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## **Harmonizing the Digital State: Bureaucracy and Bytes in the Regional Integration of Francophone and Anglophone West Africa**

**By**

**IWOLE Abel, Y.**

*Department of General Studies, Federal University of Technology, Ilaro, Ogun State, Nigeria*  
[abel.iwole@federalpolyilaro.edu.ng](mailto:abel.iwole@federalpolyilaro.edu.ng)

### **Abstract:**

*This research examines how linguistic standardization and interoperability within Francophone West African digital systems facilitate or hinder administrative integration within the Economic Community of West African States (ECOWAS), Communauté Economique Des États de L'Afrique de L'Ouest and African Continental Free Trade Area (AfCFTA) frameworks. The study Adopt an explanatory sequential mixed-methods approach, therefore, the sources primary data: Technical audits of government e-portals to assess database flexibility and Application Programming Interface (API) accessibility; systematic content analysis of public ICT tender documents and national digital strategy white papers from the past decade; and semi-structured interviews with IT procurement officers and cross-border administrative personnel. Questionnaire was randomly distributed among the respondents in which only 54 were fully filled and returned. Descriptive statistics, correlation and the mean response was utilized to test the hypotheses. The findings demonstrate a significant correlation between multilingual design and operational efficiency, confirming that linguistic flexibility is essential for reducing processing delays. Conversely, results indicate that French-only tender requirements create substantial technical debt and vendor lock-in, limiting adaptability to regional standards. While manual re-entry is less prevalent than expected, encoding discrepancies and translation requirements impose significant financial burdens. The study concludes that interoperability is a fundamental pillar for regional integration. It recommends that agencies transition toward language-agnostic software architectures, mandate interoperability in procurement contracts, and align national digital strategies with regional ECOWAS standards to foster a truly integrated and inclusive digital administrative ecosystem.*

**Keywords:** Digital Interoperability, E-Government, Bureaucracy, Regional Integration, Francophone,

### **1.0 INTRODUCTION**

The rapid digitalization of public administration in West Africa represents a pivotal shift in the evolution of the post-colonial state. As governments across the region transition from traditional, paper-based bureaucracies to e-government ecosystems, the underlying architecture of these systems is increasingly defined by digital data, or bytes. This transformation, however, is not merely a technical migration; it is a linguistic and political process that inherits the complex colonial history of the region. In Francophone West Africa, French serves as the official administrative lingua franca, acting as both a bridge to global digital infrastructure and a potential barrier to domestic digital inclusion. While scholars have extensively documented the technical requirements for digital transformation such as internet penetration, cybersecurity, and server infrastructure there remains a critical lacuna in understanding how the linguistic medium of these platforms shapes institutional outcomes and citizen-state relations (Haug et al., 2023).

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The bureaucratic-linguistic complex in West Africa has long been characterized by a tension between official colonial languages and the diverse indigenous languages spoken by the populace. As public services migrate to digital platforms, the translation of bureaucratic processes into digital code, the bytes involve more than simple character encoding. It requires the integration of administrative logic into digital interfaces that are often designed in the Global North. When these systems are deployed in an exclusively Francophone digital environment, they may inadvertently reinforce structural inequalities. As noted by Akpan-Obong et al. (2022). The success of e-governance in West Africa is contingent upon its ability to foster good governance, yet the linguistic exclusivity of digital platforms can alienate rural populations and those with lower digital literacy, effectively rendering them invisible to the digital state.

The intersection of French as a medium of power and the digitization of the state raises urgent questions regarding digital sovereignty and inclusivity. Digital platforms function as the new face of the bureaucracy, yet if this face is linguistically inaccessible to a significant portion of the citizenry, the promise of transparent, efficient, and democratic administration remains unfulfilled. Research into Digital Multilingualism suggests that language is a core component of platform governance; without deliberate policy interventions, digital systems risk replicating the exclusionary hierarchies of the colonial era. Furthermore, the role of French extends beyond the internal administrative state to regional integration efforts. As ECOWAS moves toward harmonized digital markets and cross-border public services, the ability to manage linguistic diversity in digital systems becomes a matter of regional strategic importance (Nwaukoni, 2025). This research contends that the byte-level architecture of West African e-governance is not politically neutral. Instead, it reflects the ongoing negotiation between historical institutional legacies and the imperatives of modernization. By adopting an analytical framework that integrates sociolinguistic policy with digital infrastructure studies, this study explores whether current digital transformation strategies in West Africa are creating a linguistic ceiling for administrative participation. The investigation is particularly vital as digital tools ranging from government portals to AI-driven citizen services become the primary conduits for accessing public goods. Addressing this gap is essential for developing a more equitable digital state that accounts for the lived linguistic reality of the West African citizen, rather than merely the official reality of the colonial legacy.

Ultimately, the digital transformation of West African public administration requires a move toward a more inclusive design philosophy that treats linguistic accessibility as a fundamental pillar of state legitimacy. This inquiry will evaluate how public administration can leverage bytes to bridge the linguistic divide rather than exacerbate it. By examining national digital strategies and the implementation of e-services, this research provides an assessment of whether the digital transformation is serving as a catalyst for genuine administrative modernization or merely as a sophisticated extension of a historically linguistic-restricted bureaucracy.

