demonstrates the Mann-Whitney U Test score for some of the dependent variables in the study.

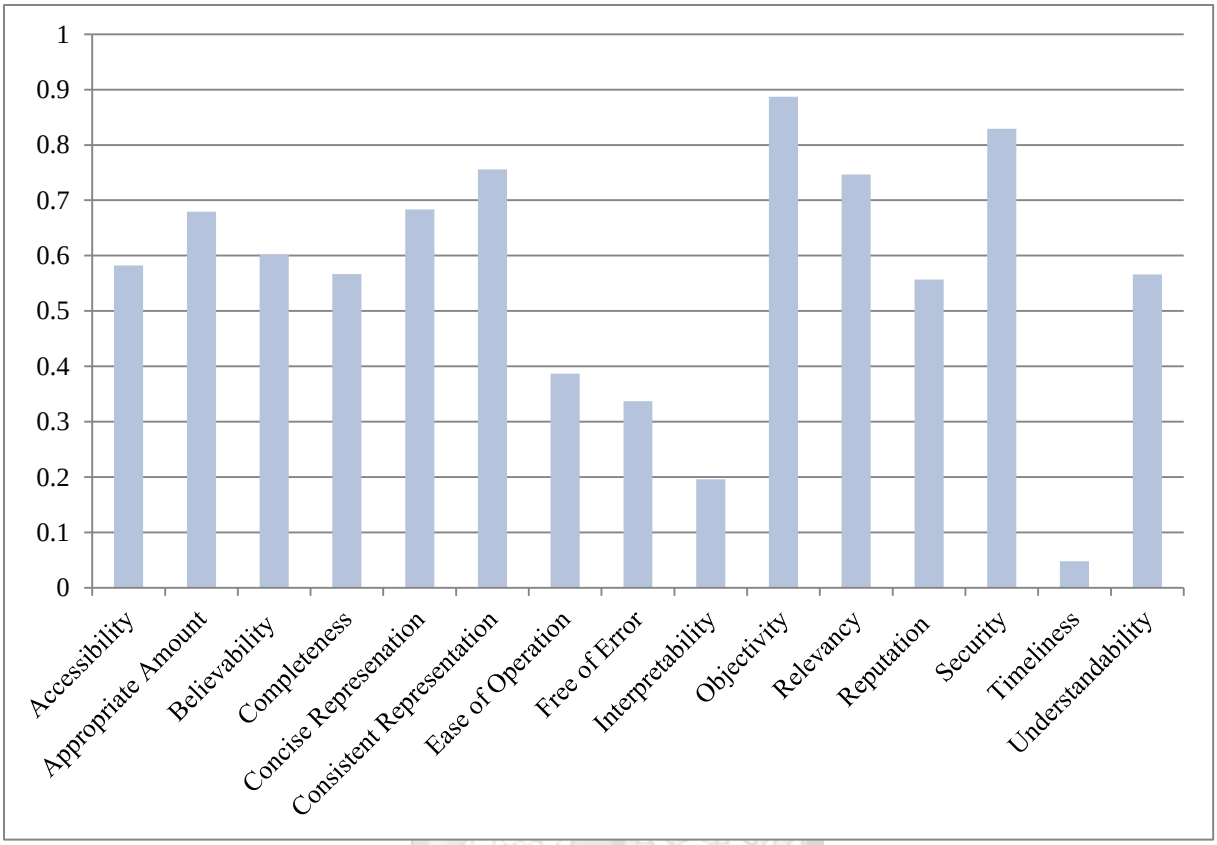

Figure 4-8: Mann-Whitney U Test Score

4.4 Role Gap analysis

The researcher further analysed the gap between the two roles of MIS Officer and the consumer of information. This is an important analysis to facilitate the understanding of an organization's IQ deficiencies as compared to different stakeholders within the organization. Using this analysis technique, an organization can benchmark their level of Information quality and determine appropriate areas to focus improvement efforts (Kahn, Strong, & Wang, 2002).

The role gap was analysed through computing the mean level reported in the two roles for the different information quality dimensions. Figure 4-9 illustrates the role gap for the users of the NSNP Single Registry. The size of the gap is a demonstration that the two categories of users of the Single Registry agreement or disagreement on the level of information quality. Khan, Strong and Wang (2002) note that the greater the gap, the more that these two categories differ in their opinion on the level of information quality. This is an indication of the need for improvement efforts to be initiated. Believability and Objectiveness were two dimensions where there was a significantly large gap between the MIS Officers and the Information Consumers. This indicates that one category – the MIS Officers in this case – consider highly

the data on the Single Registry to be true, real, and credible as well as unbiased and impartial. This could be an indication that the MIS officers are not aware of a problem being experienced by the consumers.

