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Study on the Impact of Digital Awareness and Training on the Use of Digital Communication Tools in the Malagasy Public Treasury

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Abstract*—The objective of this study is to analyze the effect of digital awareness and training on the use of digital communication tools within the Malagasy Treasury. A questionnaire was administered to 60 agents to assess their perception of the importance of training, their knowledge of existing awareness programs, the use of digital tools, and their perception of the slowness of administrative procedures. The data were analyzed using the Chi-square (Chi^2) independence test on contingency tables constructed for four main associations: importance of training vs. slowness of procedures, importance of training vs. number of tools used, type of awareness vs. obstacles to digital integration, and slowness of procedures vs. number of tools used. Expected frequencies were calculated and compared to observed frequencies for a more refined interpretation of the results. The results show that digital training and the perception of quick procedures significantly encourage the use of digital tools, while the type of awareness does not significantly reduce obstacles related to lack of information or training. These results highlight the importance of combining training and awareness to improve the adoption of ICT in the public sector.*

***Keywords*—** *Digital Training, Awareness, Digital Communication, ICT, Chi^2, Malagasy Treasury.*

I. Introduction

Digitalization is now a strategic challenge for public administrations. Information and Communication Technologies (ICT) offer substantial opportunities to improve service quality, accelerate administrative processes, and increase institutional transparency (Bertot et al., 2012). However, the mere availability of digital tools does not guarantee their effective use by public servants. Training and awareness play a central role in the adoption of these technologies.

The Malagasy Treasury, the central institution responsible for managing public finances in Madagascar, oversees the collection of revenues, payment of expenditures, and management of public debt. Its complex hierarchical structure makes it a relevant field for studying ICT adoption in an administrative environment where efficiency, transparency, and modernization are particularly crucial.

The literature highlights that digitalization projects often fail not for technical reasons but due to low adoption by end-users (Heeks, 2006). Digital skills and motivation directly influence the effectiveness of digital tools (Davis, 1989). Thus, targeted training programs allow users to acquire practical skills, while awareness campaigns strengthen the perception of the importance of ICT and foster their integration into daily professional life.

Recent studies confirm and update these findings. For example, Abubakar & Bala (2023) show that ICT adoption in African administrations is largely conditioned by continuous training for agents and the simplification of organizational procedures (Government Information Quarterly). Similarly, Kim et al. (2024) analyze the impact of digital platforms in the public sector and demonstrate that the perception of speed and administrative efficiency increases the likelihood that agents will use digital tools. Moreover, Ouboumlik & Touhami (2024) highlight that successful digitalization reforms depend on an approach combining awareness, support, and adaptation to local realities. Finally, in the specific context of public finances in Africa, Ngoma et al. (2023) emphasize that the appropriation of technological innovations requires not only suitable digital infrastructure but also capacity-building programs for civil servants.

In this context, this study aims to test the hypothesis that digital awareness and training facilitate the use of digital communication tools within the Malagasy Treasury. The key questions are as follows:

1. Do training and awareness influence the perception of the slowness of administrative procedures?
2. Do they promote the use of available digital tools?
3. Can obstacles identified by the agents be overcome by targeted awareness campaigns?

II. Methods

Population and Sample

The study focused on a sample of 60 agents from the Malagasy Public Treasury, randomly selected to ensure representativeness of the different services and hierarchical levels. Agents performing various functions, ranging from accounting management to general administration, and

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presenting different levels of familiarity with ICT were interviewed.

Description of the Questionnaire

A questionnaire consisting of six sections was used:

1. Perception of the Importance of Digital Training: Agents were asked to rank the importance of training on four levels: very important, fairly important, somewhat important, and not important. For analysis, responses were grouped into two categories: "important" and "not important."
2. Types of Known Digital Awareness: These awareness campaigns were classified into two groups: indirect (video reports, media, clips, giant screens) and direct (website, emails, tactile totem). This distinction allowed for the evaluation of whether the awareness channel influences the adoption of ICT.
1. Participation in Awareness Activities: The agents were questioned about the necessity of active participation of the Public Treasury in awareness activities and the reasons for this participation (facilitation of ICT, better knowledge of products, reduction of the digital divide).
2. Perception of the Slowness of Administrative Procedures: The responses were grouped into two categories to simplify the analysis: "fast" and "slow."
3. Obstacles to the Integration of Digital Tools: The main obstacles identified include the lack of information or training, lack of time, lack of resources, and resistance to change.
4. Knowledge and Use of Specific Digital Tools: The agents had to indicate whether they had used tools such as Global Money Week (GMW), Statistical Bulletin of Debt (BSD), and Treasury Bond FIHARY (BTF), grouped into "none" or "≥1 tool used."

