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Final Evaluation Report

Evaluation of TradeMark Africa's ICT-For-Trade (ICT4T) Portfolio in Strategy 2 (2017-2023)

On behalf of TradeMark Africa

27th March 2024

EXECUTIVE SUMMARY

Introduction

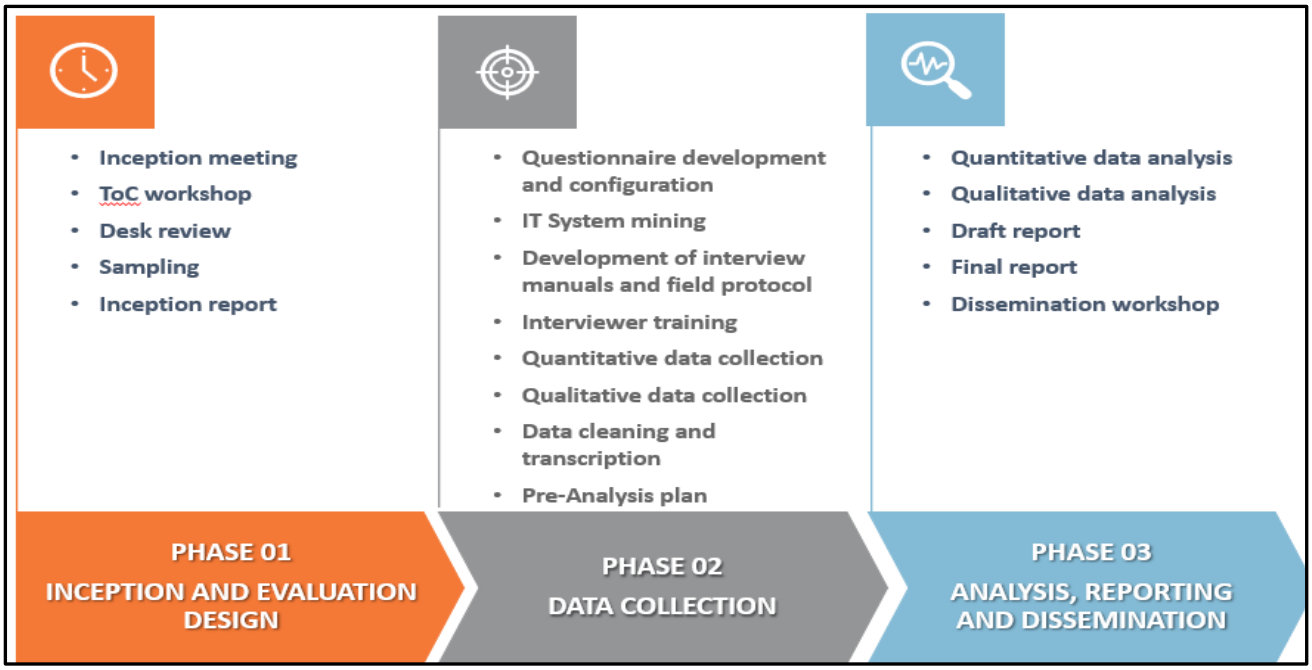
TradeMark Africa (TMA) is an Aid-for-Trade organisation that was established in 2010, with the aim of growing prosperity through increased trade. TMA works closely with regional intergovernmental organisations, national Governments, the private sector and civil society organisations in Eastern Africa, the Horn of Africa, Southern Africa, and West Africa. This evaluation focuses on the Information and Communication Technology for Trade (ICT4T) programme. TMA's projects in the ICT4T portfolio aim to simplify, harmonise, increase transparency, and improve the efficiency of trade systems and procedures by automating manual processes or enhancing processes and procedures at key trade nodes such as ports and borders. Projects are implemented in partnership with both the private sector and government affiliates including revenue authorities, standards bodies, regulatory agencies and other government agencies in service to the private sector. This evaluation covers TMA's ICT4T Portfolio over the Strategy 2 period between July 2017 and June 2023.

Evaluation Objectives and Scope

The main objective of the evaluation is to assess the design, scope and achievements of the ICT4T portfolio against the Theory of Change (ToC) and TMA's Strategy 2 objectives. Specifically, the evaluation assesses the extent to which the ICT4T Portfolio has contributed to the high-level outcome areas of: (i) Reduced Barriers to Trade and; (ii) Improved Business Competitiveness. The scope of the evaluation is at the portfolio level using an evidence base from 21 evaluable projects within the ICT4T Portfolio as agreed with TMA based on an evaluability assessment and availability of data.

Evaluation Approach, Methods, and Limitations

The evaluation uses a theory-based evaluation approach where the ToC plays a central role to assess the progress and achievement of ICT4T Portfolio based on the six OECD-DAC criteria. The evaluation methods included: desk review and research on previous evaluation reports, and other relevant documents; reviewing and validation of the ToC; finalising the evaluation questions (EQ) matrix; conducting primary data collection (both quantitative through phone surveys with beneficiaries and qualitative data collection through key informant interviews (KIIs) with stakeholders and in-depth interviews (IDIs) with businesses); and secondary data extraction and review from ICT4T systems. For Value-for-Money (VfM) assessment, we build on the FCDO's "Four Es" approach (economy, efficiency, effectiveness, and equity) as well as a Break-Even Analysis (BEA) which draws on data and assumptions for the project-level analysis from available project evaluations, systems data generated by the ICT4T systems and the quantitative survey with system beneficiaries.



There are some limitations to be borne in mind when interpreting the results. Selection bias for quantitative data due to purposively sampling projects caused by the lack of available beneficiary data across all projects may affect the ability to generalise results. This was the case for both the evaluation and VfM study. Social desirability bias and lack of trust to participate in the primary data collection may affect the accuracy of some business responses. Due to a considerable time gap between service provision and this evaluation, recall bias might also affect the accuracy of responses given by respondents who may not accurately remember what happened several years ago.

The Evaluation Sample

The total number of respondents for the phone survey was 1,852 (54% from Kenya and 46% from Tanzania) and included 20% female-led businesses, this covered 8 out of 21 (38%) of evaluable projects. The total qualitative sample was 41 respondents (26 KIIs and 16 IDIs), covering 12 ICT4T systems (57%), most of the qualitative sample came from Kenya (13 KIIs, 16 IDIs) due to respondent availability. We also conducted some KIIs in Tanzania (6 KIIs), Rwanda (3 KIIs), and Ethiopia (1 KII). The total geographical distribution of the evaluable projects is: Kenya 7 (33%), Tanzania 5 (24%), Rwanda 4 (19%), Ethiopia 1 (5%) and Regional 4 (19%).

Key Findings

The evaluation focuses on key findings for effectiveness, impact, efficiency, sustainability, relevance, coherence, and lessons learned. The findings of this report relate to the period of TMA's Strategy 2 (2017-2023). During this period, countries within the East African Community observed year-on-year increases in Gross Doestic Product (GDP) (US$), with the total GDP for the region rising from $224 billion (2017) to 326

billion (2022).[1] EAC countries also observed average increases in import volumes (+9.1%) and export volumes (+2.7%) from 2017 to 2021.[2]

Effectiveness

Effectiveness is defined as understanding the extent to which the portfolio's objectives were achieved, considering their relative importance. The evaluation focuses on the extent to which TMA-funded ICT4T reduced the time and cost to trade, as well as exploring themes of governance, transparency, accountability and assessing private sector commitment.