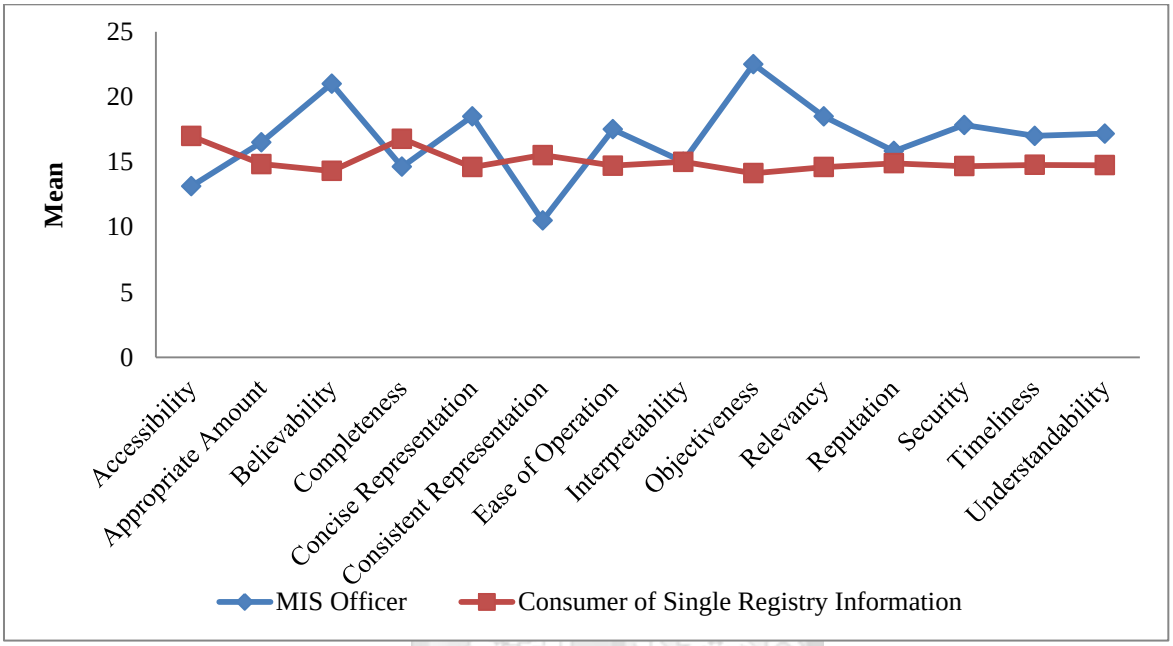

Figure 4-9: Role Gap Analysis

4.5 Information Quality Management

The researcher conducted key informant interviews with the MIS Officers to ascertain the measures put in place to ensure quality information, including the personnel assigned. The following paragraphs outline the feedback received from the key informant interviews.

4.5.1. Information quality management and Measures put in place

This question's intention was to gauge implementation of the information quality success factors. The following is a summary of responses from the key informants. A key observation is that there measures that have been put in place to address information quality; however, there is no coordination mechanisms to ensure proactive information quality management.

"Access control and CCTV system has been installed to monitor physical security at the social protection secretariat"

"A firewall has been implemented to bar unauthorized access to the Single Registry."

"A security access matrix has been developed to guide how users of the Single Registry, their rights and privileges within the system." The researcher confirmed this with review of the Security Access Matrix document. (Secretriat, 2015)

"IT controls have been implemented in the MIS and the single registry to monitor double registration, accuracy of data"

"There are audit trails generated by the system to track who access which information at what time"

"There is a general risk framework for the NSNP, but there is nothing specific on information quality risk framework"

"Training is only conduct as specific times when data entry is being planned for, otherwise no other training conducted for information quality."

"Back-up are done every day for the program MIS and weekly for the single registry"

4.5.2. Human resource capacity for ensuring information quality in NSNP

It was observed that the personnel at the NSNP have a dual role in terms of information quality management. The county and the sub-county officers in the target population act as information producers as well as consumers of the same information. This is due to the fact that they undertake a bulk of the data entry and also rely on the information single registry for their day to day operations. They, therefore, have a key role in ensuring that accurate and free-or-error data is entered into the system.

It was however noted that there are few IT personnel at the NSNP who can provide technical guidance on information quality.

4.6 Additional Comments

The questionnaire had a section on additional comments from the respondents. The researcher grouped the feedback in four categories. The following paragraphs present a summary of the feedback received.

i. Improve on quality

A number of respondents felt that there were information quality issues that needed to be addressed to make the Single Registry more useful. The IQ issues mentioned varied from accuracy, timeliness, accessibility, to security.