Statistical Analysis

The data were analyzed using the Chi² independence test on four main associations:

- Q1 (opinion on the importance of training) vs Q4 (perception of the slowness of procedures)
- Q1 (opinion on the importance of training) vs Q6 (number of digital tools used)
- Q2 (type of awareness) vs Q5 (obstacle: lack of information or training)
- Q4 (perception of the slowness of procedures) vs Q6 (number of digital tools used)

The simple Chi² test is suitable for determining whether there is a significant relationship between two categorical variables. The significance threshold retained was $p < 0.05$ (Agresti, 2018). For each association, the expected frequencies were calculated and compared to the observed frequencies to assess conformity to statistical hypotheses. This method allows for evaluating the strength and significance of the associations between the agents' perceptions and their behavior towards digital tools.

III. FINDINGS

Results 1-Q1 vs Q4: Opinion on the Importance of Training and the Perception of the Slowness of Procedures

The analysis was conducted on the relationship between the perception of the importance of digital training (Q1) and the appreciation of the slowness of administrative procedures (Q4). The observed frequencies were presented in the table below:

TABLE 1: Observed Frequencies on the Opinion on the Importance of Training and Perception of the Slowness of Administrative Procedures

Opinion on the importance of training	Slowness of administrative procedures		Total
	Fast	Slow	
Important	13	23	36
Not important	4	20	24
Total	17	43	60

Next, the expected frequencies were calculated under the assumption of independence from the data above, using the standard Chi² formula. The table of expected frequencies was as follows:

TABLE 2: Expected Frequencies on the Opinion on the Importance of Training and Perception of the Slowness of Administrative Procedures

Opinion on the importance of training	Slowness of administrative procedure		Total
	Fast	Slow	
Important	10,2	25,8	36
Not important	6,8	17,2	24
Total	17	43	60

Chi² Test: 2.7; ddl = 1; p = 0.10 – not significant.

Importance of Training and Slowness of Administrative Procedures

Slowness of Administrative Procedures Slow

Slowness of Administrative Procedures Fast

The value of $\chi^2 = 2.7$ was obtained by the Khi² test statistic. The p-value was estimated at 0.10. Being higher than the threshold of 0.05, the association was not considered statistically significant. However, an interesting descriptive trend was highlighted by examining the observed effectiveness: individuals who deemed training important were slightly more numerous in perceiving the procedures as fast (13 individuals), compared to those who placed less importance on training (4 individuals). This observation suggests that a favorable influence on the appreciation of the speed of the procedures may have been exerted by a positive perception of training, even if the relationship was not considered statistically significant in this sample.

Furthermore, a slight trend was illustrated by the diagram, according to which respondents who considered training important perceived the procedures as somewhat faster than those who considered it unimportant. Although graphically visible, this difference was not statistically confirmed ($\chi^2 = 2.7$; $p = 0.10$)

Thus, the interest in mobilizing both formal statistical results and descriptive trends has been highlighted by this analysis to inform the directions of training and awareness programs within the Malagasy Public Treasury.

2-Q1 vs Q6: Opinion on the Importance of Training and Use of Digital Tools

The analysis was conducted on the relationship between the perception of the importance of digital training (Q1) and the number of digital tools known or used (Q6) by the

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participants. The observed frequencies were presented in the table below.