- ✓ Evidence gathered from desk review, our business survey and stakeholder consultations shows that **the ICT4T portfolio is a significant driver in reducing trade barriers across East Africa**. ICT4T systems play a positive, attributable role in saving time when conducting trade-related activities and reducing associated business costs. In addition, ICT4T systems are generally effective because they are being used regularly by the trading community, with users generally reporting high levels of satisfaction.
    - For time reductions, we observe **an average reduction of 66 hours to complete a trade-related activity (97 hours to 31 hours)** since the introduction of an ICT4T system, which equates to a reduction of **68%,** derived from our business survey**.** The margin of reduction is greater among micro and small businesses, compared to medium and large businesses. We estimate a cumulative time reduction for the survey sample in the range of **-506,041 hours (-21,085 days) to -759,061 hours (-31,627 days)** taken out of the East African trade system per month (four weeks), which equates to between **-6,072,486 hours (-253,020 days) to -9,108,729 hours (-379, 530 days)** per year**,** directly attributable to the ICT4T portfolio.
    - Internet, facilitation, staff, printing and transport costs were the main business costs identified by respondents, and we observed an average **reduction in these costs of USD $14 per system application** (e.g. permit application) per business ($27 to $14), which equates to an average cost reduction of 49%. The margin of cost reduction is greatest among large firms and weakest among micro firms. We estimate a cumulative business cost reduction in the range of **-$91,785 to -$137,678 per month** and between **-$1,101,421 to -$1,652,132 per year, attributable to ICT4T** for businesses in our survey sample.
- ✓ **ICT4T systems were found to be effective in improving the governance of the trade system through increasing transparency and accountability of the trade environment, enabling businesses to trust trade processes and trade bodies more.**

Impact

For this evaluation, impact is defined as changes in business performance brought about by the ICT4T portfolio with a specific focus on trade volumes, transaction values, annual financial turnover and employee growth.

- ✓ We observe that businesses, on average, have **increased their number of monthly trade transactions by 29% and average transaction value has increased by 15% ($133),** with increases most prominent among **larger businesses.**

[1] Figures generated by the **World Bank Development Indicators** (WDI) and include all East African Community members except for South Sudan where no WDI data is available. No data is available for 2023.
[2] Figures generated by the **WDI** and include all East African Community members except for South Sudan where no WDI data is available. No data is available for 2022 or 2023.

- ✓ We estimate businesses in our sample attribute an average increased trade volumes per business per month after automation of $603 to ICT4T systems, equating to **an annual increase of $7,235 per business** on average. If the systems are used optimally by a sample of 1,852 businesses, we observe a **total annual increase in the value of goods traded of $13,398,565 that is attributable to ICT4T systems.**
- ✓ **Evidence from the business survey shows tentative signs of improved business competitiveness as businesses reported average increases in turnover of $5,647 (24%) per annum since automation.** However, despite average increases in annual turnover, the evaluation found no evidence that this had yet translated into increases in employment in the businesses surveyed.
- ✓ Reduction in face-to-face contact brought about by ICT4T systems has had a positive effect on trade system efficiency and nimbleness with agencies now reporting less complaints or issues from the business communities which they serve.

Efficiency

We explored efficiency by assessing how financial resources have been planned and utilised to achieve the intended outputs. We also assessed how economically the financial and human resources were allocated and identified challenges in delivering economically. In doing so, we combined the evaluation evidence with findings from the VfM assessment.

- ✓ **TMA's ICT4T portfolio meets the definition of 'good' economy** – based on the programme's 4Es framework. Financial resources were found to be well-allocated across projects in the portfolio, demonstrating effective budget management. Human resources are also effectively distributed within the portfolio, minimising duplication of efforts and there is minimal evidence of resource wastage within the portfolio.
- ✓ **Overall, the portfolio adequately delivered to expectations and within the designated timeframes and operating environments as reflected in repeated Strategy 2 Annual Reviews.** However, given the weaknesses and limitations of TMA's own monitoring data, the evaluation team could not independently assess the extent to which project outputs were achieved by the projects included in the evaluation.
- ✓ One of the main ways to consider the value of TMA's ICT4T investments is to assess the ease of use, reduction in trade barriers, overall satisfaction and reliability of ICT4T systems reported by systems users. **Business users confirm that ICT4T has made trade processes easier, perceiving high ease of use and high levels of satisfaction with systems.** Further, availability of system-based information on application requests and support documentation was found to have reduced paperwork.
- ✓ VfM Analysis shows **positive NPV for most projects, leading us to conclude that this sample has already delivered a positive return on investment.** This is shown strongly in the **Kenya National Chamber of Commerce and Industry (KNCCI), Tanzania Ministry of Livestock and Fisheries (MLF) and Rwanda Utilities Regulatory Authority (RURA) projects where the estimated Benefits-to-Costs Ratio (BCR) is above 14.** However, due to the data limitations mentioned above it has not been possible to calculate an NPV at the ICT4T portfolio level. The tentative conclusion based on this analysis is that if these benefits are replicated across other systems, then based on the observed level of return per system, the overall ICT4T portfolio is likely to be net positive. But that cannot be fully confirmed without further analysis.

Sustainability

Sustainability in this evaluation is defined as *"the continuation of benefits from the portfolio after TMA support ends…and the extent to which the supported interventions were both environmentally and financially sustainable."*

- ✓ **Evidence from previous evaluations and our primary evidence shows that ICT4T systems largely remain viable post-TMA support.** Host agencies appear willing and able to *maintain* the ICT4T systems they host (i.e. upkeep of the system developed during the project), but they are often unable to develop and improve their systems (i.e. software upgrades, improved user experience) without TMA's funding and expertise. Technological interventions such as ICT4T cannot remain static and need to keep up with the pace of technological change and the evolving needs of the private sector, meaning systems can quickly become outdated. This needs to be an area of focus for ICT4T in Strategy 3, to enable agencies to become more standalone in the upgrading of ICT4T systems.
- ✓ **The evaluation has failed to find strong evidence from previous evaluations or our primary evidence that ICT4T systems have played a prominent role in promoting green growth.** The majority of evaluation reports and stakeholder consultations cite the reduction of paper and reduction of fuel emissions as a result of automation, but beyond these insights, no tangible secondary evidence of green growth promotion was available. Multiple references to reductions in paper usage and reduction of fuel emissions imply a positive environmental impact, but currently there is no effective way of quantifying this. We have illustrated a quick approach to understanding paper reductions in the Sustainability section of the report. TMA may also consider approaches used in other project evaluations such as the Greenhouse Gas Inventory (GHG) used in the Mombasa Roads Baseline Report, as an approach to understanding reductions in fuel emissions.[3]

Relevance

Relevance is defined as *"the extent to which the objectives of the portfolio as laid out in the TMA Strategy 2 and ToC were consistent with recipients' requirements, country needs, global priorities and partners' policies".*

- ✓ **Evaluation of the ICT4Trade systems implemented by TMA underscores their overall relevance and alignment with the needs that were identified by the trade community and host agencies at design stage, such as reduced inefficiencies at borders and addressing complexities in the regulatory environment.**
- ✓ **Evidence of the inclusivity of the ICT4T portfolio is positive, but it is notable that much of this inclusivity has been achieved by default rather than by design.** The evidence indicates that while ICT4T systems have managed to reach a diverse user base, including women, marginalised groups, SMEs and a variety of stakeholders, this outcome often occurred organically rather than as a result of targeted efforts.

[3] Baseline and Endline of Project Surveys for Mombasa West Roads Improvement Programme and Mombasa County Port Access Roads, Alternatives (2019).

