An Investigation of Selected Identity Management Agencies Towards a Unified National Registry System for Identity Services in Nigeria

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ABSTRACT

In this study, selected identity agencies were investigated to address the duplication challenge that bedevils the accurate retrieval of a citizen's identity information across identity registries. A Unique Identification Number was proposed towards a unified registry service system to serve as a signature identity across selected identity systems and all legal documents for registered individuals. A mixed-methodology consisting of DevOps, experimental, and quantitative approaches were adopted to model and evaluate the resultant service solution. User evaluation was examined for the proposed and developed service system with a view to establish the feasibility of identity management transition toward a unified national registry system. The study approach and findings underline this system as a veritable tool and integral component for identity agencies and the National Population Registry to ensure cost-effective and centralized registry-based identity management initiatives towards a digital identity, particularly for Nigeria.

(Keywords: digital identity, unified registry systems, unified identification number, identity information deduplication)

INTRODUCTION

In the forecast of THALES (2021), the foundational role of digital identity will change the identity landscape with the era of modern technologies towards a digital economy. Digital identity has been driven by the national identity (ID) scheme in some countries as a collection of legalized digital traits and identifications towards a digital world in similarity to a person's real or physical identity attributes. It can include "attributes such as a unique identity number, social security number, vaccination code, name, place, date of birth, citizenship, biometrics, and more, as defined by national law with specific credentials such as an eID card (Germany, Italy, Spain, or Portugal), a derived digital driver's license on a mobile phone (in several US states), a unique biometric-related ID number like in India, a mobile ID (Finland, Belgium or Estonia) or a Digital ID Wallet (EU initiative, Australia, etc.). It can be used to authenticate its owner" (THALES, 2021). The unique identity number is basically core to individual identification, even across other forms of identification in respect to national laws of a country.

The World Bank Group (2016), in affiliation with the United Nations, first introduced the universal identity concept around digital identity with sophisticated technologies like blockchain and cryptographic methods for the underprivileged across continents including Africa. However, the struggle for physical identity is yet but a challenge to some developing countries in Africa – Ghana, Kenya, Lesotho, Mozambique, Nigeria, Rwanda, South Africa, Tanzania, Uganda, and Zimbabwe, etc. In the report of the World Bank Group (2016), functional identity information registries are burdened with information replicas for a particular citizen due to multiple disintegrated repositories.

In the context of Nigeria, the present-day approach to identification governance and identity management for foundational identity systems is plagued with duplication of individual identity information and disunification of identity registries. This duplication of identity information services is a result of the clustering of citizens' identity information in different registries by identity agencies within the nation and represents an excessive financial burden for stakeholders like the government. Citizens' duplication of identity information hampers the nation's vital statistics that are needed to engage in informed planning and identify areas for improvement towards national development and service

delivery (Maduekwe, *et al*., 2016). The unification of functional identity registries of a nation is paramount for effective planning and improved identification service delivery for stakeholders and citizens.

Moreover, the resultant duplication challenge is consequent on the identity process, which is a product of registration involving biometric capturing across agencies. In the Nigerian context, a number of agencies are saddled with the tasks of providing and managing citizens' identity information services (e.g., the National Identity Management Commission (NIMC), Federal Road Safety Commission (FRSC), and Independent National Electoral Commission (INEC)). For each of these agencies, a civil registry database is used to store records from each registration process. A collection of these systems represents a National Population Registry System (NPRS) for a country's Population (Ibrahim and Abubakar, 2016). However, these records are somewhat unlinked and the drive for an integrated identity registry service system has been purported over a decade in some studies (Straub and Aichholzer, 2010; Ogungbe, 2012).

The means of identification today in Nigeria are overwhelmingly numerous and, for several reasons, the country is spending more than required on these efforts (Ogochukwu, 2021). As a result of dissimilar identity registries, different identity numbers are assigned to citizens with various means of identification such as Bank Verification Number (BVN), National Identity Number (NIN), Tax Identification Number (TIN), Passport Number, License Numbers, etc. With different identification numbers and records, multiple identification means are fashioned for a fully registered citizen such as National Passports, National Voters Card, National Driver's license, and National Identity Card. These forms of citizen identification are presently identity cards with different identification numbers which consequently result in a gateway for fraudulent practices such as dual identity and identity theft in accessing basic, social, and financial services.

In the view of NIMC (2010), digital identity is very important to a country, but it has been a struggle for a nation like Nigeria to implement a nationally accepted identification numbers with digital attributes across all identity documents. These would enable de-duplication of identity information and reduction in identity frauds. However, legal identity should be uniquely assigned to an individual during the process of registration and this unique identification should be his signature identity across all legal documents. This would serve as a means of digital identity for citizens in fundamental and financial identity services like voting, banking, etc. (Ayo, 2010; Adeola, *et al*., 2013; Ayamba and Ekanem, 2016; Amujo, *et al*., 2019; Handforth and Wilson, 2019; Ogochukwu, 2021). Sadly, the "rapid scale-up of national identity, integration of parallel identity systems, and low cost of identity programs are key challenges for the identity ecosystem of Nigeria" (World Bank Group, 2016).