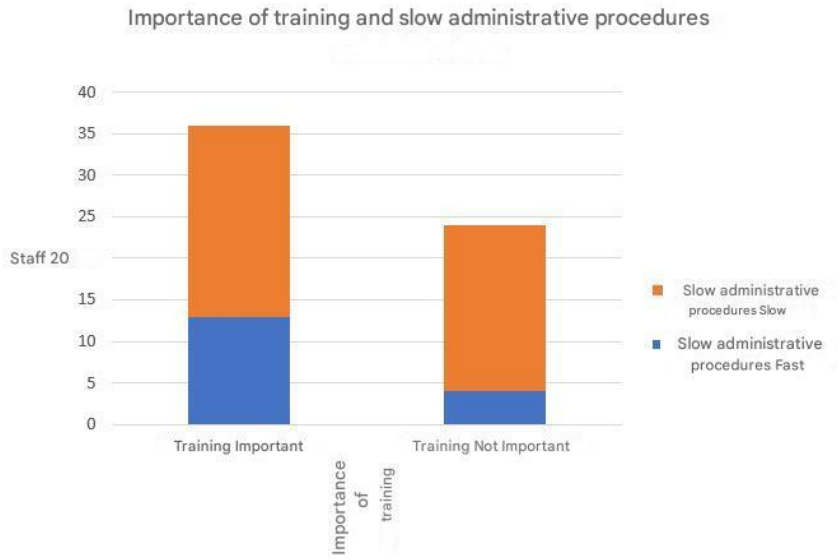

Figure 1: Relationship Between the Importance of Training and the Perception of the Slowness of Procedures (Q1 vs Q4)

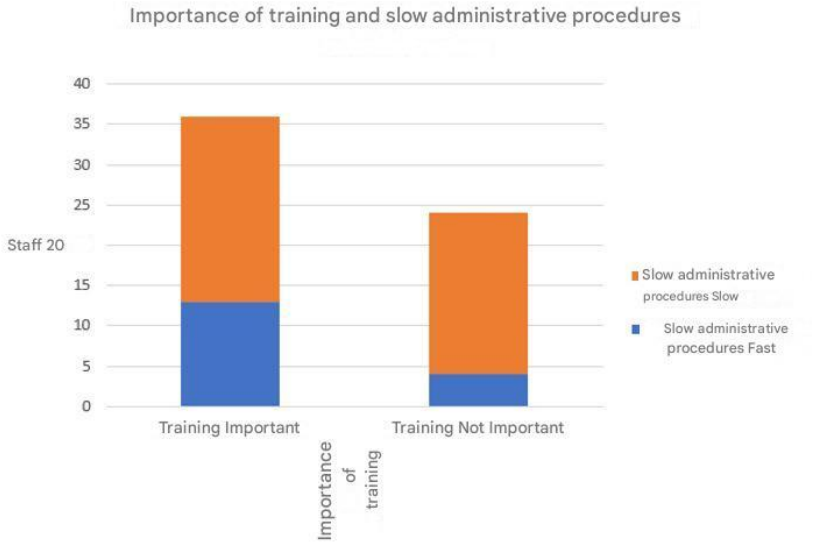

Figure 2. Relationship between the importance of training and the use of digital tools (Q1 vs Q6)

TABLE 3: Observed Frequencies on the Opinion on the Importance of Training and Use of Digital Tools

Opinion on the importance of training	Number of tools known or used		Total
	None	≥ 1	
Important	5	29	34
Not important	13	13	26
Total	18	42	60

TABLE 4: Expected Frequencies on the Opinion on the Importance of Training and Use of Digital Tools

Opinion on the importance of training	Number of tools known or used		Total
	None	≥ 1	
Important	10,2	23,8	34
Not important	7,8	18,2	26
Total	18	42	60

From these data, the expected frequencies were calculated under the independence hypothesis according to the Chi² formula. The table of expected frequencies has been presented below:

Chi² Test: 8.74; ddl = 1; p = 0.003 – significant.
Importance of perceived training and use of digital tools
Number of tools known or used ≥ 1
Number of tools known or used None

A Khi² value of 8.74 was obtained, accompanied by a p-value of 0.003, lower than the threshold of 0.05. Thus, the

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association between the perception of the importance of training and the use of digital tools was considered statistically significant.

It was shown by examining the data that individuals who deemed training important were significantly more likely to use at least one digital tool (29 individuals), compared to those for whom training was considered less important (13 individuals).

Through this association, it was highlighted that a positive perception of training is directly influenced in its effect on the adoption and use of digital tools, emphasizing that the key role of awareness and training has been recognized in the digitalization process.

Furthermore, this difference between groups was clearly illustrated by the graph: the use of at least one digital tool was observed much more frequently among individuals who considered training important than among those who did not deem it essential.

Trend, statistically validated ($\chi^2 = 8.74$; $p = 0.003$), has been confirmed as highlighting the central importance of training in the appropriation of technologies. Finally, it has been suggested by these results that targeted training programs may significantly increase the use of digital tools by participants, thus constituting a strategic lever that can be mobilized to enhance the effectiveness and modernization of administrative procedures within the Malagasy Public Treasury.