Coherence

Coherence is defined in this evaluation as *"the extent to which the various components, strategies, and interventions within the ICT4T portfolio work together in a coordinated and harmonious manner to achieve the intended objectives and outcomes."*

- ✓ A review of previous evaluations of specific ICT4T systems identified **strong coherence and alignment between ICT4T systems and the national / regional policies and strategies.**
- ✓ **The evaluation has found evidence that the ICT4T systems were designed in collaboration with government partners** and, as a result, there is generally strong ownership of the ICT4T systems by host government institutions.
- ✓ **TMA's involvement has also been instrumental in building linkages between difference agencies as a 'neutral broker'** particularly where integrations were required, and in many instances, helping to build partnerships to facilitate the integration of systems.
- ✓ **Collaboration with government agencies has also ensured that ICT4T systems have been customised to align with the regulatory and procedural frameworks of national governments**. This ensures that ICT4T systems are compatible with existing government systems and can seamlessly integrate.
- ✓ **The evaluation has not found strong evidence that a sufficiently robust regulatory framework exists to facilitate inter-agency collaboration, particularly at the national level**. There are currently no laws or regulations that explicitly mandate government agencies to collaborate using ICT tools and platforms for specific purposes, such as trade facilitation or public service delivery across the EAC countries. There are some exceptions, but generally this is an area where more work is required.

Conclusions and Recommendations

While the evaluation has succeeded in finding evidence of TMA's achievements, several areas where improvements can be made are offered.

1. **TMA's ICT4T and Results Teams must take urgent and immediate steps to improve project and portfolio monitoring and the use of monitoring data.** Greater organisational resources and leadership focus on improving TMA's monitoring system is therefore the number one recommendation of this evaluation. The evaluation suggests that this could be achieved through:
   - ✓ Stronger emphasis from TMA leadership on the importance of robust project monitoring;
   - ✓ Building the capacity of ICT4T project management team to be more effective at project monitoring; and
   - ✓ Adequate allocation of monitoring and evaluation funds at the outset of ICT4T projects and greater protection of such funds for their intended purpose.
2. **TMA's ICT4T team must ensure that it puts data sharing agreements in place with all host agencies that it provides with financial and technical assistance.** This will ensure that repeating evaluations of this nature in future are easier and TMA itself has better access to data that helps it measure its impact in the ICT4T space.
3. **TMA's ICT4T team should work with host agencies to capture and report on gender disaggregated data.** The evaluation concludes that ICT4T systems are broadly inclusive, providing an equal platform for women, men, marginalised groups and a wide variety of stakeholders to access services. However,

it has also found that this has been by default rather than design. Another way of stating this is that ICT4T systems are not unconsciously 'exclusive' but are not consciously 'inclusive' either.

4. **The TMA ICT4T team should be more intentional in conducting gender and social inclusion analysis when designing and formulating projects in Strategy 3.** Reference to the various iterations of the ICT4T portfolio ToC show no consideration of gender and inclusivity outcomes in the levels of change or logic pathways. At project design level, undertaking gender and social inclusion analysis to better understand how projects should be framed to achieve stronger outcomes for the traditionally underserved will ensure that opportunities for inclusion are maximised. The only clear example where this has occurred is with the iSOKO system, which clearly aims to onboard small-size female traders and businesses. One practical way of achieving this is for TMA to ensure that no Project Appraisal Report (PAR) is approved without the incorporation of a gender and social inclusion analysis at project design stage.

5. **The TMA ICT4T team should be more intentional in considering pathways to poverty reduction when designing and formulating projects in Strategy 3.** The prominence of poverty reduction outcome reporting has increased among TMA's donor base. Strategy 2 ICT4T projects were not explicitly designed with poverty reduction outcomes in mind, so finding direct evidence of that through this evaluation has been challenging. Being more deliberate about the pathways to poverty reduction in Strategy 3 projects will help to capture and report on these outcomes more effectively in the next period. Being more explicit on how poverty reduction outcomes will be achieved at portfolio and project design stage is the first step to implementing this recommendation. This may require the ICT4T portfolio delivering different types of projects than it did in Strategy 2, with a focus more on those which achieve social impact (such as iSOKO) as well as time and/or cost reductions.

6. **The TMA ICT4T team should be more intentional in considering the potential climate change and environmental impacts (positive and negative) when designing and formulating projects in Strategy 3.** As with inclusivity and poverty reduction, beginning the design process by defining the climate related outcomes which are possible, and then regularly monitoring progress towards them, will ensure that TMA can tell a better story on its contribution to the defining issue of our time. As with Recommendations 4 and 5 above, this will require TMA to consider climate change mitigation and/or adaptation at the design stage of projects and may also lead to a change in the mix of projects which ICT4T has in its portfolio in Strategy 3. **To improve the prospects for sustainability upon exit, TMA should develop ICT4T system sustainability plans tailored to the differing capacities of the organisations it works with.** TMA works with a wide range of partners with differing levels of financial and human capacity to sustain the ICT4T systems independently once TMA exits. The evaluation calls for a tailored approach to capacity building with ICT4T partners, with more effort invested in those with lower resources. TMA is already taking steps in this area and the evaluation calls for the organisation to continue and deepen this individualised approach to sustainability.

CONTENTS

FIGURES AND TABLES

ABBREVIATIONS AND ACRONYMS

AEO	Authorised Economic Operators
AFA	Kenya Agriculture and Food Authority
ATMIS	Agricultural Trade Management Information System
BEA	Break Even Analysis
CCTO	Central Corridor Transport Observatory
CMIS	Chamber Management Information System
COO	Certificate of Origin
DRC	Democratic Republic of the Congo
EAC	East Africa Community
EATTA	East African Tea Trade Association
ECCSA	Ethiopian Chamber of Commerce and Sectoral Associations
ECDS	Ethiopian Chamber Digital Service
e-COO	Electronic Certificate of Origin
EQ	Evaulation Questions
FCDO	Foreign, Commonwealth and Development Office
FDA	Food and Drug Authority
FGDs	Focus Group Discussions
FPEAK	Fresh Producer Exporters Association of Kenya
GHG	Greenhouse Gas
iCMS	Integrated Customs Management System
ICT4T	ICT For Trade
IDIs	In Depth Interviews
II	Intermediate Impact
IMIS	Integrated Management Information System
IMS	Information Management System
IO	Intermediate Outcome
ISP	Information Sharing Platform
ITMS	Integrated Trade Management Systems
ITTS	Integrated Tea Trading System
KEPHIS	Kenya Plant Health Inspectorate Service
KEPSA	Kenya Private Sector Alliance
KIIs	Key Informant Interviews
KNCCI	Kenya National Chamber of Commerce and Industry
KPA	Kenya Ports Authority
KRA	Kenya Revenue Authority
KRC	Kenya Railways Corporation
KSH	Kenyan Shilling
MEL	Monitoring, Evaluation and Learning
MIMIS	Mifugo Integrated Management Information System

MLF	Tanzania Ministry of Livestock and Fisheries
MOA	Tanzania Ministry of Agriculture
NAEB	Rwanda National Agricultural Export Board
NCTO	Northern Corridor Transport Observatory
NCTTA	Northern Corridor Transit and Transport Agreement
NeSW	National Electronic Single Window
NPV	Net Present Value
NTB	Non-tariff Trade Barrier
OBR	Office Burundais des Recettes
OECD-DAC	Organisation for Economic Co-operation and Development's – Development Assistance Committee
PAR	Project Appraisal Report
RECDTS	Regional Electronic Cargo and Driver Tracking System
RECTS	Regional Electronic Cargo Tracking System
ReSW	Rwanda Electronic Single Window
RFLS	Rail Freight Logistics Services
RRA	Rwanda Revenue Authority
RSB	Rwanda Standards Board
RURA	Rwanda Utilities Regulation Authority
SC-PVP	Seed Certification & Plant Variety Protection Services
SCT	Single Customs Territory
SPS	Sanitary and Phytosanitary
SQI	Standards Quality Infrastructure
STEF	Safe Trade Emergency Facility
SWIFT	Single Window Information for Trade
TCCIA	Tanzania Chamber of Commerce, Industry and Agriculture
TMA	TradeMark Africa
TMDA	Tanzania Medicines and Medical Devices Authority
ToC	Theory of Change
TOR	Terms of Reference
TRA	Tanzania Revenue Authority
TSH	Tanzanian Shilling
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
URA	Uganda Revenue Authority
USD	United States Dollar
VAT	Value Added Tax
VfM	Value-for-Money
WDI	World Bank Development Indicator
ZNCC	Zanzibar National Chamber of Commerce