In view of unifying analogous identity management services, the current study seeks to interlink identity registries towards a unified registry service system with emphasis to uniquely identify an individual across selected identity systems via a Unique Identification Number (UIN). The rest of the paper is organized in sections which address a review of theoretical concepts in related literary works; the proposed methodology and conceptual development approach; the user evaluation and result analysis; and the conclusions of the study with future recommendations.

LITERARY SURVEY

The unification of identity was emphasized in the work of Ayo (2010). The study was motivated by the duplication of identity information in the form of identity theft and proposed a framework to unify electronic identity systems associated with online transactions. The resultant system was centered on the generation of a unique "single electronic identity that can be used across the various platforms for business transaction". The challenge of duplicated identity registries and false identity information was addressed but with emphasis only on online business transactions.

The authors of Adeola, *et al*. (2013) exposed the nature of identity systems in Nigeria with a review of the prospects and challenges. Their investigation frowned at the poor state of identity management systems in the country as a result of several challenging frameworks associated with identifying a citizen. They proposed insights for stakeholders with suggested proactive steps in plugging the surge of its impact on national growth. Their study was a theoretical framework

with suggested initiatives toward a better identity management system.

The World Bank Group (2016), proposed an identification approach that would develop Nigeria as a country with a mission "to enable all people to access services and exercise their rights, by increasing the number of people who have an official form of identification". They collaborated with identity for development (ID4D) to "provide financial and technical assistance for the implementation of robust, inclusive, and responsible digital identification systems that are integrated with civil registration". The integration of identity registries was emphasized towards a foundational identification, but the current study explicates the notion beyond foundational to functional identification and the interlinking of agency's registries to promote national planning and development.

On the contrary, the decentralization of the identity management system was proposed by the authors of Amujo, *et al*. (2019). Their proposal was based on blockchain technology with a user-focus in which control is entrusted to the user but, the form of identification was a case beneficial only to NIMC while duplication of identity services like biometric registration and capturing were redundant for other identity agencies. Although their approach was securely effective for identification, the challenge of redundant identity services was still of financial concern to stakeholders like the government. Forestalling replication services would scale up with cost-effective identification management towards a digital economy.

Ogochukwu (2021) probed identification management with a view to its innovations for financial inclusion in Nigeria. The investigation revealed proof of identity as a big challenge with the lack of a system to prove the existence of a citizen's identification across one or more platforms. In his view, "a self-sustaining universal national identification system that provides Nigerians with the needed foundational identity to access financial services and achieve financial inclusion" was proposed. However, the artifact of the study was a theoretical framework that supports the objectives of the current study toward the unification of national identity services.

Several challenges were drawn from the literary survey – different forms of identification exist for citizens via rigorous processes of registration, redundant identity services with duplication of citizen information across identity registries, disunification of identity registries for accurate retrieval of a citizen's unique information, etc. (Ayo, 2010; Adeola, *et al.*, 2013; Ayamba and Ekanem, 2016; Amujo, *et al.*, 2019; Handforth and Wilson, 2019; Ogochukwu, 2021). Thus, a legal identity should be uniquely assigned to an individual with a single process of registration and this unique identification should be his signature identity across all legal documents as a means of digital identity.

Summarily, the review of literary works was paramount to studying existing research efforts, their challenges, platforms, and suggested solutions on identity registries and citizens' identity information management to enable a conceptual framework capable of contributing toward a unified national identity services registry system with UIN across selected identity agencies. The proposed methodology and implementation approach are covered in the next section.

MATERIALS AND METHODS

Research methodology is a conceptual framework for the understanding, visualizing, and validity of the study with alignments to the various steps and techniques utilized. In a case-based study, a software development methodology is usually considered to structure, plan, and control the process development of an information system. Thus, the current study adopted a mixed-methodology approach - the DevOps software methodology and experimental research method.

The architecture solution employed the DevOps and experimental approaches employed for user evaluation. The DevOps methodology is depicted in Figure 1.

The Development and Operations – DevOps methodology expresses the continuous integration and delivery model for business solutions that permit an agile and lean approach towards the crisp collaboration between the development and operational teams in all the stages of engineering a service system or solutions.