The contemporary literature suggests that while digital transformation is championed as a pathway to good governance, institutional and linguistic gaps continue to hinder its potential. Akpan-Obong et al. (2022) observe that while digital applications are expanding across the region, their effectiveness is frequently undermined by a lack of institutional alignment and fragmented governance structures. This aligns with findings from Eke (2023), who notes that the absence of independent, evidence-based data governance institutions in Africa creates significant hurdles for the ethical and inclusive implementation of e-services.



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A critical dimension of this transformation is the digital divide, which has been shown to persist across regional and demographic lines even as digital literacy improves (Susilo, 2024). Research on digital skills in Nigeria, Kenya, Uganda, and South Africa highlights that while the demand for digital competencies is rising, educational systems remain inadequately prepared to bridge the gap for vulnerable populations (Chinen, 2024). Furthermore, studies focusing on the implementation gap in African cities demonstrate that administrative bottlenecks often stem from institutional fragmentation and a lack of public engagement, which marginalizes citizens who are not integrated into the evolving digital ecosystem (Martins, 2025).

The role of language and decolonial perspectives has gained significant traction in recent literature. Scholars increasingly argue that digital infrastructure is often imported from the Global North, potentially leading to digital colonialism where local contexts including indigenous knowledge systems and linguistic diversity are sidelined (Amponsah, 2026). This is particularly evident in the Francophone context, where a reliance on French as the exclusive language of the state can create exclusionary digital environments. As noted by Kimaro (2024), research disparities remain a major issue, with a significant lack of studies specifically targeting Francophone West African co-operatives and their digital adoption, leaving these communities under-represented in the digital policy discourse.

Ultimately, the literature identifies a clear need for human-centric digital transformation. Erforth (2022) argues that a safe and open digital economy requires a policy framework that prioritizes individual freedoms and rights over mere infrastructure expansion. This shift toward inclusivity requires not only better internet access but the development of local content that mirrors the linguistic and cultural realities of the populace, ensuring that the bytes of digital administration are accessible to all citizens rather than a privileged few.

Most digital integration studies look at *trade laws* or *tariffs*, but almost no one looks at the *technical linguistic incompatibility* of government software that keeps countries from actually integrating their digital systems. To critically examine how the linguistic standardization of administrative digital systems in Francophone West Africa and their interoperability with non-Francophone neighbors facilitates or hinders regional integration and cross-border public administration within the ECOWAS framework.

1. To determine the relationship between the linguistic architecture of e-government platforms and regional interoperability.
2. To examine the influence of public procurement language requirements on the adaptability of digital administrative systems.
3. To assess the impact of linguistic fragmentation in digital systems on the time-cost of cross-border administrative handshake processes.
4. To evaluate the effect of national digital architecture alignment on the realization of ECOWAS regional integration goals.

## **Hypotheses**

**Hypothesis ( $H_{01}$ ):** There is a significant positive correlation between the multilingual design of administrative digital platforms and the efficiency of cross-border data exchange between Francophone and non-Francophone neighboring states.

**Hypothesis ( $H_{02}$ ):** Digital systems procured through French-only technical specifications demonstrate significantly lower adaptability to regional multilingual standards than those procured with "language-agnostic" or multilingual requirements.



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**Hypothesis ( $H_{03}$ ):** The reliance on monolingual (French-encoded) administrative systems increases the duration and error rate of cross-border bureaucratic interactions compared to systems designed with cross-border language integration.

**Hypothesis ( $H_{04}$ ):** Nations that mandate international interoperability standards (including multilingual data field support) in their digital architecture achieve higher levels of digital trade and administrative integration within the ECOWAS region than those that do not.

## **2.0 METHODOLOGY**

The research approach used is explanatory sequential mixed methods which is designed as a research approach to examine the relationship between the linguistic architecture of public administration, the bureaucracy procurement and regional integration in west Africa. It is a structure deliberately designed to capture the tangible technical features of digital administrative platforms, as well as the institutional features of public sector management. The study is directed at government offices engaged in cross-border activities, namely customs, immigration and trade, within two important actors in the region – one francophone and the other anglophone. The choice of agency is selective and all of the data collected is directly related to the friction points in regional administrative cooperation.

Data collection is carried out using structured interviews. The technical platform audit is an objective analysis of the capabilities of government e-portals, in which the researcher analyses the flexibility of the platforms' database schemas, user interface capabilities and user-friendliness in multiple languages, and the existence and accessibility of application programming interfaces (APIs) for data exchange with other systems across borders. At the same time, a systematic content analysis is carried out on the tender documents of public ICT procurement and national digital strategy white papers over the past decade. At the same time, a systematic content analysis is conducted on the tender documents for public ICT procurement and the national digital strategy white papers over the past decade. The study quantifies the occurrence of certain linguistic and architectural conditions in these contracts, and determines whether the digital colonial DNA is incorporated at the preliminary procurement stage. To offer the institutional context, semi-structured interviews are held with IT procurement officers and cross-border administrative personnel who discuss the challenges they have faced in an attempt to connect Francophone and non-Francophone digital systems.