1. INTRODUCTION

In July 2023, TradeMark Africa (TMA) contracted EDI Global to undertake an independent evaluation of the organisation's Information and Communication Technology for Trade (ICT4T) Portfolio. This draft report presents the key findings from this independent evaluation. The report is structured to answer the main evaluation questions proposed by TMA in the evaluation's terms of reference (TOR) and finalised during the inception phase. The main report focuses on presenting the evidence gathered using the framework of the evaluation questions with additional detail provided as annexes. The report is structured as follows:

- ✓ Section 2 provides a broad overview of the evaluation approach.
- ✓ Sections 3 to 8 present the key findings for each evaluation question in the six OECD-DAC categories against which the ICT4T portfolio was evaluated, namely effectiveness, impact, efficiency, relevance, coherence, and sustainability.
- ✓ Section 9 offers conclusions and recommendations from the evaluation.

1.1. CONTEXT

TMA is an aid-for-trade organisation that was established with the aim of growing prosperity across Africa through increased trade. TMA's Theory of Change (ToC) is anchored on two strategic outcome areas: (i) Outcome 1 – Reduced Barriers to Trade; and (ii) Outcome 2 – Improved Business Competitiveness. As such, all TMA's interventions sit under one or both broad outcome areas. TMA implemented its Strategy 2 programme from July 2017 to June 2023 with the intermediate impact goal of increasing trade in the countries and regions that it operates.

TMA's approved MEL Strategy[4] outlines the corporate ToC, results chain and nested ToCs for each corporate intermediate outcome (IO).[5] The development of the IO-level ToCs was an intentional step by TMA to understand and account for change that specific portfolios and projects can directly contribute to. The MEL Strategy posited that higher level impact such as "Sustainable, Inclusive Prosperity" and outcomes such as "Reduced Barriers to Trade" are a multi-generational endeavour in Africa, to which TMA is one of many contributors.

TMA has therefore shifted focus to the parts of the impact pathways over which it believes it has more influence, enabling it to place its activities and outputs in the context of the higher-level changes it seeks to achieve. One of those pathways is "Reduced Barriers to Trade", in which there are four Ios including the effective trade systems and procedures portfolio, nested under IO 1.3. This IO covers all TMA's ICT4T initiatives, and includes the private sector, and public sector actors such as government ministries, departments and agencies, and intergovernmental institutions such as the Northern and Central Corridor authorities and the East African Community (EAC) Secretariat. It is important to note that while these projects aim to improve public sector services, they are designed to improve systems

[4] TMA's MEL Strategy was approved by the TMA Council in July 2020.

[5] TMA had six intermediate outcome (IO) areas in Strategy 2: IO1.1 – Sustainable and Efficient Transport Infrastructure; IO1.2 – Improved Trading Standards and SPS Measures; IO1.3 – Effective Trade Systems and Procedures; IO1.4 – Improved Trade Regulatory Environment; IO2.1 – Increased Trade Capacity of East African Businesses; and IO2.2 – More Inclusive Trade.

for the private sector, primarily those participating in import and export trade either within the region or globally.

TMA's projects in the ICT4T portfolio aim to simplify, harmonise, increase transparency, and improve the efficiency of trade systems and procedures by automating manual processes or enhancing processes and procedures at key trade nodes such as ports and borders. They are implemented by both the private sector and government affiliates including revenue authorities, standards bodies, regulatory agencies, and other government agencies in service to the private sector. In Strategy 2, ICT4T is the second largest area of investment for TMA after transport infrastructure. ICT4T interventions were delivered in Uganda, Burundi, Kenya, Tanzania, Rwanda, DRC and in new frontier programmes in the Horn of Africa and parts of Southern Africa as well as regional interventions undertaken to increase the EAC trade digital footprint.

TMA recognises that technology is a critical tool for trade facilitation, and sees it as not an end in itself, but as an enabler of improved public services to the private sector and a cross cutting approach to addressing inefficiencies in trade. TMA has therefore commissioned this portfolio evaluation to establish the extent to which the ICT4T portfolio has contributed to changes at the outcome and impact levels, beyond the various technology solutions whose implementation it has supported. The findings from this evaluation will inform TMA's future investment in this portfolio in its third strategy period.

1.2. Objectives

The main objective of this evaluation was to assess the design, scope and achievements of the ICT4T portfolio within Strategy 2. As part of this, the evaluation has assessed the extent to which the ICT4T Portfolio has contributed to the high-level outcome areas of: (i) Reduced Barriers to Trade and (ii) Improved Business Competitiveness.

The evaluation has considered questions related directly to the ICT4T portfolio's ToC to better understand the pathways and processes of change. A deeper understanding of the ToC will enable TMA to think more strategically about where it should focus its efforts in Strategy 3, which commenced in July 2023. In addition, the evaluation TOR posed several fundamental questions to be considered by the evaluation:

- ✓ What was the impact of the ICT4T Portfolio since the beginning of Strategy 2 in reference to the ToC logic that was established?
- ✓ How did the portfolio enhance transparency, efficiency and service delivery for trade in the region?
- ✓ What is the evidence that the portfolio has contributed to the reduction of time and cost of doing business in targeted countries and regions?
- ✓ What have been the benefits established and how do the established results contribute towards economic growth, poverty reduction, job creation, gender mainstreaming, climate change and sustainable livelihoods?
- ✓ Has the private sector responded to the interventions that were implemented, leading to an ease in doing business?

- ✓ How will the completed projects remain viable and operational post TMA support?
- ✓ What key lessons have been learnt and knowledge transferred to the Government, key implementing partners Secretariat and other stakeholders in order to improve the project results and its long-term sustainability?

These broad areas are unpacked and captured in specific evaluation questions under each of the OECD-DAC criteria presented in Section 2.3.

1.3. Evaluation Scope

To conduct a portfolio-level evaluation and understand the contribution of the portfolio towards high-level outcomes, we are reliant upon using project-level evidence. Prior to commissioning of this evaluation, TMA commissioned an Evaluability Assessment of the ICT4T portfolio. The purpose of the Evaluability Assessment was to assess the extent to which the 42 projects within the Strategy 2 ICT4T portfolio were 'evaluable' and therefore suitable for inclusion in an evaluation. The method for assessing evaluability was structured using the utility, plausibility and feasibility criteria. These criteria are explained in more detail below:

- ✓ **Utility –** analysis of projects against 10 sub-criteria, including (i) clear definitions of long-term outcomes and (ii) steps to achieving them, (iii) clearly identified beneficiaries and (iv) sufficient implementation period.
- ✓ **Plausibility –** analysis of projects against 8 sub-criteria, including (i) likelihood of the portfolio objective being achieved, (ii) presence of valid and reliable indicators for each ToC event, and (iii) whether assumptions about the roles of other actors have been considered.
- ✓ **Feasibility –** analysis of projects against 5 sub-criteria, including (i) availability of complete sets of project documents, (ii) availability of baseline measures and (iii) availability of data in reviews and evaluations.