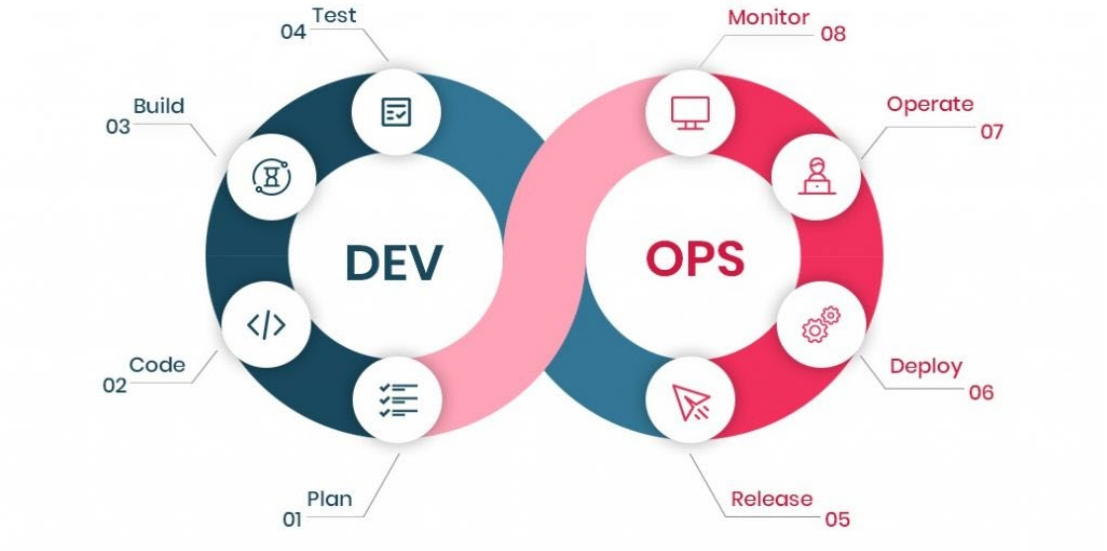

Figure 1: DevOps Methodology.

As opposed to the agile methodology, this model offers collaboration with rapid deliveries such as microservices with continuous delivery, faster process, and reliability with increasing changes in the solution and infrastructure. In view of the above, the model was adopted for the study denoting the researcher as the development team while the selected identity agencies (stakeholders) were the operational team. The stepwise implementation of the model's activities was captured in subsequent sections.

DEVELOPMENT

Planning: Requirement Engineering and Analysis

A properly implemented system can make identity agencies more serviceable. Alternatively, poorly implemented information systems can result in defects in the agency performance and failure in service delivery and at worst, neglect with usability issues (Masinde, 2006). In the DevOps model, proper planning entails appropriate system investigation of selected case studies to proffer an effective information system. Requirements engineering entailed a qualitative approach of system investigation and data gathering – observation and interview techniques.

The observed identity agencies were NIMC, FRSC, and INEC while data were gathered with structured questions that intended to elucidate information from the sample participants on the mode of operations at the respective identity agencies. The investigation findings and analysis formed a base for proposing the design of an implementable framework depicted in Figure 2.

One novel component of the framework's deliverables is the Unique Identification Number which is a unique characteristic on every identity card generated by the system for every registered citizen. With this feature, identity records are created, stored, queried, and retrieved from the system. A primary user is proposed in the framework as the National Population Registry (NPR) user.

The NPR user is a top-level handler who oversees all the responsibilities designated to concerned identity agencies – NIMC, FRSC, INEC. The secondary users have a separate platform to execute identity services transparent to each other.

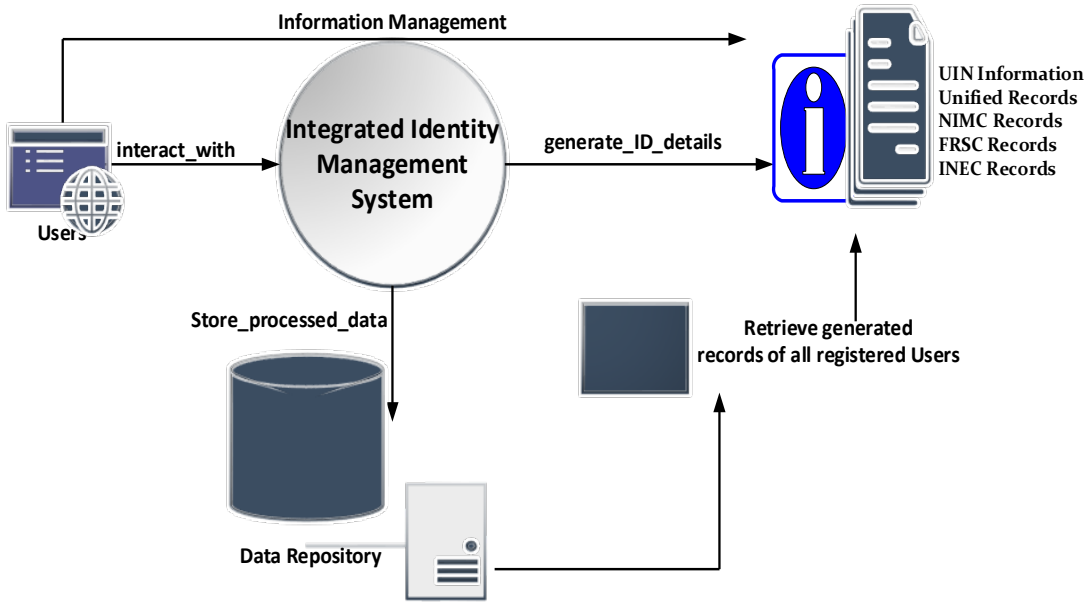

Figure 2: A Conceptual Framework for Identity Information Management.