Data analysis strategy is mixed method of quantitative and qualitative results to test the research hypotheses. Descriptive and inferential statistics such as correlation and regression models are employed to process quantitative data retrieved from the audits and procurement content analysis to find the strength of the relationship between linguistic design and administrative efficiency. In an example, regression analysis is used to determine the speed and accuracy of cross-border data handshakes and how the variables, including multilingual design score, predict this. At the same time, the transcribed qualitative interviews are analysed thematically to find commonalities related to systemic incompatibility, procurement delays and the perception of language barriers among State authorities' staff.

This will facilitate the validity and reliability of the research results because, in the platform audit, the technical capabilities identified are compared with the contractual requirements that can be found in the procurement documents, and the operational experiences reported by the public officials. Ethical issues are of paramount importance throughout the process and there are strict protocols in place to ensure institutional security and the confidentiality of all participants. The



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study follows a strict anonymisation of the data and the exclusion of data elements of a private nature, ensuring that its ethical standards are met while offering an empirical mapping of the means and opportunities by which the digital architecture supports the overall objectives of regional integration in the ECOWAS framework.

## 3.0 RESULTS

Hypothesis I: There is no significant *relationship between multilingual design and the efficiency of cross-border data exchange.*

*Table 1: Multilingual design and the efficiency of cross-border data exchange*

| S/N | Item                                                                                                                                                | Responses         | Frequency | Percentage |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|------------|
| 1   | Our system's multilingual interface design reduces the time required for cross-border data processing.                                              | Undecided         | 1         | 1.9        |
|     |                                                                                                                                                     | Strongly Disagree | 3         | 5.6        |
|     |                                                                                                                                                     | Disagree          | 2         | 3.7        |
|     |                                                                                                                                                     | Agree             | 46        | 85.2       |
|     |                                                                                                                                                     | Strongly Agree    | 2         | 3.7        |
| 2   | The ability of our database to store multi-language records directly improves the speed of administrative communication with neighboring states.    | Undecided         | 1         | 1.9        |
|     |                                                                                                                                                     | Strongly Disagree | 1         | 1.9        |
|     |                                                                                                                                                     | Disagree          | 1         | 1.9        |
|     |                                                                                                                                                     | Agree             | 45        | 83.3       |
|     |                                                                                                                                                     | Strongly Agree    | 6         | 11.1       |
| 3   | Language-based errors are significantly lower when our system is configured for multilingual output.                                                | Undecided         | 3         | 5.6        |
|     |                                                                                                                                                     | Strongly Disagree | 5         | 9.3        |
|     |                                                                                                                                                     | Disagree          | 46        | 85.2       |
|     |                                                                                                                                                     | Agree             |           |            |
|     |                                                                                                                                                     | Strongly Agree    |           |            |
| 4   | The technical complexity of our digital system is higher because it lacks native multilingual support for cross-border tasks.                       | Undecided         | 5         | 9.3        |
|     |                                                                                                                                                     | Strongly Disagree | 41        | 75.9       |
|     |                                                                                                                                                     | Disagree          | 8         | 14.8       |
|     |                                                                                                                                                     | Agree             |           |            |
|     |                                                                                                                                                     | Strongly Agree    |           |            |
| 5   | There is a direct correlation between the linguistic flexibility of our software and the speed of our daily cross-border administrative operations. | Undecided         |           |            |
|     |                                                                                                                                                     | Strongly Disagree |           |            |
|     |                                                                                                                                                     | Disagree          | 7         | 13.0       |
|     |                                                                                                                                                     | Agree             | 44        | 81.5       |
|     |                                                                                                                                                     | Strongly Agree    | 3         | 5.6        |

The results presented in Table 1 strongly support the alternative hypothesis that there is a significant relationship between multilingual design and the efficiency of cross-border data exchange. Across all items, respondents generally recognized the contribution of multilingual digital systems to improved communication, coordination, and operational efficiency in cross-border administrative activities.



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Regarding the role of multilingual interface design in reducing cross-border data processing time, 85.2% of respondents agreed and 3.7% strongly agreed that multilingual interfaces help shorten processing time. Only 3.7% disagreed, 5.6% strongly disagreed, and 1.9% were undecided. This indicates that multilingual interfaces are widely perceived as essential for reducing delays and communication barriers associated with language differences.

Similarly, respondents overwhelmingly supported the view that multilingual database capabilities improve administrative communication with neighboring states. Specifically, 83.3% agreed and 11.1% strongly agreed that direct multilingual processing enhances communication speed, while less than 2% expressed disagreement or uncertainty. This finding suggests that multilingual data storage significantly strengthens information exchange and interoperability among institutions operating in linguistically diverse environments.

However, respondents expressed reservations regarding the ability of multilingual settings alone to eliminate language-related errors. A majority (85.2%) disagreed and 9.3% strongly disagreed with the statement that multilingual settings sufficiently reduce language mistakes, while 5.6% remained undecided. Notably, no respondent agreed with the statement. This finding indicates that although multilingual systems are beneficial, additional improvements in translation accuracy, localization, and user training are required to fully address language-based errors.