Using project documentation provided by TMA, each project was scored, aggregated and weighted to generate an Evaluability Score out of 5. The Evaluability Scores were then classed as Red (below 2.5 – not ready for evaluation), Amber (2.5 to 2.9 – can proceed but there are critical data gaps), and Green (3 to 5 – ready for evaluation). In total, the assessment identified 22 projects (52% of the portfolio) as "evaluation ready", 8 projects (19%) requiring critical gaps addressed and 12 projects (29%) not ready for evaluation. EDI Global presented these 22 projects as the potentially evaluable projects in the pre-inception report.[6]

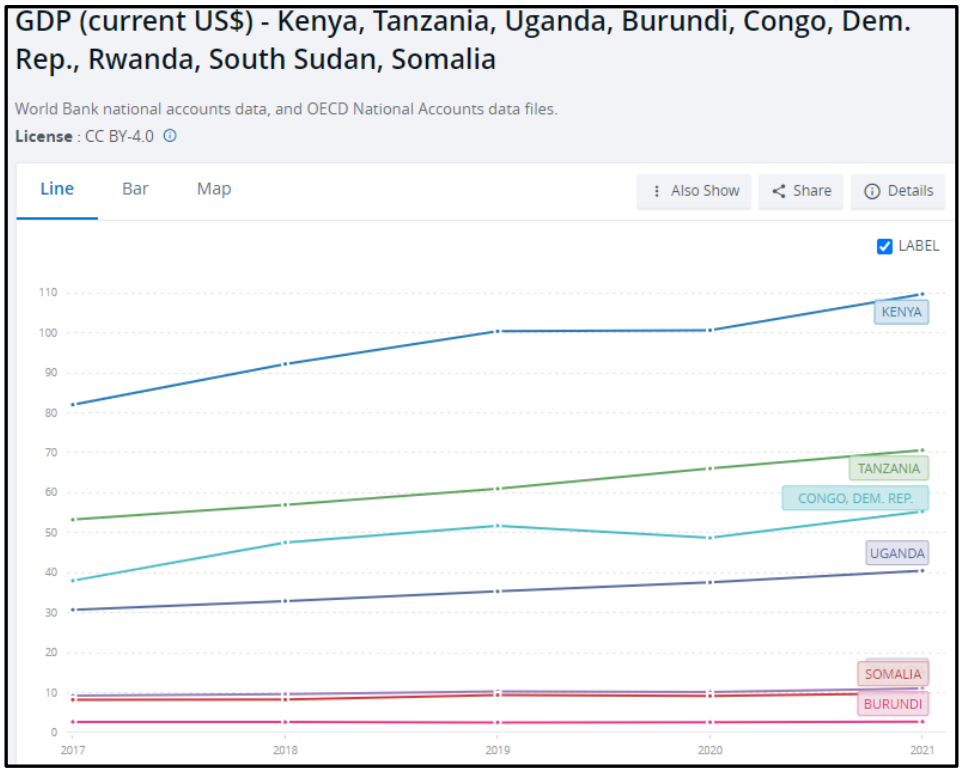
During the Inception Phase, the list of evaluable projects was reviewed by EDI Global and TMA. TMA provided insights on project progress following submission of the evaluability assessment and proposed dropping three projects (DRC CMS, TMX and AEO Enterprise) and replacing them with two projects – Food and Drug Authority Information Sharing Platform (FDA ISP) and Regional Electronic Cargo Tracking System (RECTS). Based on this assessment, the evaluation has collated and analysed evidence from 21 evaluable projects in the portfolio with the aim of generating lessons learned, challenges faced and identifying best practices. 0 presents the list of all projects included in the evaluation.

[6] Pre-Inception Report: Evaluation of TradeMark Africa ICT4T Portfolio (July 14th, 2023)

1.4. Regional Context

The period of TMA's Strategy 2 (2017-2023) can be characterised as a period of economic and trade growth for countries within the East African Community (EAC). According to the World Bank's Development Indicators, the total GDP (current US$) in real terms for the region grew from $224 billion to $325 billion (+45.5%) from 2017 to 2022 (see Figure 1).[7] Although countries suffered a decline in GDP growth rates in 2020 due to COVID-19, they experienced a bounce back in subsequent years.

Figure 1 GDP (Current US$) for EAC Countries.



Source: Word Bank Development Indicators

The growth in GDP for EAC countries is mirrored by average increases in import and export volumes during this period. For the period of 2017 to 2021, imports increased by 9.1% while exports increased by 2.7% for EAC countries. The breakdown of import and export volumes by EAC country are presented in Figure 2 and Figure 3.[8] Although the overall trend shows increases in import and export volumes for

[7] GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or for the depletion and degradation of natural resources. Data are in current USD. Dollar figures for GDP are converted from domestic currencies using single-year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.

[8] Import / export volume indexes are derived from the United Nations Conference on Trade and Development's (UNCTAD's) volume index series and are the ratio of the import / export value indexes to the corresponding unit value indexes. Unit value indexes are based on data reported by countries that demonstrate consistency under UNCTAD quality controls, supplemented by UNCTAD's estimates using the previous year's trade values at the Standard International Trade Classification three-digit level as weights.

EAC countries, the trend for imports and exports in the EAC was more volatile due to COVID-19. Import and export volumes for most EAC countries declined in 2020 and 2021 compared to 2019 levels.

Figure 2 Import Volume Index for EAC Countries (2017-2021).

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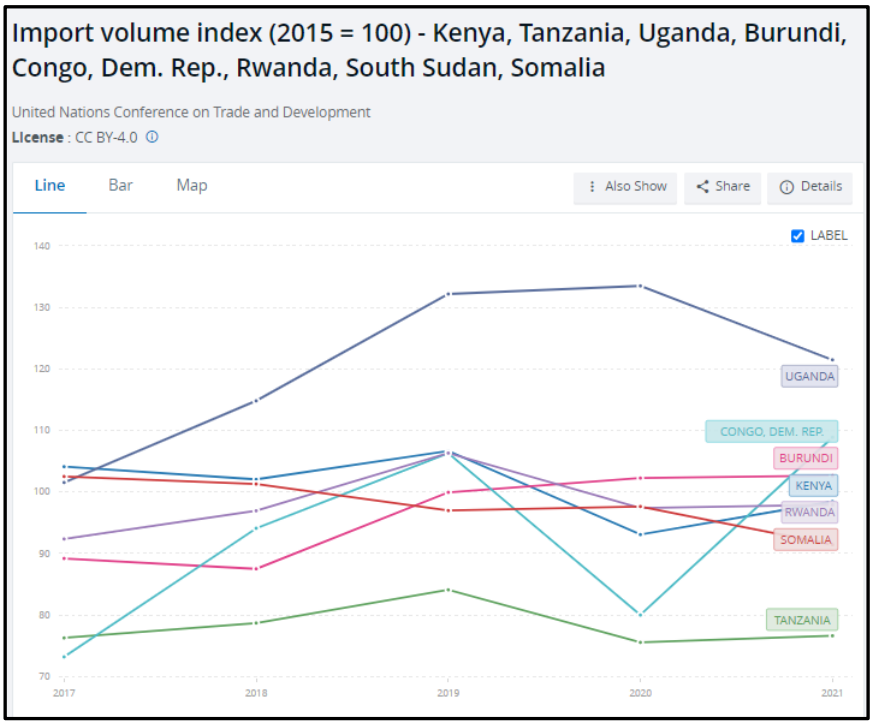
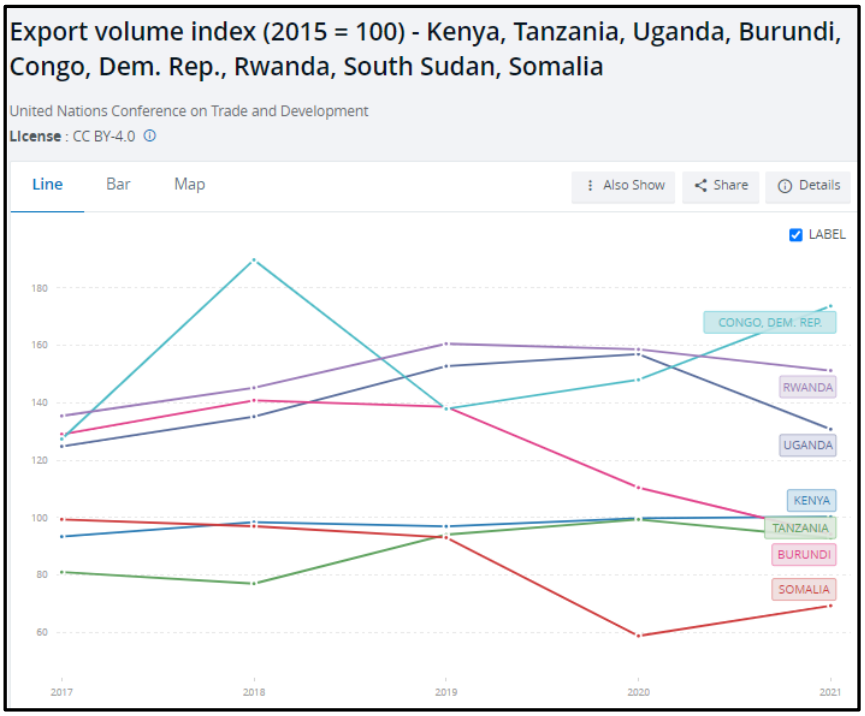