3-Q2 vs Q5: Type of Awareness and Obstacles to Digital Integration

The analysis was conducted on the relationship between the type of digital awareness (Q2) and the obstacles identified to the integration of digital tools, notably the lack of information or training (Q5). The observed frequencies were grouped and are presented in the table below.

TABLE 5: Observed Frequencies on the Type of Awareness and Obstacles to Digital Integration

Type of awareness	Obstacle: Lack of information or training		Total
	Yes	No	
Indirect (vidéo report, large screen, média, clip)	12,6	15,4	28
Direct (E-mail, website, touch screen totem)	14,4	17,6	32
Total	27	33	60

The expected frequencies were calculated under the assumption of independence according to the classic Chi-squared formula. The table of expected frequencies was as follows:

TABLE 6: Expected numbers on the type of awareness and obstacles to digital integration

Type of awareness	Obstacle: Lack of information or training		Total
	Yes	No	
Indirect (vidéo report, large screen, média, clip)	12,6	15,4	28
Direct (E-mail, website, touch screen totem)	14,4	17,6	32
Total	27	33	60

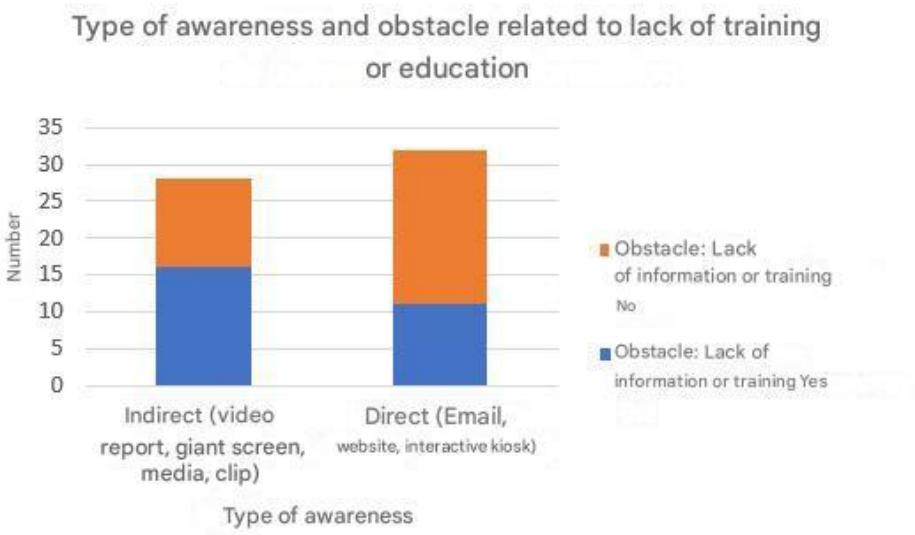

Fig. 3

TABLE 7: Number of respondents who cited slow procedures and use of digital tools

Slowness of administrative procedures	Number of tools known or used		Total
	None	≥ 1	
Fast	0	19	19
Slow	18	23	41
Total	18	42	60

TABLE 8: Expected staffing levels based on the slowness of procedures and use of digital tools

Slowness of administrative procedures	Number of tools known or used		Total
	None	≥ 1	
Fast	5,7	13,3	19
Slow	12,3	28,7	41
Total	18	42	60