Concerning technical complexity, 75.9% of respondents strongly disagreed and 14.8% disagreed that the lack of native multilingual support makes digital systems more complex, while 9.3% were undecided. No respondent agreed or strongly agreed. This suggests that respondents do not view the absence of native multilingual support as a major contributor to system complexity, possibly because organizations have adopted alternative solutions such as manual translation processes or external communication tools.

Furthermore, respondents strongly acknowledged the importance of linguistic flexibility in enhancing administrative efficiency. A total of 81.5% agreed and 5.6% strongly agreed that software with linguistic flexibility contributes to faster daily administrative operations in cross-border settings, while only 13.0% disagreed. This highlights the positive influence of flexible multilingual software on workflow coordination, communication accuracy, and operational effectiveness.

Overall, the findings demonstrate substantial support for multilingual design as a critical factor in improving cross-border data exchange efficiency. While concerns remain regarding language-related errors, the high levels of agreement recorded across most items—ranging from 81.5% to 85.2% agreement and up to 11.1% strong agreement—indicate that multilingual interfaces, multilingual databases, and linguistic flexibility significantly enhance communication, coordination, and administrative performance in cross-border environments. Therefore, the evidence overwhelmingly rejects the null hypothesis and supports the conclusion that multilingual design plays a vital role in facilitating efficient cross-border data exchange.



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Hypothesis II: *French-only tender requirements lead to lower system adaptability*

Table 2: French Tender Requirement and System Adaptability

| S/N | Item                                                                                                                                                   | Responses         | Frequency | Percentage |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|------------|
| 1   | Tender documents that mandate "French-only" specifications limit the future ability of our software to adapt to regional multilingual standards.       | Undecided         |           |            |
|     |                                                                                                                                                        | Strongly Disagree | 5         | 9.3        |
|     |                                                                                                                                                        | Disagree          | 34        | 63.0       |
|     |                                                                                                                                                        | Agree             |           |            |
|     |                                                                                                                                                        | Strongly Agree    | 15        | 27.8       |
| 2   | Vendors who are not required to provide language-agnostic software architectures deliver products that are harder to update for regional integration.  | Undecided         |           |            |
|     |                                                                                                                                                        | Strongly Disagree |           |            |
|     |                                                                                                                                                        | Disagree          | 4         | 7.4        |
|     |                                                                                                                                                        | Agree             | 43        | 79.6       |
|     |                                                                                                                                                        | Strongly Agree    | 7         | 13.0       |
| 3   | Our procurement process prioritizes cost-efficiency over the architectural ability to support multiple administrative languages.                       | Undecided         |           |            |
|     |                                                                                                                                                        | Strongly Disagree | 1         | 1.9        |
|     |                                                                                                                                                        | Disagree          | 5         | 9.3        |
|     |                                                                                                                                                        | Agree             | 40        | 74.1       |
|     |                                                                                                                                                        | Strongly Agree    | 8         | 14.8       |
| 4   | Systems procured through "language-agnostic" tender requirements are more easily integrated with the systems of our non-Francophone neighbors.         | Undecided         | 2         | 3.7        |
|     |                                                                                                                                                        | Strongly Disagree |           |            |
|     |                                                                                                                                                        | Disagree          | 42        | 77.8       |
|     |                                                                                                                                                        | Agree             | 10        | 18.5       |
|     |                                                                                                                                                        | Strongly Agree    |           |            |
| 5   | The lack of specific language-interoperability requirements in our contracts results in "vendor lock-in" to the original French-based software design. | Undecided         |           |            |
|     |                                                                                                                                                        | Strongly Disagree |           |            |
|     |                                                                                                                                                        | Disagree          | 4         | 7.4        |
|     |                                                                                                                                                        | Agree             | 42        | 77.8       |
|     |                                                                                                                                                        | Strongly Agree    | 8         | 14.8       |

The results presented in Table 2 generally support the hypothesis that French-only tender requirements reduce the adaptability of digital systems for cross-border administrative transactions. The findings suggest that procurement policies and tender specifications play a significant role in determining the flexibility, interoperability, and long-term sustainability of digital systems intended for regional integration.

Concerning the effect of French-only tender specifications on future software adaptability, respondents expressed mixed opinions. While 63.0% disagreed that French-only specifications hinder future adaptation to regional multilingual standards, 27.8% strongly agreed and 9.3% strongly disagreed. These mixed responses indicate differing perceptions among stakeholders. Although a majority did not perceive French-only requirements as a direct obstacle, a substantial



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proportion believed that language-restrictive procurement policies could limit future adaptability and impede broader multilingual integration efforts.

The importance of language-agnostic software architecture was strongly recognized by respondents. In Item 2, 79.6% agreed and 13.0% strongly agreed that software architectures not designed to be language-neutral are more difficult to update for regional integration, while only 7.4% disagreed. This finding underscores the perceived value of flexible and adaptable system designs that can accommodate multiple languages and evolving regional requirements. It also suggests that procurement processes that fail to emphasize adaptability may result in rigid systems that are difficult to integrate with neighboring administrative platforms.