"The information could be helpful if not for the numerous inaccuracies of the content. Do something about it!"

"There is need to provide real time information about beneficiaries who collected / did not collect payments at the end of day during payments."

"Update data especially on location. There is overlap in some constituencies"

"The website is not easily accessible; at times it refuses to open."

"Some of the functions restricted for CCs and SCSDOs should be made accessible"

"It is recommended that the information be updated on a timely basis and all the field actors".

ii. Additional data and system enhancement:

Respondents furthermore had additional comment on how the Single Registry can be improved. The comments were focused on having additional data to make SR more useful and on some system enhancements as well.

"The data in the single registry would be helpful if it included the lowest administrative level of the beneficiary for ease of quick identification and reference"

"SR should enable field officers to send updates from the field offices"

"The SR should as well give status information of beneficiaries who have been exited even if it was due to death and date. The newly targeted individuals should also be captured. Users need to be cautioned not to allow unauthorized people to get access to the program and a tracking method should be in place to know those who may violate this rule. Finally, field officers need to be empowered immediately to start removing and adding beneficiaries straight from their stations. Otherwise, this is a very important milestone in this area of cash transfer."

"It should also reflect on results of the beneficiaries, for example, documented success stories, best practices and lessons learnt as additional thematic areas.

"The single registry should be design to interpret and avoid double registration"

"SR should provide a section where we can key in grievances and complaints directly from the sub-county and updates. Should not be able to change the information on it for security and should be web based."

iii. **Capacity enhancement (Train more staff, Infrastructure)**

The respondents also provided feedback regarding capacity enhancement in terms of skill as well as infrastructure enhancement.

"I am the only officer trained on single registry while there are three sub county children officers under my supervision who are yet to be trained so as to work from the same level of understanding"

"The SR has been very instrumental on giving the beneficiaries immediate feedbacks. However, am not able to connect to IPRS. I also recommend that field offices be connected to internet because this is a requirement for one to use. Single registry"

"The information should be easily accessible to all users. Set timelines and every user of single registry should be well versed with his/ her roles. Thanks good work."

"Need more training on single registry, decentralize the single registry"

"There is need to further train staff on SR as well as equipping them with IT equipment so as to improve further on quality of information/or embrace SR."

iv. Appreciation

Finally a proportion of the feedback on additional comments was expressing appreciation and praise towards the single registry.

"The single registry is easy to use. it provides relevant and useful information on the cash transfer programmes."

"SR has made our work easier in the process of serving our clients effectively and efficiently."

"Single registry information is of good quality"

"I wish I had access to this tool while I was writing my final MA Research Report on Cash Transfer for Older Persons in 2013. Thank you"

"All on all, it is of high quality and has minimised writing of letters asking of some minor issues."

"The information is precise but much should be done to improve response to address the complaints because on the ground nothing much is to be done to address some queries."

Chapter Five: Discussions

5.1 Overview:

This chapter discusses the findings of this research. The proposed framework had three core phases that NSNP needs to factor in information quality. The following sections discuss these three phases based on the findings of the research.

5.2 NSNP Single Registry Information Quality Framework

This study has proposed a framework to guide in the assessment of information quality in the NSNP Single Registry. This research was anchored on existing frameworks and focused on key considerations for the NSNP Single Registry Management. The researcher proposed to adopt a framework that would guide the assessment, improvement and overall management of information quality for the NSNP Single Registry.