Source: World Bank Development Indicators

Figure 3 Export Volume Index for EAC Countries (2017-2021).



Source: World Bank Development Indicators

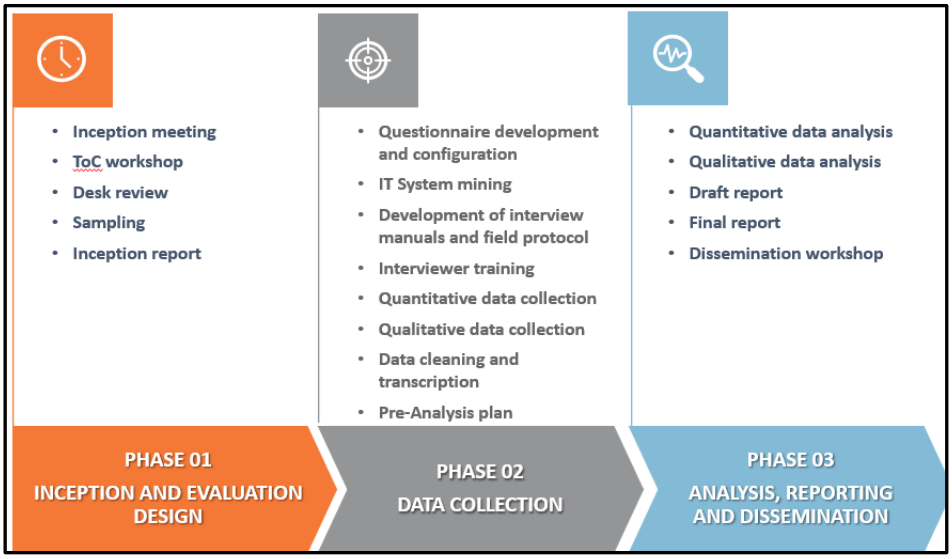
2. Evaluation Approach

Our evaluation methodology is theory-based and evaluates the programme through the six lenses of the OECD-DAC criteria. We use a mixture of quantitative and qualitative data from previous evaluations, our business survey and stakeholder consultations to answer the agreed evaluation questions which have been split into the OECD-DAC criteria. We also provide a commentary on the quality and limitations of the evidence provided to ensure our findings are caveated appropriately. The ToC also plays a central role in assessing whether the ICT4T portfolio has contributed to higher levels of transformation at the outcome and impact levels. In our analysis, we comment on the extent to which the key ToC impacts, outcomes and assumptions of the ICT4T portfolio can be validated.

During the inception phase, we worked with TMA to revise the ICT4T portfolio ToC and to group projects according to the three agreed portfolio outputs: (1) Integrated Trade Management Systems; (2) Improved Monitoring and Inspections Systems; (3) Effective Data Information Systems. We reviewed the mapping of activities implemented within these clusters to the short-term outcomes and intermediate outcome 1.3. We also reviewed the key assumptions during this process. The ToC workshop and revision of the ToC are described further in Section 2.2.

Having revised the ToC and reviewed the key assumptions, we reviewed existing evidence (quantitative and qualitative) and collected primary quantitative and qualitative data to assemble our responses to the evaluation questions. Our evaluation approach was delivered across three phases as shown in the Figure 4 below:

Figure 4 Project Phases



2.1. Desk Review

EDI Global received all relevant documents from TMA relating to the evaluable projects. A table presenting all documents reviewed per project is attached as ANNEX B. These documents included:

- ✓ Project Appraisal Reports (PARs)
- ✓ Monitoring Plans

- ✓ Results Chains
- ✓ Annual Project Reviews
- ✓ Evaluation Reports (where projects or clusters of projects had been previously evaluated).

The desk review was conducted in two stages. In stage one, projects were reviewed in relation to their intermediate outcomes (Ios) and how those Ios mapped onto the ToC. For example, the results chain of the Integrated Tea Trading System (ITTS) states IO 1 as "Improved Efficiency and Effectiveness in the management of tea trade", and IO 2 "Improved Governance in the management and administration of tea trade". After reviewing all evaluable projects, we found that the main IO themes were: (i) Improved Governance, (ii) Improved Efficiency and Effectiveness, and (iii) Improved Capacity. These were plotted onto the ToC, and mapped to portfolio outputs (see in ToC3 development in ANNEX C for more details).

In stage two, secondary data sources were mapped from programme documents that had the potential to contribute to answering the evaluation questions. These included project level evaluation reports and monitoring plans. For example, the "Endline Study of the TMEA Funded Integrated Tea Trading Systems Project", presents evidence on indicators such as: (i) Time taken to complete a tea trade cycle, and (ii) Costs incurred in completing a tea trade cycle, which combined with other similar indicators from secondary evidence and primary evidence, will help us answer the portfolio-level effectiveness EQ (9) "How did the portfolio strengthen governance, enhance transparency, efficiency and service delivery for trade, and improve trader competitiveness, and compliance in the countries and the region?" (see EQ Matrix in **Error! Reference source not found.**). In answering this EQ, we can also assess the shorter-term outcome (level 3) of "Strengthened governance and transparency of trade processes and procedures" as presented in ToC3 (see Figure 32). This process was replicated for all Eqs.

During the data analysis phase, we decided to remove the Monitoring Plan's from our secondary analysis. Although these plans are cited in the project-level evaluation reports, our evaluation team found these plans to be a weak source of evidence as most were incomplete and full of data gaps. The level of information in the monitoring plans was found to be piecemeal, inconsistent and lacking in sufficient detail for us to include in the evaluation.

2.2. Review of the ToC

One of the main tasks in the inception phase was to review the ICT4T ToC with the purpose of assessing its suitability for the portfolio evaluation. In August 2023, the evaluation team convened a ToC workshop with TMA stakeholders which included representatives from the ICT4T and Results teams. This process led to a revision of the ToC to one which better mapped and linked evaluable projects to portfolio outputs, and included the critical assumptions required for the causal pathways to occur. The version of the ToC used in this evaluation is the third iteration, referred to as ToC3. This is present as Figure 32 Theory of Change 3 for IO 1.3 - Effective Trade Systems and Procedures in ANNEX C. The annex also presents a critique of the two previous iterations of the ICT4T ToC (developed in May 2020 and March 2023 respectively) and why a third version (developed during this evaluation) was felt to be necessary by key stakeholders involved in the evaluation.