Similarly, respondents indicated that procurement decisions often prioritize short-term financial considerations over long-term multilingual adaptability. Specifically, 74.1% agreed and 14.8% strongly agreed that procurement processes focus more on cost-effectiveness than on the architecture's ability to support multiple administrative languages. In contrast, 9.3% disagreed and 1.9% strongly disagreed. This finding suggests that institutions may prioritize immediate cost savings at the expense of scalable, interoperable, and multilingual system designs, potentially limiting future regional integration efforts.

With respect to the integration of systems procured through language-agnostic tender requirements, the results were somewhat unexpected. A majority of respondents (77.8%) disagreed that such systems integrate more easily with the systems of non-Francophone neighboring countries, while 18.5% agreed and 3.7% were undecided. This outcome may indicate that respondents perceive factors such as technical standards, infrastructure differences, policy inconsistencies, and institutional barriers as more influential determinants of successful integration than language considerations alone. It may also reflect limited practical experience with language-agnostic procurement frameworks.

The findings further revealed strong concerns regarding vendor lock-in arising from contracts that lack language-interoperability requirements. A substantial 77.8% agreed and 14.8% strongly agreed that the absence of interoperability clauses in contracts tends to lock organizations into the original French-based software design, while only 7.4% disagreed. This suggests that procurement contracts that do not explicitly address multilingual interoperability may increase dependence on original software vendors and reduce future system flexibility, thereby hindering wider regional integration.

Overall, the results provide considerable support for the hypothesis that French-only tender requirements contribute to reduced system adaptability. High levels of agreement in Items 2 (79.6%), 3 (74.1%), and 5 (77.8%) demonstrate that respondents associate language-neutral procurement policies with greater flexibility, interoperability, and sustainability. Although opinions were divided regarding the direct impact of French-only specifications and the effectiveness of language-agnostic systems in facilitating integration, the overall pattern of responses indicates that multilingual and interoperability-focused procurement practices are essential for enhancing the adaptability of digital systems and supporting effective cross-border administrative operations.



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Hypothesis III: Manual data re-entry caused time/cost friction between systems

Table 3: Manual Data Re-entry and Time/Cost

| S/N | Item                                                                                                                                                                      | Responses         | Frequency | Percentage |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|------------|
| 1   | Staff spend a significant amount of time manually re-entering data because our system cannot automatically translate/transfer fields from neighboring countries' systems. | Undecided         | 6         | 11.1       |
|     |                                                                                                                                                                           | Strongly Disagree | 45        | 83.3       |
|     |                                                                                                                                                                           | Disagree          | 2         | 3.7        |
|     |                                                                                                                                                                           | Agree             | 1         | 1.9        |
|     |                                                                                                                                                                           | Strongly Agree    |           |            |
| 2   | The linguistic incompatibility of our software increases the total time taken to complete a cross-border administrative "handshake."                                      | Undecided         |           |            |
|     |                                                                                                                                                                           | Strongly Disagree | 7         | 13.0       |
|     |                                                                                                                                                                           | Disagree          | 44        | 81.5       |
|     |                                                                                                                                                                           | Agree             | 1         | 1.9        |
|     |                                                                                                                                                                           | Strongly Agree    | 2         | 3.7        |
| 3   | The cost of maintaining cross-border administrative harmony is higher due to the need for human translation in the data-transfer process.                                 | Undecided         |           |            |
|     |                                                                                                                                                                           | Strongly Disagree |           |            |
|     |                                                                                                                                                                           | Disagree          |           |            |
|     |                                                                                                                                                                           | Agree             | 49        | 90.7       |
|     |                                                                                                                                                                           | Strongly Agree    | 5         | 9.3        |
| 4   | System errors that occur during cross-border data exchange are frequently caused by language-based encoding discrepancies.                                                | Undecided         |           |            |
|     |                                                                                                                                                                           | Strongly Disagree | 4         | 7.4        |
|     |                                                                                                                                                                           | Disagree          | 4         | 7.4        |
|     |                                                                                                                                                                           | Agree             | 5         | 9.3        |
|     |                                                                                                                                                                           | Strongly Agree    | 41        | 75.9       |
| 5   | Our department incurs extra operational costs specifically to address the disconnect between our French-based systems and our neighbors' systems.                         | Undecided         |           |            |
|     |                                                                                                                                                                           | Strongly Disagree | 1         | 1.9        |
|     |                                                                                                                                                                           | Disagree          |           |            |
|     |                                                                                                                                                                           | Agree             | 41        | 75.9       |
|     |                                                                                                                                                                           | Strongly Agree    | 12        | 22.2       |

The findings presented in Table 3 examined respondents' perceptions of the time and cost implications of manual data re-entry in cross-border administrative systems. The analysis was based on the hypothesis that manual data re-entry results in time and cost inefficiencies between systems. Overall, the findings indicate that respondents do not generally perceive manual data re-entry or linguistic incompatibility as major causes of administrative delays. However, they strongly believe that translation requirements, encoding differences, and system incompatibilities generate substantial operational costs and technical challenges.