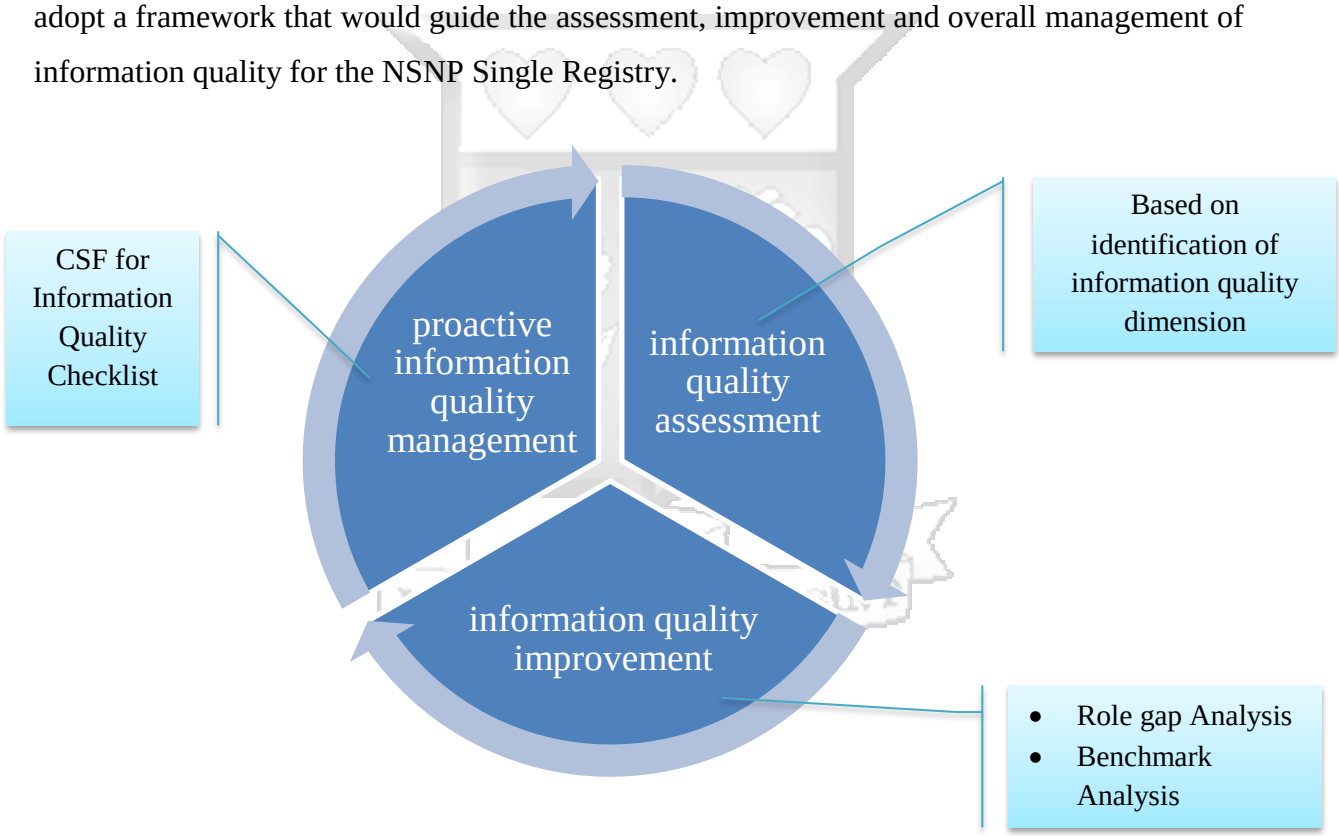

Figure 5-1: NSNP Single Registry Information Quality Framework

The first phase involves the assessment of the level of information quality for the information system in focus. Baškarada and Koronios (2014) note that before any information quality improvements can be considered, the present state of information quality needs to be established through an assessment. From the literature studied, it is apparent that the definition of information quality is dependent on the user of the information (Kahn, Strong, & Wang, 2002). It can also be noted from literature that there are certain dimensions that can be

used to describe quality information; Table 2-2: Summary of dimension of Information Quality has provided a summary of these dimensions from various authors. As confirmed in the literature, this research proposes the use of fifteen information quality dimensions (see Table 3-2) that can be used as part of the assessment of information quality. These dimensions consider key characteristics that information possesses which can be for a specific information system.

The second phase involves the identification of areas of improvement once an assessment of current quality status has been established. Lee, Strong, Kahn, and Wang (2002) in their research recommend information quality gap analysis techniques which this research is proposing to adopt. The role gap analysis and the benchmark analysis techniques compare the results of the assessment to discover areas that need improvement. The Benchmark Gap Analysis evaluates how well an organization is doing compared to other similar organization. The comparison can be done against industry leaders, competitors or even sources of best practice (Lee, Strong, Kahn, & Wang, 2002). Role Gap Analysis considers a comparative analysis of the users' feedback from the assessment based on their role in the organization, that is the information consumers or IS professional – developers or managers.

The third phase involves the continuous use of a checklist to ensure that there is the proactive management of information quality in an organization. This checklist is based on the critical success factors proposed in research (Baškarada & Koronios, 2014). These critical success factors are anchored on the theory of total quality management that considers quality a continuous improvement action. Baškarada & Koronios (2014) observe that these critical success factors are interdependent on each other. Figure 5-2: Interdependencies in CSF Framework summarizes these interdependencies. The arrows in Figure 5-2 indicate directional CSF dependence whereas the dotted line indicates cohorts of closely associated critical success factors.

The proposed framework takes an iterative approach; the main principle being continuous improvement, which is vital when ensuring quality information. Nonetheless, assessment is essentially the first phase to establish the status of information quality within an organization. For organizations that have already established this status, identifying the areas for improvement is the place to start this iterative process. Otherwise, the CSF framework for proactive information quality management is a fundamental and a strategic guide for all organizations to consider.