The evaluation has tested some of the key assumptions set out in ToC3 by capturing these in evaluation questions (Eqs). Through gathering evidence to test these Eqs the evaluation assesses the extent to which the ToC is an accurate representation of how change takes place in the ICT4T portfolio or adjustment are required.

2.3. Evaluation Questions and EQ Matrix

Below we present the revised evaluation questions organised by OECD-DAC criteria. The EQ Matrix which presents the agreed Eqs, indicators and evidence sources is found at ANNEX D.

Effectiveness

- ✓ To what extent do portfolio activities under 1.3 lead to reducing trade barriers? To what extent are changes attributable to the programme?
- ✓ How did the portfolio strengthen governance, enhance transparency, efficiency and service delivery for trade, and improve trader competitiveness, and compliance in the countries and the region?
- ✓ Is trade and corridor data effectively disseminated to the right audiences?
- ✓ To what extent are governments and the private sector in East Africa committed to the digital agenda?
- ✓ Does the reform process have necessary agency buy-in, financial backing and technical skills to manage transition to digitisation and integration of trade system?
- ✓ To what extent does improved agency competency enable effective high-level collaboration?
- ✓ To what extent has agency revenue collection and regulation enforcement (e.g. health and safety) improved?

Impact

- ✓ What was the impact of the ICT 4 Trade Portfolio since the beginning of Strategy 2 in reference to the ToC logic that was established?
- ✓ What have been the benefits established and how do the established results contribute towards effective trade systems and procedures?
- ✓ What deliberate and unintended results – positive and negative – did the intervention produce? How did these occur?

Efficiency

- ✓ How economically resources/inputs (funds, expertise, time, equipment, etc.) were converted into results?
- ✓ How valuable were the results to service providers, clients, the community and/or organisations involved?
- ✓ Have the portfolio results been achieved with good Value for Money (regarding costs and benefits)?
- ✓ To what extent does the positive impact justify continued investments?

Sustainability

- ✓ How will the completed projects remain viable and operational post TMA support?
- ✓ To what degree is the ICT4T portfolio promoting green growth?

Relevance

- ✓ To what extent did the programme address the needs (sector / trade system) identified at the formulation and design stages? At country level and regional EAC level.
- ✓ To what extent is the ICT4T portfolio inclusive and diverse? How to ensure that women, and marginalised groups are well-targeted and responded to the intervention design with measurable outcomes?

Coherence

- ✓ How does ICT4T trade contribute towards the Sustainable Development Goals and policy priorities in the East African Community?
- ✓ To what extent were the projects included in the ICT4T portfolio designed in collaboration with Government partners and achieve necessary buy-in?
- ✓ Are ICT platforms and systems aligned with legal mandate and regulatory framework at national and regional levels?
- ✓ To what extent do regulatory frameworks describe the application of ICT to accomplish inter-agency collaboration?

Learning[9]

- ✓ What are the key achievements, challenges, and lessons learned from the programme? What has worked well/not worked well, and why?
- ✓ How was the portfolio adaptive to changes and uncertainty internal and external to the programme?
- ✓ What good practices did the programme introduce to achieve better results?

2.4. Analysis Plan

As this is a portfolio-level evaluation, a range of evidence sources for the 21 evaluable projects included in the evaluation were synthesised. An overview of our approach to analysing the evidence is described below:

- ✓ **Step One: Plot Secondary Evidence** – the first step involved reviewing project-level evaluation reports and the secondary data available from the TMA-supported ICT4T systems themselves to populate secondary quantitative and qualitative evidence for all evaluable projects (where this evidence was available).

[9] The learning questions are covered in the final section which presents the evaluation's overall conclusions and recommendations.

- ✓ **Step Two: Plot Primary Quantitative Evidence –** the next step involved analysing the primary quantitative data in the statistical analysis software, Stata. Once the quantitative data summaries were produced, we transferred these to the relevant projects in the analysis plan.
- ✓ **Step Three: Plot Primary Qualitative Evidence –** we then transferred summaries for the qualitative transcripts to the relevant project and EQ.
- ✓ **Step Four: Write Secondary Data Summaries –** we then summarised findings per Eqs where secondary evidence was available.
- ✓ **Step Five: Write Primary Quantitative Summaries –** next, we wrote the summary for the primary quantitative data where evidence is available and commented on the extent to which it validates secondary evidence.
- ✓ **Step Six: Write Primary Qualitative Summaries –** then we wrote summaries from the primary qualitative data per EQ where evidence was available.

Our rationale for using this approach is that it enables us to systematically examine and compare evidence across the evaluable systems in the ICT4T portfolio. Using the analysis template, we also visually identify evidence gaps and areas where sufficient evidence exists.

2.5. Value for Money (VfM) Analysis

The portfolio evaluation also conducted a VfM assessment of the ICT4T portfolio. The approach adopted builds on *FCDO's Approach to VfM.*[10] Through the evaluation our team has examined the "Four Es" of economy, efficiency, effectiveness, and equity as set out in FCDO's approach. The Four Es approach is complemented by a Break-Even Analysis (BEA) which draws on data and assumptions for the project-level analysis from available project evaluations, systems data generated by the ICT4T systems and the quantitative survey with system beneficiaries. A full description of the VfM methodology is provided in ANNEX E.

2.6. Methodological Limitations

As with all evaluations, this one has had to apply research methods which were appropriate to answer the evaluation questions, and which conformed to the realities of the data available. This has led to a number of methodological limitations which we briefly describe below.

1. **Selection bias** for quantitative data is one of the main caveats when considering the quantitative analysis. The survey sample is constrained by a number of factors, including purposively sampling projects due to the lack of available beneficiary data across all projects. This affected our ability to make generalisations on projects not included in the quantitative data. However, we have been able to make claims on the contribution of the eight projects towards causal pathways in the ToC with a high degree of precision (95% confidence interval and 2% margin of error) (see sample in Table 1). We also used qualitative and secondary evidence sources to assess the contribution of the other projects towards answering the evaluation questions and assessing the causal pathways in the ToC. Furthermore, we primarily used a stratified random sampling technique to sample businesses per system to avoid

[10] DFID (2011). DFID's Approach to Value for Money (VfM). Department for International Development, July 2011.

respondent selection bias which can further compromise accuracy of estimation. Although we did not cover all projects in the quantitative sample, we have triangulated quantitative evidence with qualitative data and secondary data from evaluation reports and IT systems data, to ensure a broad coverage of evaluable projects in the portfolio.

2. **Social desirability bias** might affect the accuracy of the data collected. Due to fear of negative consequences or mistrust of outsiders, respondents may have responded to survey questions in a way that they believe will be viewed favourably by others, rather than providing honest or accurate answers. To minimize these, the evaluation recruited and trained enumerators on building rapport with the beneficiaries. Although most interviews were conducted over the phone or via video-conference, we trained all the enumerators to probe for accurate responses, while ensuring confidentiality and anonymity. In addition, we ensured that adequate information about the purposes and objectives of this evaluation (i.e., why the data is being collected and how it will be used) was provided to the respondents.

3. Related to social desirability bias, there may have also been **a lack of trust or reluctance to participate in the phone survey** in some cases due to concerns about confidentiality and privacy. In addition, the absence of physical contact with the enumerator, which is important for rapport building, can also lead to lack of trust resulting higher non-response rate. To minimise this, we trained our data collectors to equip them with the knowledge, skills and tailored approaches for effective rapport building and communication in a phone survey. In addition, we recruited data collectors who had previous experience in conducting phone interviews, preferably with businesses. Moreover, we conducted the interviews in local languages, based on the respondent preference. This helped avoid communication gaps and improved trust between the interviewer and respondent.