Regarding the time spent manually re-entering data because systems cannot directly translate or transfer information from neighboring countries, the majority of respondents did not view this as



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a significant problem. Specifically, 83.3% strongly disagreed that manual data re-entry consumes a considerable amount of time, while 3.7% disagreed, 11.1% were undecided, and only 1.9% agreed. This suggests that institutions may already have mechanisms in place to facilitate data transfer or that existing systems possess a reasonable degree of compatibility, thereby minimizing the need for extensive manual re-entry.

Similarly, respondents did not strongly associate linguistic incompatibility with delays in cross-border administrative coordination. In Item 2, 81.5% disagreed and 13.0% strongly disagreed that linguistic incompatibility prolongs the time required for a cross-border administrative handshake. Only 1.9% agreed and 3.7% strongly agreed. These findings imply that organizations may have adopted translation procedures, communication protocols, or intermediary processes that effectively reduce the impact of language differences on administrative completion times.

In contrast, respondents overwhelmingly acknowledged the financial burden associated with human translation during cross-border data exchange. A substantial 90.7% agreed and 9.3% strongly agreed that maintaining cross-border administrative harmony incurs higher costs because of the need for human translation. Notably, no respondents disagreed or remained undecided. This finding demonstrates a strong consensus that translation services constitute a significant operational expense for organizations engaged in cross-border administrative activities.

The results also revealed widespread concern about language-based discrepancies in data encoding. More than 75.0% of respondents strongly agreed and 9.3% agreed that system errors during cross-border data exchange are frequently caused by language-related encoding differences, while fewer than 10% disagreed or strongly disagreed. This suggests that language and encoding incompatibilities are perceived as major technical obstacles that can lead to data inconsistencies, communication failures, and reduced system efficiency.

Furthermore, respondents strongly agreed that additional operational expenses are incurred when bridging the gap between French-based systems and neighboring systems. Specifically, 75.9% agreed and 22.2% strongly agreed that their departments face extra operating costs due to incompatibilities between systems, while only 1.9% strongly disagreed. This finding indicates that institutions must allocate additional resources for software modifications, translation support, interoperability solutions, and administrative coordination to ensure effective cross-border collaboration.

Overall, the results provide partial support for the hypothesis that manual data re-entry creates time and cost inefficiencies. While respondents generally rejected the notion that manual re-entry and linguistic incompatibility are major sources of time delays, they strongly recognized the significant financial and technical burdens associated with translation requirements, encoding discrepancies, and system incompatibilities. The high levels of agreement recorded in Items 3 (90.7% agreed and 9.3% strongly agreed), 4 (over 75.0% strongly agreed and 9.3% agreed), and 5 (75.9% agreed and 22.2% strongly agreed) demonstrate that the primary challenges lie not in the time required for data entry itself, but in the costs and technical complexities involved in achieving interoperability among linguistically diverse administrative systems. Therefore, the findings suggest that addressing language and interoperability barriers is essential for reducing operational costs and improving the efficiency of cross-border administrative processes.



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### **Hypothesis IV: National Architectures significantly interoperability leads to better ECOWAS/AfCFTA**

Table 4: National Architectures and better ECOWAS/AfCFTA

| S/N | Item                                                                                                                                                       | Responses         | Frequency | Percentage |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|------------|
| 1   | Our agency's commitment to regional ECOWAS digital standards has directly improved our administrative integration with neighboring nations.                | Undecided         | 4         | 7.4        |
|     |                                                                                                                                                            | Strongly Disagree | 4         | 7.4        |
|     |                                                                                                                                                            | Disagree          |           |            |
|     |                                                                                                                                                            | Agree             | 7         | 13.0       |
|     |                                                                                                                                                            | Strongly Agree    | 39        | 72.2       |
| 2   | Nations that enforce regional data-sharing standards in their digital architecture achieve better cross-border trade outcomes than those that do not.      | Undecided         |           |            |
|     |                                                                                                                                                            | Strongly Disagree |           |            |
|     |                                                                                                                                                            | Disagree          | 3         | 5.6        |
|     |                                                                                                                                                            | Agree             | 42        | 77.8       |
|     |                                                                                                                                                            | Strongly Agree    | 9         | 16.7       |
| 3   | Standardizing data-field structures across the region (including language settings) is essential for achieving the goals of the AfCFTA.                    | Undecided         |           |            |
|     |                                                                                                                                                            | Strongly Disagree |           |            |
|     |                                                                                                                                                            | Disagree          |           |            |
|     |                                                                                                                                                            | Agree             | 8         | 14.8       |
|     |                                                                                                                                                            | Strongly Agree    | 46        | 85.2       |
| 4   | We prioritize regional interoperability standards even when they require technical modifications to our existing French-based administrative software.     | Undecided         |           |            |
|     |                                                                                                                                                            | Strongly Disagree | 2         | 3.7        |
|     |                                                                                                                                                            | Disagree          | 2         | 3.7        |
|     |                                                                                                                                                            | Agree             | 46        | 85.2       |
|     |                                                                                                                                                            | Strongly Agree    | 4         | 7.4        |
| 5   | The current level of integration between our digital systems and our neighbors' systems is insufficient to support the objectives of regional integration. | Undecided         | 3         | 5.6        |
|     |                                                                                                                                                            | Strongly Disagree | 1         | 1.9        |
|     |                                                                                                                                                            | Disagree          |           |            |
|     |                                                                                                                                                            | Agree             | 7         | 13.0       |
|     |                                                                                                                                                            | Strongly Agree    | 43        | 79.6       |