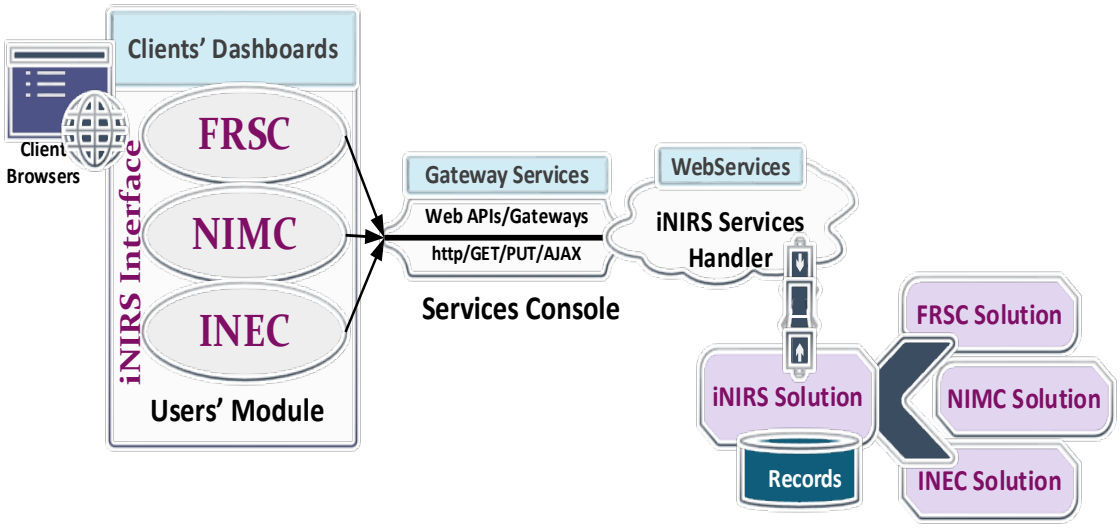

Figure 3: The Proposed iNIRS Service Architecture.

Design, Code, and Build

The model's activities of code, build, and test were synchronized within the development phase. Figure 3 is a service architecture for the implementation of the proposed unified national identity registry services system code-named iNIRS – Integrated National Identity Registry System.

The architecture is service-based, and it's coordinated by the iNIRS service's handler to support interoperable identity information exchange for service provision and consumption between identity agencies. That is, platform inter-communication is highly facilitated by Webservices middleware technology, allowing the handling of API routing services for the backend solutions with other supporting technologies – JavaScript, AJAX, web APIs, and dynamic database.

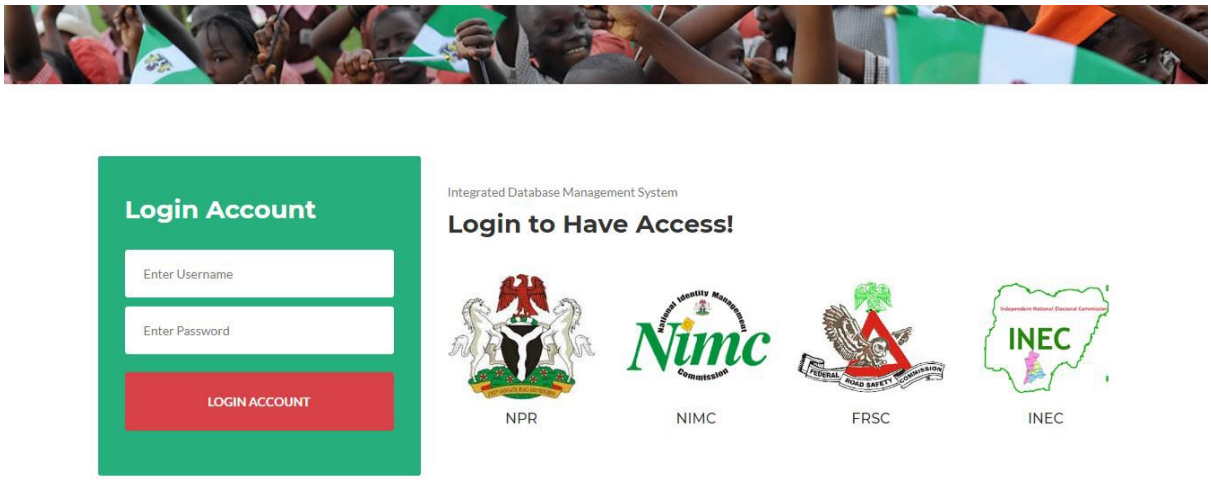

Figure 4: Access Panel for all Users.

The resultant service solution was built and tested to ascertain the target objectives in passivity with identity registration and record specifications. The solution was executed appropriately as errors were flagged in the case of wrong inputs and access was granted for the set of correct input data. The user interface of the resultant service solution was captured in Figure 4 for the different identity administrative agency users, respectively.

Operations – Release, Deploy and Operate

In this phase of DevOps methodology, the developed functional identity service modules were tested by the operative staff, that is, functional identity operations were examined by representatives of respective identity agencies on the built architecture solution in order to produce a refined workable system. The functional service modules such as registration, biometric data capture, UIN generation, agency user creation and registrations (FRSC, NIMC, INEC), and identity card generation were examined in the operations phase.

The implemented iNIRS solution first permits the NPR agency to create UIN for citizens by registering. The registration captures the basic identity information that is attached to the UIN for distributed purposes across other identity agencies and specifically for the national population registry. A summary of the registered individual (citizen) is depicted in Figure 5.