Test Khi²: 11,92; ddl = 1; p = 0,0005 – significant

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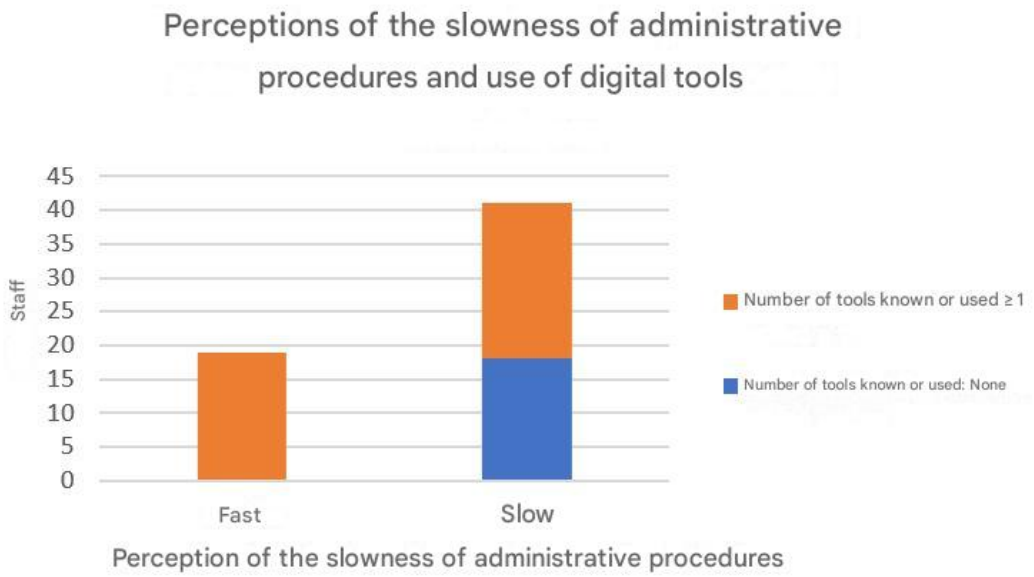

Figure 4: Perception of slow procedures and use of digital tools (Q4 vs Q6)

TABLE 9: summary Table of Associations

Association	Khi²	Degree of freedom	p-value	Interpretation
Q1 vs Q4	2,7	1	0,1	No significant
Q1 vs Q6	8,74	1	0,003	Significant
Q2 vs Q5	3,13	1	0,08	No significant
Q4 vs Q6	11,92	1	0,0005	Significant

Association Khi² Degrees of Freedom p-value InterpretationQ1 vs Q4 2.7 1 0.1 Not significantQ1 vs Q6 8.74 1 0.003 SignificantQ2 vs Q5 3.13 1 0.08 Not significantQ4 vs Q6 11.92 1 0.0005 Significant

IV. Discussion

4.1 Role of Training in the Perception of Administrative Efficiency

Moreover, a marked distinction was highlighted by the graph: the use of digital tools was observed much more frequently among people considering the procedures as fast than among those perceiving them as slow. This relationship was revealed to be highly significant ($\chi^2 = 11.92$; $p = 0.0005$), suggesting that the integration of digital technology was favored by the perception of effective administration. Thus, it was indicated by these results that the adoption and use of digital tools were encouraged by the perception of speed and efficiency of administrative procedures, emphasizing that the importance of the fluidity of processes was highlighted in the success of digitalization initiatives. Finally, it was brought to light by this observation that, to strengthen the use of digital technologies, it is not enough for training and awareness to be reinforced: the reduction of administrative delays was also recognized as essential, as the perception of efficiency was identified as directly influencing user behavior. According to the literature, training contributes to improving competence.

4.2 Responsiveness and Performance of Staff

The responsiveness and performance of staff can influence the perception of the speed of administrative processes (UNDP, 2019; OECD, 2021; Andrews et al., 2011; Heeks, 2006). However, the analysis of the intersection between the perception of the importance of training (Q1) and the perception of administrative slowness (Q4) shows that the appreciation of training does not significantly change the perception of the effectiveness of procedures. Agents may recognize the usefulness of training without considering that administrative processes are faster. This suggests that organizational constraints, complexity of administrative circuits, workload, and lack of resources continue to strongly influence the perception of the slowness of services, regardless of the training received (Pollitt & Bouckaert, 2017; Dunleavy et al., 2006). Thus, an improvement in internal efficiency remains essential to enhance the impact of training on the perception of procedures.

4.3 Influence of Training on the Adoption of Digital Tools

The integration of new technologies in public administrations involves not only their availability but also the staff's ability to use them. The literature emphasizes that training is a key determinant of the effective adoption of digital tools (UNDP, 2019; OECD, 2021; Bwalya, 2018). Davis's TAM model (1989) and the UTAUT model (Venkatesh et al., 2003) confirm that training improves the perception of usefulness and mastery of tools, which increases their use. The results of the intersection between the

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perception of the importance of training (Q1) and the number of digital tools used (Q6) confirm this trend: agents who place great importance on training are more numerous in using digital tools. This statistically significant relationship shows that training constitutes a direct lever for technological use. In other words, agents who are better informed or better trained adopt the platforms and digital tools made available to them more easily. This finding supports the need to strengthen continuous training programs to promote a more effective digitization of the Public Treasury (World Bank, 2020; Silva & Rodrigues, 2020).