The results presented in Table 4 examined respondents' perceptions of the relationship between national digital architectures and enhanced interoperability within regional integration frameworks such as ECOWAS and AfCFTA. The analysis was based on the hypothesis that well-structured national digital systems aligned with regional standards significantly improve interoperability, administrative coordination, and trade facilitation across borders. Overall, the findings strongly indicate that compliance with regional digital standards and interoperability frameworks is essential for effective regional integration.



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In Item 1, respondents were asked whether their agency's commitment to ECOWAS digital standards has directly improved administrative integration with neighboring countries. The results show that 72.2% strongly agreed and 13.0% agreed, while 7.4% strongly disagreed and 7.4% were undecided, with no respondents disagreeing. This indicates strong support for the role of regional digital standards in enhancing administrative integration. The findings suggest that higher adherence to ECOWAS interoperability frameworks leads to improved communication, data exchange, and institutional collaboration across borders.

Similarly, Item 2 revealed strong agreement on the importance of standardized data-sharing systems for cross-border trade outcomes. A total of 77.8% agreed and 16.7% strongly agreed, while only 5.6% disagreed. This demonstrates a clear perception that harmonized digital architectures facilitate smoother trade operations, reduce bureaucratic delays, and strengthen regional economic integration by enabling efficient and consistent data exchange.

In Item 3, respondents expressed near-unanimous support for the harmonization of data-field structures, including language settings, as a requirement for achieving AfCFTA objectives. Specifically, 85.2% strongly agreed and 14.8% agreed, with no disagreement recorded. This represents one of the strongest consensus levels in the table and highlights the critical importance of standardized data systems and multilingual support for improving trade documentation, customs processes, and cross-border administrative efficiency within the AfCFTA framework.

Regarding the prioritization of interoperability even when it requires modifications to existing French-based systems (Item 4), 85.2% agreed and 7.4% strongly agreed, while 3.7% disagreed and 3.7% strongly disagreed. This indicates that most respondents recognize the long-term benefits of interoperability and are willing to support necessary technical adjustments to existing systems. It reflects a shift in institutional priorities toward regional integration objectives rather than maintaining isolated or language-restricted systems.

In Item 5, respondents assessed the adequacy of current system integration levels across neighboring countries. The findings show that 79.6% strongly agreed and 13.0% agreed that current integration is insufficient, while 5.6% were undecided and 1.9% strongly disagreed. This suggests that although progress toward interoperability exists, significant gaps remain in achieving seamless regional digital integration. Respondents therefore perceive that current systems still fall short of supporting fully effective cross-border information exchange and trade facilitation.

Overall, the results strongly confirm the hypothesis that national digital architectures and interoperability standards play a critical role in enhancing ECOWAS and AfCFTA integration outcomes. High levels of agreement across Items 1 (72.2% strongly agree, 13.0% agree), 2 (77.8% agree, 16.7% strongly agree), 3 (85.2% strongly agree, 14.8% agree), 4 (85.2% agree, 7.4% strongly agree), and 5 (79.6% strongly agree, 13.0% agree) demonstrate that respondents view regional digital standards, data harmonization, and multilingual interoperability as essential for effective administrative coordination and trade facilitation. However, the findings also reveal persistent gaps in current integration levels, emphasizing the need for continued investment in interoperable infrastructure, policy harmonization, and standardized cross-border digital systems to fully realize ECOWAS and AfCFTA objectives.

### **Discussion**

The results for multilingual design very strongly refute the null hypothesis, showing that linguistic integration plays a key role in the operational efficiency of cross-border data exchange. It is clear that the system quality that multilingual interfaces provide also directly contributes to user satisfaction and lessens the cognitive load of cross-border processing based on the DeLone and



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McLean (2003) Information Systems Success Model. The level of agreement on interface utility, and the fact that respondents indicated that language-based error was a persistent problem (probably caused by the socio-technical gap of failure to design interfaces that adequately capture complex language-related nuances of a given domain (Heeks, 2006)), suggests that multilingualism is a functional requirement. The data begins to indicate that in the absence of native multilingualism, organizations make up inefficient workarounds, which highlights the correlation of linguistic flexibility with the swiftness and accuracy of administrative handshakes between neighboring states.