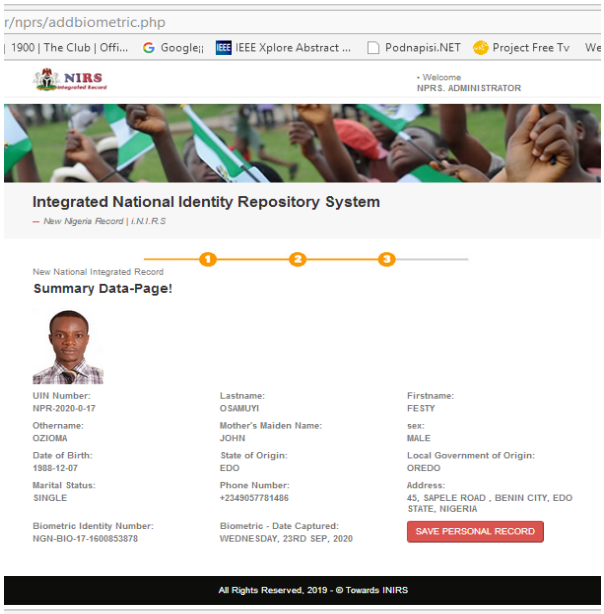

Figure 5: National Identity Registration Data Summary.

In Figure 5, the national identity data is created for the registered citizen, and his identity information is housed in the NPR. The registration data summary are specifications of the inputs and the expected output of registered citizens. This is the first crucial procedure to acquire the UIN for any individual of a nation. However, other legal documents (birth certificate, certificate of origin, etc.) are required for physical verification before registration.

Once the UIN is generated, a biometric data capture is booked as the next identification process. The generation of a NIN slip mimics the existing identification process in Nigeria today and thus, the NIN in the NINS – National Identification Number Slip is replaced with the proposed UIN as depicted in Figure 6, for foundational identity access to verify and register with other identity agencies (FRSC, NIMC, INEC) interlinked with NPR.

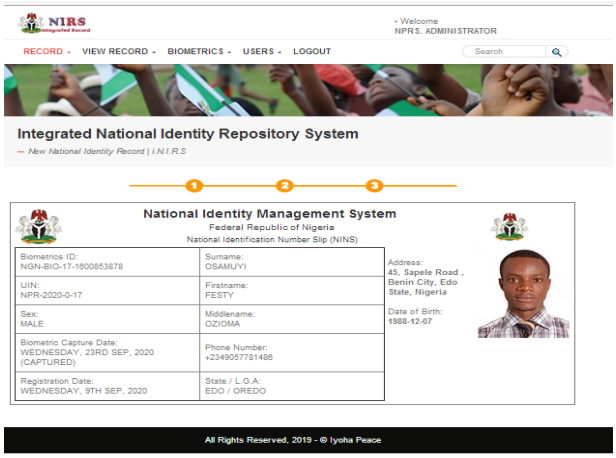

Figure 6: NIN Slip with UIN and Biometric Details.

The UIN is required to generate identification for other agencies as it becomes the NIN visible in all other legal documents associated with the bearer. This mode of operations is new to the existing approach in these identity agencies in Nigeria.

The importance of this approach is to deduplicate redundant identity information from identity agencies and also reduce cost by capturing biometric data once only by NPR which is linkable to other registries. Thus, Figure 7 demonstrates the handling of redundant identity information during the registration process for the national driving license by the FRSC identity agency handle.

The data capture handle for FRSC excludes registration for basic identity information except for information unique to the agency such as height, blood group, etc. However, an individual's information must first be queried by the iNIRS solution for identity presence with the UIN for deduplication and false identity.

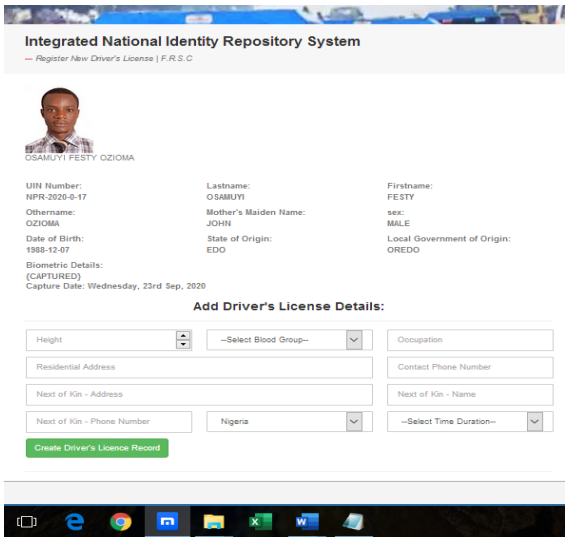

Figure 7: FRSC Data Capture Handle.

Figure 8: Generated NINS.

If the query results are true then FRSC data capture can begin else, declined or flagged. The same procedure is executed for all other agencies and identity records of these agencies are accessible to the NPR office while agency-centered identity information are agency-transparent to others.

The generated identification means by every identity agency for a registered citizen are captured in Figure 8, Figure 9, and Figure 10 as the end products for a duly processed citizen identity card with UIN inclusion across all.