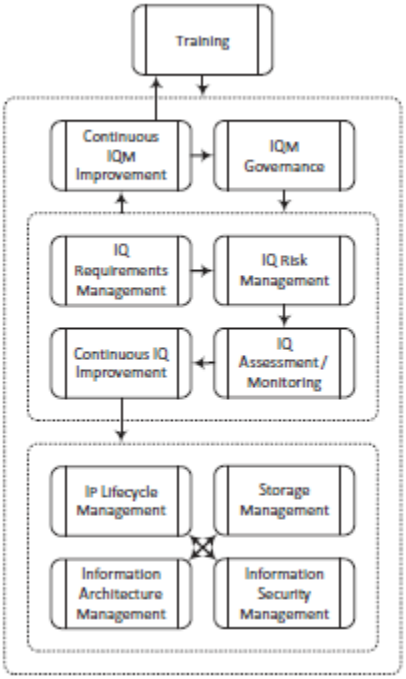

Figure 5-2: Interdependencies in CSF Framework (Baškarada & Koronios, 2014, p. 291)

5.3 Information Quality Assessment:

Further to the conclusion of this preliminary research conducted, it can be construed that there is agreement that the information on Single Registry is of quality. From the analysis, the level of education does not affect the information quality variable and how the respondents assess it. The minimum level of education qualification for users of this IS was Diploma, which can include some level of computer literacy skills. This research demonstrated that there was a significant difference between the timeliness information quality variable and the role of the user on the system (see Figure 4-8). In the course of the research, the researcher discovered that some users have a dual role in the single registry, considering this fact, the research proposes some further analysis on what are the key concerns are in the timeliness variable and how they can be addressed. There was no significance difference between the role of the user and the other information quality variables.

5.4 Information quality improvement:

The Information quality gap analysis was investigated to aid in the identification of areas of improvement in the single registry. The role gap analysis was conducted on the information variables for both the MIS and the Consumer of information. The initial assumption here was that the two roles are distinct and the users had a unique role on the systems. It was observed that there were significant gaps in the believability, consistent representation, and objectivity variables.

In two variables of believability and objectivity, there was a positive gap as the IS professional had a higher regard for them compared to the consumers of information. A positive gap may be construed to mean that the MIS Officers are not aware of the concerns that the consumers of information have. For instance, if there is no credibility for the information on the consumers, this may affect the relevance and reputation of the information on the Single Registry. The variable on consistent representation had a negative gap as the consumers of information had a higher regard for the variable compared to IS professional.

This research was not able to analyse the benchmark gap due time constraints. This is proposed as an area of further research.

5.5 Proactive information quality management:

From the interaction with the key informants – MIS officers, it was evident that the NSNP has made effort to put measures in place that can ensure information quality for the single registry. However, it was evident from the responses received that these efforts were not coordinated. For instance on the back-up of data, it was confirmed that indeed it does take place but at different times for the program MIS and the Single Registry. The proposed framework provides a checklist of critical factors to be considered that can guide in proactively in ensuring that all critical concerns are addressed.

This study proposed a further research on the state of all the ten critical success factors at the NSNP Single Registry. This provides a checklist of where to start from for the Personnel responsible for information quality.

5.6 Validation of the proposed framework

The proposed framework was presented to officers from the National Safety Net Program (NSNP). The participants who were selected to review the proposed framework have worked in the management of the Program for more than three years. Each of the participants was taken through the proposed framework and asked questions to determine the applicability of the Information Quality Assessment Framework.

The officers agreed in principle that the proposed framework was indeed a good guide for assessing information quality for NSNP Single Registry. They, however, noted that there was no clear definition of what quality is or means to the NSNP. The benchmark analysis was a welcome idea, though majority noted that unless the point of reference is an international

organization. The IS Professional managers agreed that the proactive management framework is a commendable guide for ensuring information is of quality from the onset.

Chapter Six: Conclusion and Recommendations

6.1 Overview:

This chapter discusses the Conclusions and Recommendations of this research. The Recommendations will also discuss the areas proposed for future research.

6.2 Conclusions

Further to conducting this research, it is evident that there is a need to assess these information quality dimensions from time to time to ensure that the quality is maintained and the goal of the information system is achieved. This is also emphasised in the CSF framework, where continuous improvement is one of the key success factors identified. This study was cross-sectional and constraints of time and financing restricted further analysis.

It can be noted that most of the respondents in this research had a dual role in the system, where they were both the consumers of the information and also the once generating the information.