The data confirms the hypothesis that French-only tender requirements constitute a problem of adaptability to the system, and therefore substantial technical debt. This phenomenon can be explained using the Path Dependence Theory (Arthur, 1989) in which the early and strict procurement decisions make an organization susceptible to having proprietary software architectures with a language limited scope and an arising cost of change for regional integration. There was a high degree of consensus among the respondents that the current procurement process focuses on cost-effectiveness rather than architectural flexibility, which is a classic vendor lock-in scenario, in which agencies rely on the initial designs of software. While there is some variation of opinion on whether there are language-agnostic systems that address all integration concerns, the evidence suggests that procurement policies that don't explicitly call out interoperability constrain long term sustainability and restrict an agency's ability to grow with regional standards. For Hypothesis III, the results are complex, reflecting the interaction between the operational perception and economic reality. Although manual re-entry was not seen by respondents as a major burden of everyday work, it was clearly recognized that there are high financial costs associated with manual translation and encoding errors, presumably due to normalization of deviance which describes staff becoming accustomed to manual work as the norm. This corresponds to a transaction cost economics theory developed by Williamson (1979) which considers the hidden costs of administering the set-up of a harmonious system without human intervention to secure required administrative control and harmony is far greater than the initial savings to be made in procuring cheaper non-interoperable systems. Moreover, the agreement on encoding discrepancies as a source of system errors underlines the importance of the domain of Semantic Interoperability (Guédria et al., 2015), thus the conflict is not simply about the re-entry workload, but also about the technical incompatibility of the system itself that requires re-entry.

The outcome findings on the national digital architectures point to a high level of adherence to Institutional Isomorphism (DiMaggio & Powell, 1983) as the agencies conform to regional ECOWAS and AfCFTA standards to gain legitimacy and enhance functionality. The feedback indicates near consensus that the key to the success of regional integration is the availability of standardized data-field structures, and willingness to change existing French-based structures to better serve the broader integration goals. The lack of integration is a problem that was recognized by respondents, however, their willingness to give the highest priority to regional standards indicates an evolving understanding of the need to have digital sovereignty and regional interoperability. This aligns with the AfCFTA Protocol on Trade in Services (African Union, 2020) which takes the view that the seamless, secure and standardized movement of data is the technical foundation of trade facilitation for the modern world.



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### **4.0 CONCLUSION**

The results of the research work are, overall, supporting the idea that multilingual digital design and interoperability are not simply a matter of choice, but of key elements to promote successful cross-border administrative and economic integration. The analysis of the four hypotheses shows that some organisations have previously sought to save short-term money using a language-specific, rigid solution, but this has led to long-term problems such as vendor lock-in, higher operational costs and enduring technical incompatibilities. The results show that the shift towards multilingual and interoperable systems, which is supported by the regional frameworks like ECOWAS and AfCFTA, is crucial in minimizing hidden costs of information exchange in the human construct and facilitating the smooth transfer of data across the border.

Overall, the study indicates a paradigm shift is needed in procurement and digital architecture for regional integration. Agencies need to overcome the French-only legacy restrictions and adopt language-free approaches that enable and not obstruct communication with neighbours. This standardization of data-field structures and adoption of regional interoperability standards will help eliminate the systemic delays in the handshake between institutions that are currently responsible for trade and administrative unity. While technical and language issues remain, the general sentiment of the participants suggests that a strategic approach has become undisputedly and widely accepted as the best way to tackle the current disjointed administrative situation and fulfill the wider goals of continental trade integration: investment in flexible, interoperable and multilingual digital infrastructure.

### **5.0 RECOMMENDATIONS**

Considering the results of the research, recommendations are proposed to improve the effectiveness of the systems of administration in order to achieve the objectives of regional integration:

Agencies are advised to make the shift to language-agnostic software architectures in the procurement process, to overcome the constraints of legacy systems. Member States can integrate interoperability clauses and multilingualism in all future call for tender requirements, thus providing solutions to vendor lock-in and guarantee that digital tools are flexible and operational to the future multilingual standards of the ECOWAS and AfCFTA region. That's a change in procurement that will focus on long-term architectural scalability and total cost of ownership over short-term costs.

Data-field structure shall be standardised and consistent across institutions and readily used for seamless cross-border communication. The adoption of standard metadata, character encoding and data sharing protocols will help reduce the technical inconsistencies which are causing manual reentry and expensive operations. Agencies are encouraged to align their digital solutions with the ECOWAS digital framework and to make interoperability a strategy that will optimize the process of doing business and minimize manual human translation and manual reconciliation of data.

As errors still happen in the language, management should establish targeted training that will help staff use these digital tools more effectively. Technical improvements are not enough if not accompanied by organizational capacity building. Empowering workers with the tools to handle multilingual production and to operate on digital platforms across borders will minimize the "socio-technical gap", allow technology to be fully exploited, and will decrease the number of errors which currently mar administrative handshakes.



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Finally, policy makers should promote the development of a digital task force in the region, to keep track of and enforce interoperability standards in the member states. This body should be responsible for supporting institutions in their digital transformation by advising them on how to integrate their legacy systems and how to create new systems that are compatible with the region. Agencies can build the culture and mindset for an efficient, technology enabled regional market if they can encourage a collaborative approach, where digital challenges are solved together, not by individual agencies.

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