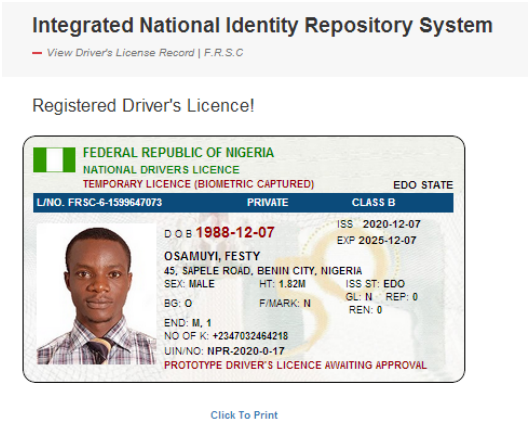

Figure 9: Generated FRSC Driver's License.

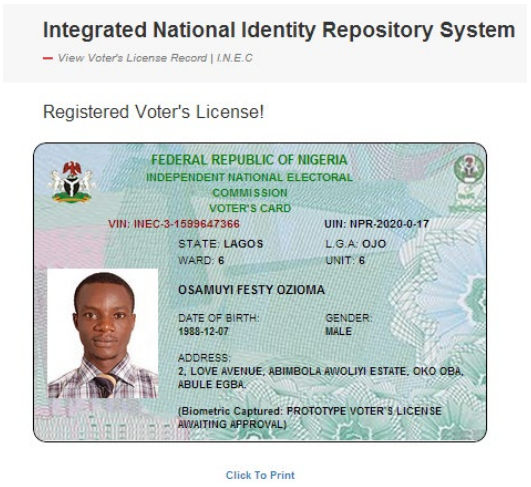

Figure 10: Generated Voter's ID Card.

Apparent functional services of the system were demonstrated in citizen's identity registrations, biometric capturing, record generation, and interlinked data repositories for agencies involved. The identification cards are similar to already existing samples except that they bear the UIN on them to combat identity theft and other identity frauds. The proposed approach is not to replace the existing but to serve as a foundational artifact for improving the existing means of identification in the country. The iNIRS solution is only a prototype proposed with a demonstration of functional identity services management. Non-functional evaluation like performance, ease of use, portability, security, etc. is also critical for information systems before adoption or use.

Monitor: User-Centric Evaluation

Users' evaluation requires an assessment of their perception of a system's usefulness for achieving a specific task. An experimental evaluation method was adopted to assess the post-system usability of the iNIRS solution via the standard metrics of usefulness, effectiveness, and satisfaction (Mifsud, 2015; Munaiseche and Liando, 2016; El-firiani *et al.*, 2017). Participants of the benefiting agency were privileged to evaluate the iNIRS solution for about three weeks between the periods of November 3rd, 2020 to November 25th, 2020 on a registered weblink accessible via a web browser. The necessary assistance was rendered (when necessary) – until participants were satisfactorily accustomed to the system. The tasks were with simplified guidelines on systematic steps towards completion.

The experimentation involved several tasks related to identity issuing agencies with a total of 13 participants employed as evaluators in a joint evaluation session, the number of evaluators (participants) was quite adequate in range with regards to software usability evaluation (Macfield, 2009; Six and Macfield, 2016). Table 1 contains the evaluation tasks and the user evaluation ratings for each task are represented in Table 2.

In rating the users' preferences in Table 2 according to Hayat *et al*. (2019), *UL* indicates Usability Level which scales from "Very Difficult" to "Very Easy".

Table 1: Evaluation Tasks.

SN	Tasks
1	Register and create Agency admins accounts
2	Account login by Agencies admins
3	Citizen identity registrations by NPR admins
4	Biometric capturing
5	Validate and confirm data capturing
6	Generate UIN for all registered citizens
7	Add, view, edit, or save identity records
8	Access interlinked or individual agency's identity records
9	search, query, and print identity information
10	Complete agency task and logout successfully

Solution's Effectiveness

Table 1 represents modified tasks designated for the evaluation by each participant (Mifsud, 2015; Oliha, 2020). The effectiveness of the solution is measured via the time it takes on average to complete each task by the participants. The log of each participant's usability ratings on different tasks recorded with start time, finish time, and the level of completeness reached with every task was used for evaluating the metric of effectiveness as depicted in Figure 11.

Table 2: Evaluation Rating Scale (Hayat, *et al*., 2019).

SN	Average Usability Rating	Indication
1	0.00 ≤ UL ≤ 2.00	Very Difficult
2	2.00 ≤ UL ≤ 4.00	Difficult
3	4.00 ≤ UL ≤ 6.00	Moderate
4	6.00 ≤ UL ≤ 8.00	Easy
5	8.00 ≤ UL ≤ 10.00	Very Easy

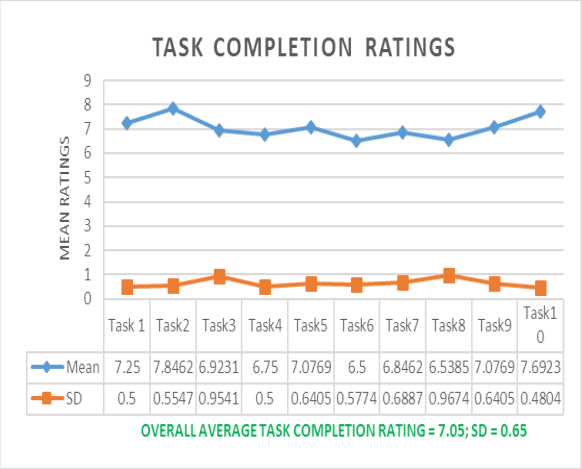

Figure 11: Average Task Completion Ratings.