6.3 Recommendations

Recommendations identified during the course of this research will be forwarded to the NSNP management for consideration based on feedback from this study. First, there is need to develop an all-encompassing security policy for the NSNP. The key informant mentioned of vital security measures that have been put in place, such as the implementation of a firewall, the installation of access control system and the development of a User security matrix. It is however of importance that these efforts are coordinated and consolidated in an NSNP Information Security Policy. Secondly, it was observed that the audit trails are generated automatically through the system, it is however not clear if these are monitored regularly, nor the penalties for breaching confidentiality.

This research also proposes the recruitment or reassignment of more staff to focus solely on information quality for the NSNP Single Registry.

6.4 Further Research

i. It is proposed that an in-depth study be conducted to identify a benchmark organization that is similar in structure and scale so that the Benchmark Gap Analysis can be undertaken.

ii. Considering the fact that some users have a dual role in the single registry, this research proposes some further analysis on what are the key concerns are in the timeliness variable and how they can be addressed.

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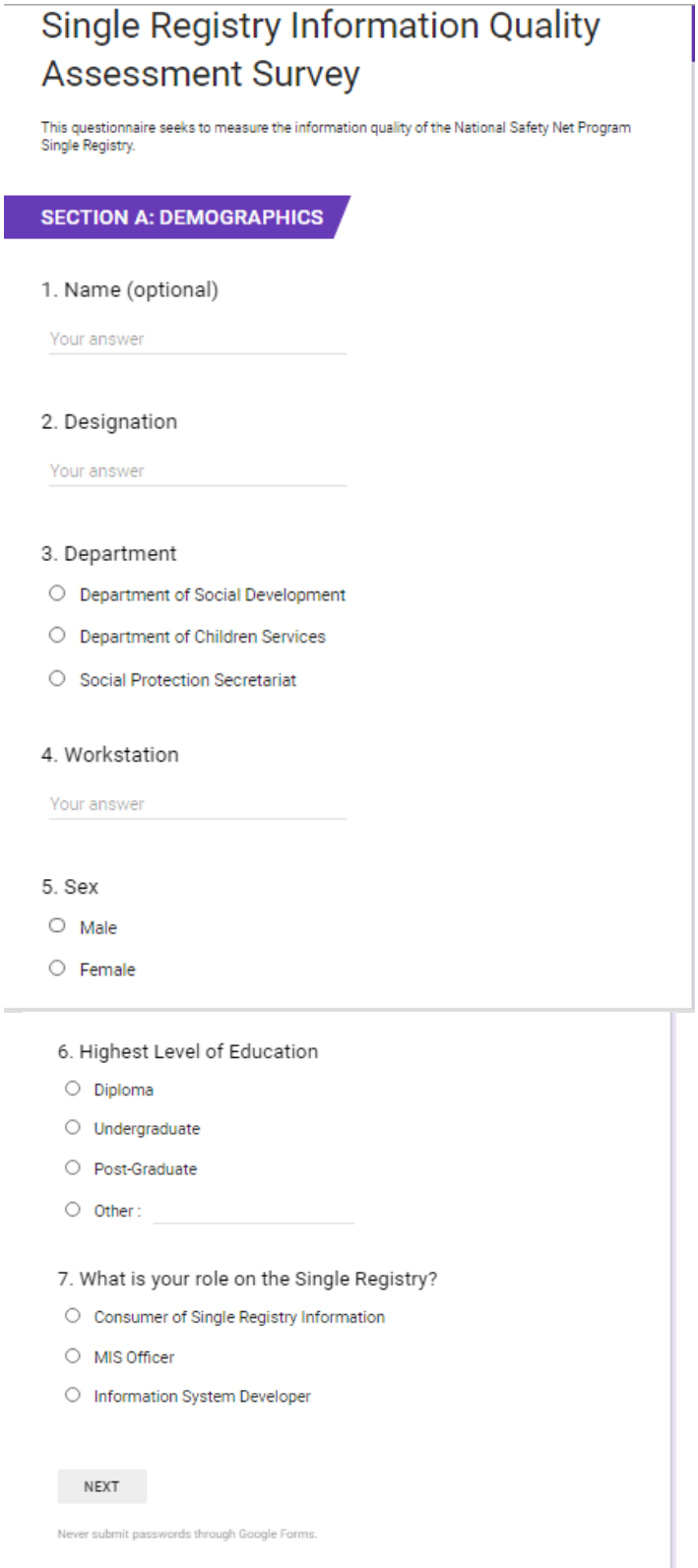
Appendices

A. Single Registry Information Quality Assessment Survey Questionnaire



Single Registry Information Quality Assessment Survey

This questionnaire seeks to measure the information quality of the National Safety Net Program Single Registry.