4.4 Effect of the Type of Awareness on Barriers to Digital Integration Related to Lack of Information or Training

Awareness of digital tools, whether direct or indirect, constitutes an important complement to training. The literature indicates that good awareness can.

4.5 Improving the Understanding of Tools, Strengthening Their Acceptability, and Reducing Certain Psychological or Organizational Barriers Related to Their Adoption (OECD, 2021; Rogers, 2003).

The analysis of the intersection between the type of awareness (Q2) and the lack of information or training identified as an obstacle (Q5) shows, however, that awareness alone is not sufficient to significantly reduce perceived obstacles. Agents who have benefited from awareness, whether direct or indirect, continue to identify the lack of information or training as the main barrier to the integration of digital tools. This indicates that awareness must be accompanied by more structured devices, practical training, individualized support, and interactive sessions to produce a lasting effect (Kotter, 1996; Benabdelkader, 2019). In the absence of in-depth learning, awareness plays an informative but non-transformational role.

4.6 Impact of the Perception of Administrative Efficiency on the Use of Digital Tools

Administrative efficiency is a determining factor in the adoption of digital technologies. According to the OECD (2016), organizations perceived as efficient and responsive foster a conducive context for innovation and the appropriation of technological tools. This perspective is also supported by technological adoption theories (Davis, 1989; Venkatesh et al., 2003), which emphasize the importance of the organizational context in technological behaviors.

The analysis of the intersection between the perception of the speed or slowness of administrative procedures (Q4) and the use of digital tools (Q6) shows a statistically significant relationship: agents who perceive procedures as fast use digital tools more than those who consider them slow. The associated diagram clearly illustrates this trend, demonstrating that all agents perceiving procedures as fast resort to at least one digital tool. This result suggests that the adoption of digital tools is facilitated in an environment deemed efficient. Conversely, the perception of administrative slowness may hinder the use of ICT, either through discouragement or through a feeling of inefficiency or inadequacy of the proposed tools (Filgueiras & Fernandes, 2020; Gupta & Jana, 2003). This finding underscores the necessity to simultaneously strengthen organizational efficiency, simplify procedures, and promote technological adoption in order to create a virtuous circle of continuous improvement (World Bank, 2016; Mimba et al., 2017)

V. Conclusions

The study conducted with the Malagasy Public Treasury highlighted several major lessons regarding the impact of digital training and awareness on the use of digital communication tools. First of all, it is clear that digital training represents a central lever for the adoption of ICT. The agents who benefited from tailored training demonstrate a better mastery of the tools and greater confidence in their use. Thus, training should not be perceived as a simple transmission of technical knowledge, but as a support process that promotes a real appropriation of technologies. Moreover, the analysis reveals that the perception of a faster and more efficient administration significantly contributes to the acceptance of digital tools. Indeed, when procedures are deemed smooth, agents are more inclined to integrate digital technology into their daily practices. This underscores the close link between organizational quality and the effectiveness of technological innovations. A successful digital transformation cannot therefore be limited to the implementation of tools but must also rely on a revision of administrative practices to ensure their coherence. However, it is important to emphasize that awareness alone, although useful for informing and generating interest, is not a sufficient solution to overcome the obstacles related to the use of digital technology. Without structured support and in-depth training, awareness actions risk remaining superficial and having a limited impact on changing agents' behavior. In light of these results, several recommendations are necessary. On the one hand, it is essential to strengthen targeted training programs, considering the specific needs of agents and the skills required for their missions. On the other hand, the simplification and acceleration of administrative procedures must remain a priority in order to maintain a favorable environment for the use of digital tools. Finally, an integrated approach combining direct awareness and practical training appears to be the most effective strategy for sustainably overcoming obstacles and promoting the appropriation of ICT. In perspective, this study also opens avenues for reflection for public decision-makers. It would be interesting to broaden the research to other institutions in order to compare the dynamics of digital adoption in different administrative contexts. Similarly, a long-term evaluation of the impact of training and awareness-raising would allow for measuring the sustainability of the gains and better adjusting public policies regarding digitalization.

In summary, the experience of the Malagasy Public Treasury highlights an undeniable reality: digital transformation cannot be reduced to a technological dimension.t requires human, organizational, and institutional support, where training, simplification of procedures, and the combination of awareness strategies play a central role in

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successfully transitioning to a modern, efficient, and inclusive administration.

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