The result from Figure 11 revealed mean scores between 6.5 and 7.85. The effectiveness rating of the iNIRS solution is capped at the "Easy" usability level for executing all tasks by the participant. This is an indication that the level of completeness reached with every task by all participants is easy using the iNIRS solution.

Solution's Efficiency

The usability metric of efficiency is measured via the "time-based" or "overall relative" efficiency. The overall relative efficiency (ORE) was adopted for efficiency evaluation as a result of multiple tasks involved in the experiments. Efficiency refers to the number of time resources relatively spent while completing a task. The ORE for each completed task was obtained via Equation 1 (Mifsud, 2015):

$$ORE = \frac{\sum_{i=1}^{R}\sum_{j=1}^{N} n_{ij}t_{ij}}{\sum_{i=1}^{R}\sum_{j=1}^{N} t_{ij}} x\ 100\% \qquad (1)$$

where,
N is the tasks to be completed,
R is the number of participants;
t_{ij} is the completion time of task **i** by participant **j,**
n_{ij} is the outcome of task **i** by participant **j**,
n_{ij} **= 1**: if the task **i** was completed by all participants **j**, otherwise it is divided by the entire participants over the number of those who completed the tasks.

Applying Equation (1), ORE = **93.04**%. Figure 12 depicts the chart for Overall Relative Efficiency (ORE) computation.

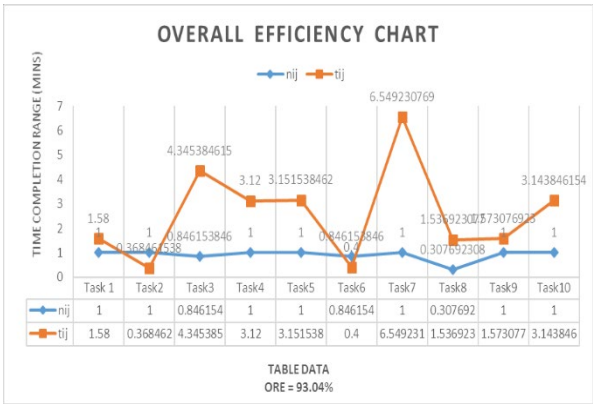

Figure 12: Data and Chart for ORE.

Figure 12 revealed that the outcome of task 3, task 6, and task 8 were somewhat not in completeness for all participants. The time resources for completing task 3, task 4, task 7, and task 10 were above 3 mins for participants.

However, the overall relative efficiency for completing the designated tasks of the iNIRS solution was 93.04%. This implied that the iNirs solution is efficient in completing identity-related tasks and services.

User Satisfaction on Effectiveness and Efficiency of the iNIRS Solution

A quantitative method was adopted to evaluate users' satisfaction with the iNIRS solution. A psychometric evaluation tool - the Post-Study System Usability Questionnaire (PSSUQ) was employed to assess their perceptions. PSSUQ is a standard post-task level usability measurement metric following a 7-point Likert scale representing 1 – "Strongly Agree" to 7 – "Strongly Disagree", 16 post-usability questions with associated Overall Score under the sub-scales, namely system usefulness (SYSUSE: 1 - 6), information quality (INFOQUAL: 7 -12), and interface quality (INTERQUAL: 13 - 15) adopted from literary works (Berkman and Karahoca, 2016; Sauro and Lewis, 2016; Rotolo, 2017; Sauro, 2019). The participants expressed their perceived usefulness of the system via the PSSUQ and the resulting outcome reflects the overall system usability based on the evaluator's experience as depicted in Figure 13.

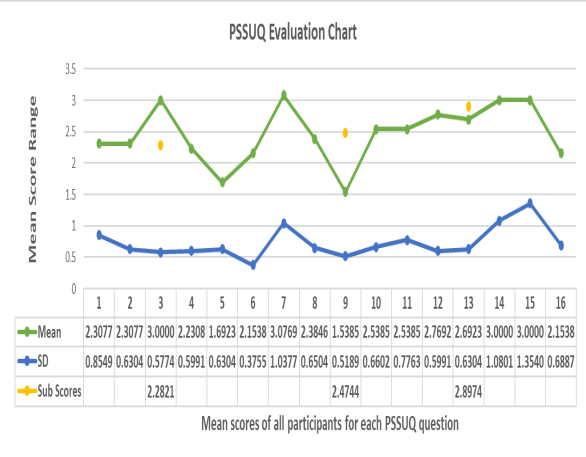

Figure 13: Post System Usability Experience Chart.

The chart in Figure 13 shows the average subscale scores for SYSUSE as 2.2821; INFOQUAL as 2.4744; INTERQUAL as 2.8974 respectively. The overall average mean from the post-experience test was 2.5 with a standard deviation of 0.2. Recalling Sauro and Lewis (2016), the overall mean is capped at 2.82, INTERQUAL is up to 2.49, SYSUSE is capped at 2.80, while INFOQUAL is capped at 3.02. – the lower the better. Thus, the SYSUSE, INFOQUAL, and INTERQUAL sub-category scores were within the acceptable ratings for system usefulness by users' perception. Their overall perception of the usefulness of the iNIRS solution was very satisfactory with a score of 2.5.