SECTION A: DEMOGRAPHICS

1. Name (optional)

Your answer

2. Designation

Your answer

3. Department

- Department of Social Development
- Department of Children Services
- Social Protection Secretariat

4. Workstation

Your answer

5. Sex

- Male
- Female

6. Highest Level of Education

- Diploma
- Undergraduate
- Post-Graduate
- Other :

7. What is your role on the Single Registry?

- Consumer of Single Registry Information
- MIS Officer
- Information System Developer

NEXT

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Single Registry Information Quality Assessment Survey

SECTION B: Information Quality Dimensions

This section intends to measure the quality of information on the single registry (SR) using 15 key characteristics. All statements are measured on a scale of 1 to 5, where 1 is strongly disagree and 5 is strongly agree.

1. Accessibility:

The information on the SR is easily retrievable

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is easily accessible

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is easily obtainable

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is quickly accessible when needed

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Appropriate Amount

The information on the SR is of sufficient volume for your needs

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The amount of information on the SR matches your needs

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The amount of information on the SR is sufficient for your needs

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The amount of information on the SR is neither too much nor too little.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3. Believability

The information on the SR is trustworthy

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is credible

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

4. Completeness.

The information on the SR includes all necessary values

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is incomplete

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is complete

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR covers the needs of your tasks

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR has sufficient breadth and depth for your task

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

5. Concise Representation.

The information on the SR is formatted compactly

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is presented concisely

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is presented in a compact form

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The representation of the information on SR is compact and concise

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

BACK NEXT

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6. Consistent Representation

The information on the SR is presented in the same format

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is presented consistently

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is represented in a consistent format

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is not presented consistently

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

7. Ease of Operation.

The information on the SR is easy to manipulate to meet your needs

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is easy to aggregate

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is difficult to manipulate to meet your needs

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is difficult to aggregate

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is easy to combine with other information

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

8. Free of Error.

The information on the SR is correct

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is accurate

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is reliable

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is incorrect

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

9. Interpretability.

It is easy to interpret what the information on the SR means

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is difficult to interpret

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The measurement units for information on the SR is clear

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

10. Objectivity

The information on the SR is objectively collected

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is based on facts

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is objective

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

BACK NEXT

11. Relevancy.

The information on the SR is useful in your work

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is relevant to your work

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is appropriate for your work

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

12. Reputation.

The information on the SR has poor reputation for quality

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is of good reputation

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR comes from good sources

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

13. Security.

The information on the SR is protected against unauthorized access

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Access to information on the SR is sufficiently restricted

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR can only be access by people who should see it

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is not protected with adequate security

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

14. Timeliness.

The information on the SR is sufficiently current for your work

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is not sufficiently timely

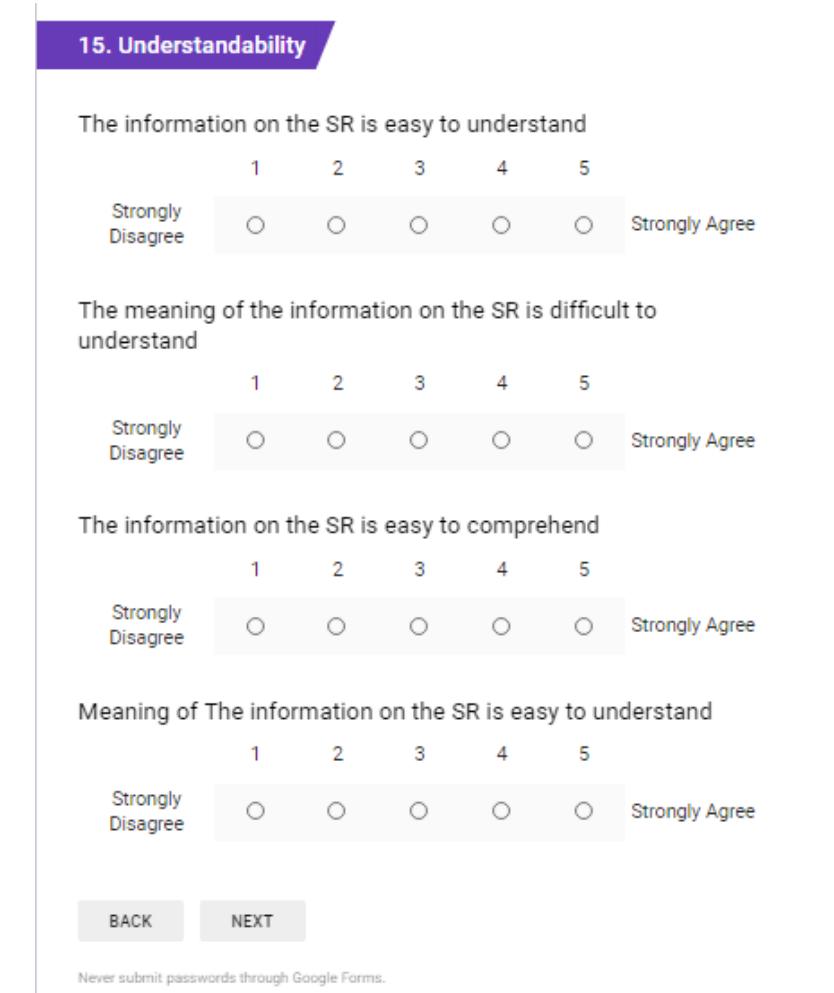
	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is not sufficiently current for your work