DISCUSSIONS AND IMPLICATIONS

The investigated identity management systems permit rooms for dual identities; falsified identity records; multiple individual identity information across agencies – duplicated records in identity registries; redundant identification processes and services like biometric capturing, double registration of basic similar individual information; excessive cost for repeated identification processes; multiple identification numbers – BVN, NIN, TIN, etc. across legal documents like voters card, driver's license, national identity card, etc. Consequently, the financial burden to attain a full-scale civic registration is cost-ineffective for core stakeholders like the Federal Government and identity management agencies due to duplication of identity registration processes across agencies. Thus, unifying analogous identity management services is vital for uniquely identifying citizens and their information. In view of the above, the current study proposed the deduplication of citizen identity information across registries of functional identity management towards a unified registry service system with an emphasis on uniquely identifying an individual across selected identity systems with a Unique Identification Number.

In doing so, literary works of related identity concepts were surveyed via document analysis, and the prospects, challenges, existing identity platforms, agencies, and management systems formulated the basis for the proposed iNIRS architecture and solution. The DevOps development methodology was adopted for iNIRS solution engineering with each phase's activities implemented accordingly. Practical identity services were deployed and examined to ascertain the workability with functional and non-functional evaluation. The resulting iNIRS solution demonstrated efficiency in the delivery of foundational identity services captured in Figure 5 through 7. Figures 8 to 10 captured the byproduct of individual identity from each agency.

The testing results revealed that the proposed solution is capable of effective delivery of national and operational identity services. However, user evaluation was vital since many identity programs and systems proposed and reported in similar notion have been shelved to the background, and as a result, poorly implemented information systems can result in defects in the agency's performance and failure in service delivery and at worst, neglected with usability issues (Masinde, 2006). Thus, a user-centered evaluation was employed on a post-study system usability approach with standard usability testing metrics of effectiveness, efficiency, and user satisfaction (Mifsud, 2015; Munaiseche and Liando, 2016; El-firiani, *et al*., 2017) to determine the usefulness of iNIRS solution in an identity management context with ease by designated users and relevant stakeholders – NPR, FRSC, NIMC, and INEC.

The user evaluation measured *effectiveness* as the average mean time to complete an identity task. The result revealed an average mean task completion timeframe between 6.5 and 7.85 on the UL rating scale indicating “Easy”. The overall mean was capped at 7.05 with a standard deviation of 0.65. This implied that the level of completeness reached with every identity-related task by all participants was effectively “Easy” using the iNIRS solution.

On the construct of time resources, *efficiency* was evaluated as a time-based metric, but the overall relative efficiency was adopted due to the multi-task services associated with the evaluation. The result revealed an ORE of 93.04% efficiency in time resources for completing identity-related services by the participants. This implies that the proposed iNIRS solution is time efficient as too much time is avoided for completing a functional identity service or task by the user.

The third construct of the evaluation was the perception of users towards the usefulness of the iNIRS solution – *user satisfaction*. The evaluation revealed results for three sub-categories: SYSUSE, INFOQUAL, and INTERQUAL with an overall weighted average. The standard benchmark for SYSUSE is capped at 2.80; INFOQUAL is capped at 3.02; INTERQUAL is capped at 2.49; and the average mean score is capped at 2.82 (Sauro and Lewis, 2016). The findings revealed a SYSUSE of 2.28, INFOQUAL of 2.47, INTERQUAL of 2.89, and the overall average mean of 2.5 with a standard deviation of 0.2. The perceived usability experiences from users’ satisfaction indicated that the system was satisfactorily easy to use. This is an assertion that the system has a high capability of delivering efficient services for identity management.

Summarily, a unified national identity registry system was implemented to integrate selected identity management registries to combat duplication of identity information and processes across agencies. More significantly, the evaluation results and analyses further established that the proposed identity management approach is highly supportive of integrating identity information with convincing efficiency in service delivery toward a unified national identity registry system for the nation. Relatively, the integration of identity registries with civil registration (World Bank Group, 2016) and a universal identification system (Ogochukwu, 2021) towards fundamental identification to access fundamental and financial identity services are in harmony with the outcome of the current study. Furthermore, the study aligns with the emphasis in other existing literary works on identity information management systems (Adeola, *et al*., 2013; Ayamba and Ekanem, 2016; Amujo, *et al.*, 2019; Handforth and Wilson, 2019).

CONCLUSION

Dual identities and falsified records have prevailed as the defect of duplication in identity registries. The current study has established a panacea of deduplicating citizen identity information across registries of identity management agencies by introducing a functional identification approach that kickstarts with a systematic national identity process involving a one-time UIN registration and biometric information across interlinked agency registries. The proposed iNIRS solution and approach established a glaring feasibility for identity management transition towards a unified national identity services registry system for Nigeria. The unification of identity registries extends beyond a foundational identification to functional and fundamental access to identity services for stakeholders. However, further study is to be considered to check concerns relating to the issue of data security and the political will of implementing an actual system.

CONFLICT OF INTERESTS

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