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is sufficiently up-to-date for your work

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree



15. Understandability

The information on the SR is easy to understand

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The meaning of the information on the SR is difficult to understand

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The information on the SR is easy to comprehend

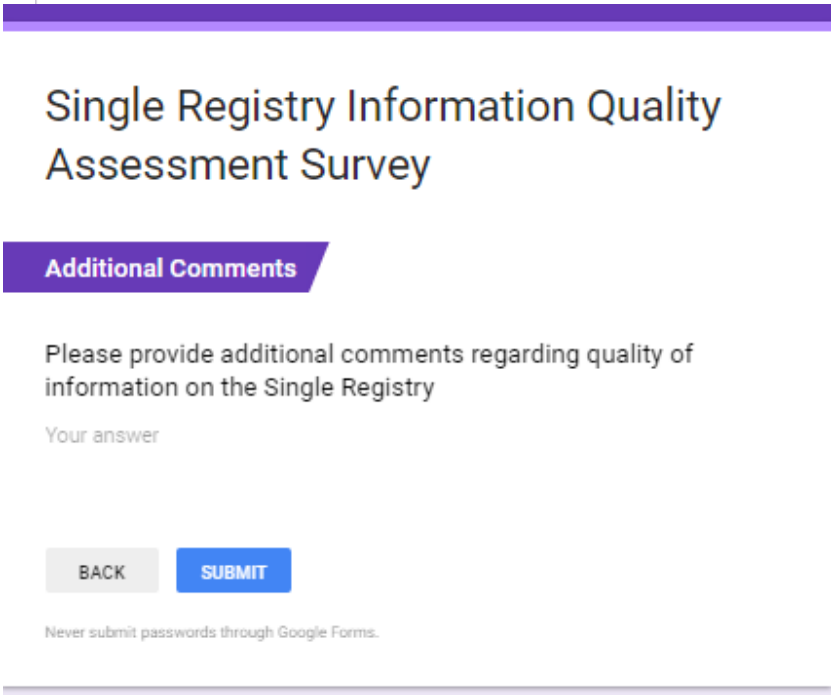
	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Meaning of The information on the SR is easy to understand

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

BACK NEXT

Never submit passwords through Google Forms.



Single Registry Information Quality Assessment Survey

Additional Comments

Please provide additional comments regarding quality of information on the Single Registry

Your answer

BACK SUBMIT

Never submit passwords through Google Forms.

B. Key Informant Interview Guide

This is a key informant interview checklist for use while conducting the interview. This guide provides the scope for the interview session.

Interview outline:

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i. Brief introduction to the research study
ii. How is information quality managed within the organizations?
iii. What are some of the measures put in place to ensure quality?
iv. What is the capacity in terms of human resource that is assigned to the task of ensuring information quality in NSNP?

C. Letter of Introduction

NATIONAL SOCIAL PROTECTION SECRETARIAT

P.O. BOX 16936-00100
Nairobi

15th January 2016

County Officers
National Safety Net Program

Sub County Officers
National Safety Net Program

MIS Officers
National Safety Net Program

LETTER OF INTRODUCTION

The bearer of this letter, Ms. Evelyn W. Mwangi, is a student in the Master of Science for Information Management Systems program at the Strathmore University. As part of the requirements for the course, she is undertaking out a study on "Information quality assessment for the single registry for the National Safety Net Program".

As part of the officers in the pilot phase of implementing the single registry, you have been identified to participate in this study. This is to kindly request for you to accord her the necessary support that she requires to enable her complete this study.

This is study is specifically for academic purpose and a copy of the final document will be made available for you upon request. Your assistance is greatly appreciated.

Thank you in advance.

Sincerely

Winnie Mwasiaiji
National Coordinator
Social Protection Secretariat