4. **Recall bias** may have been an issue since, in some cases, there was a considerable time gap between service provision and this evaluation. This could have caused respondents to not accurately remember their experiences related to ICT4T service delivery. To minimise this, we conducted extensive pre-testing of survey questions and identified potential issues with recall bias to improve the quality of the survey data. Moreover, the mixed-methods approaches such as combining surveys with qualitative interviews, has helped to triangulate and gain a more accurate and comprehensive understanding on experiences and perspectives of our study participants.

5. **Data extrapolation limitations** to the portfolio-level has been challenging for some of outcome variables such as trade volume, trade value, turnover and employee growth as our quantitative phone survey covered only eight systems in the ICT4T portfolio, all of which were hosted in Kenya or Tanzania. While we can confidently comment on findings at system and sample levels, extrapolation to the ICT4T portfolio is tentative and must be treated with caution. This is particularly true for the pathways of portfolio output 2 – Improved Monitoring and Inspection Systems and portfolio output 3 – Effective Data Information systems, where we were unable to sample any beneficiaries for the quantitative phone survey.
   In light of this, we caveat our findings appropriately. When estimates are made, we are clear that they either refer to the system or sample level, and not to the whole ICT4T portfolio. Although many similarities exist between these Kenya, Tanzania, and other EAC countries where the ICT4T portfolio delivers projects, there are differences in the nature of trade and

business in these countries which urge caution when extrapolating findings from the survey sample to all countries.

As most evaluable projects in the ICT4T portfolio broadly do the same thing (e.g. automating/digitising previously manual trade processes), our findings for time and cost outcomes can be more confidently extrapolated across all ICT4T countries and for systems contributing towards portfolio output 1 – Integrated Trade Management Systems and portfolio output 2 – Improved Monitoring and Inspection Systems, as the transition from manual to automated is standard across countries. The systems contributing towards portfolio output 3 – Effective Data Information Systems should be handled differently, as users are not acquiring a permit, certificate or licence, but rather accessing trade data.

As part of the VfM/BEA assessment, there are also some methodological and data limitations associated with the approach. While the evaluation team has utilised informed assumptions and steps to mitigate the limitations, it is important for the reader to consider the below limitations:

- ✓ **TMA's monitoring data**: Though most projects had project appraisal reports, result chains, monitoring plans and work plans, their use in ascertaining the achievement of planned project's outputs and outcomes was very limited due to their quality. Many indicators within work plans and monitoring plans had no baseline values and targets were vaguely set which made it difficult to access the achievement of desired outputs and outcomes. Work plans and monitoring plans were also not updated for most projects limiting their use in the evaluation.
- ✓ **Secondary reports have included a VfM assessment** using the 4E's of economy, efficiency, efficiency, effectiveness and equity, with these indicators generally being rated successfully for each system evaluated. The reports are minimally referenced in this evaluation. The consistency in approach and rigour differs across the reports which suggests the need for a more systematic, replicable approach for future TMA evaluations.

2.7. Primary Data Collection and Sampling

The evaluation has drawn on three primary data collection sources:

- ✓ **A large-scale telephone survey of ICT4T system users (or beneficiaries).** This survey is referred to as the quantitative survey in this report.
- ✓ **A smaller set of in-depth interviews (in person or through video conference) also with ICT4T system users.** Consultation with these businesses was intended to capture qualitative dimensions which could not easily be explored during the shorter telephone survey. This survey is referred to as the qualitative survey in this report.
- ✓ **A series of in-depth key informant interviews with stakeholders who have been involved in implementing and/or supporting TMA's ICT4T interventions.** These interviews provided largely qualitative perspectives which are used in attempting to answer some of the main evaluation questions.

This section provides a summary of each of these research methods. Further detail on the fieldwork approach is provided in ANNEX F.

2.7.1. ICT4T Systems Data Mining

One of the secondary evidence sources we sought to include in this evaluation was systems level data from TMA-supported ICT4T systems. The reason for acquiring this data was to get objective data points that could be compared against other data sources. For example, understanding the extent to which systems are being used (e.g. number of users / applications per year), measuring the time it took to complete key transactions, etc, are data points which are best obtained from the host agencies which run the ICT4T systems.

Acquiring system data from government agencies in East Africa was a challenging process. After preliminary discussions with key stakeholders during the evaluation inception phase, we realised that acquiring full system datasets would not be feasible, as it would require either a long and difficult approval process or would be contrary to national data sharing guidelines. We therefore shifted our approach to requesting specific aggregate data summaries on key system level variables such as time and cost (where available). Using TMA's leverage with host agencies to arrange a preliminary meeting to explain our request, we followed up with a template to gather the data requested. This was supported by a follow-up visit from our team where one could be arranged. These visits were helpful in further explaining the nature of our requests and in obtaining data that host agencies stipulated could only be made available in person.

In total, we managed to acquire data points from 9 of the 21 evaluable ICT4T projects (48%). Given the rigid data sharing guidelines in Rwanda, we deployed a team member to Kigali to visit Rwandan ICT4T agencies in-person, where we managed to acquire data points from four systems, the RECTS, Rwanda Electronic Single Window (ReSW) Rwanda Utilities Regulatory Authority (RURA) and Rwanda Standards Board (RSB). For the remaining five systems Mifugo Integrated Management Information System (MIMIS), Chamber Management Information System (CMIS), Ethiopian Chamber Digital Service (ECDS), Single Customs Territory (SCT) and Northern Corridor Transport Observatory (NCTO), we acquired aggregate data points through email, following a preliminary call.

All systems were able to report data on system uptake and general usage, however, data points on revenue generation (over multiple years) and time (e.g. application time, processing time) were more difficult to acquire. In the case of revenue generation, many agencies were unwilling to share this information with the evaluation team. While for time-related data points, some agencies were unable to harvest this information or claimed the system did not adequately capture application timings. Where relevant, we use system-level data in our analysis to support our responses to evaluation questions.

2.7.2. *Quantitative Data Collection*

2.7.2.1. *ICT4T System Beneficiary – Sampling Approach*

Our ambition in the quantitative sampling approach was to complete 2,000 beneficiary interviews covering as many evaluable projects within the ICT4T portfolio as possible, while also sampling as representatively as possible from different countries, sectors and groupings within the ICT4T ToC. The whole rationale behind the phone survey was to obtain quantitative data from as many ICT4T systems users as possible in a cost-effective way.

The evaluation team worked closely with the TMA ICT4T and Results teams during the inception and data collection phases to source as many beneficiary contact lists from ICT4T system host agencies as

possible. These contact lists provided the beneficiary details required to undertake the telephone survey.

In total, we drew the sample from eight projects in the ICT4T portfolio, all of which are grouped under the portfolio output 1 – Integrated Trade Management Systems (ITMS) in the ICT4T ToC. Despite TMA and the evaluation team's best efforts, these were the only systems for which the evaluation managed to obtain contact lists. Five of these projects were based in Kenya and three in Tanzania. From a possible 15,723 contacts provided, we attempted to contact 4,771 (30% of the available contacts) and completed interviews with 1,852 (12% of the available contacts and 93% of the sample target of 2,000). A final sample size of 1,852 drawn from a population of 15,723 from the eight projects, gives us a margin of error of 2.14% at a 95% confidence level.

Ideally, our business survey sample would have covered all evaluable systems in the ICT4T portfolio. However, the process of requesting and receiving beneficiary lists required multiple approvals and needed significant resource. These lengthy processes lead us to receive lists from only eight systems. As a result, our business survey sample does not cover projects in other key ICT4T countries such as Rwanda and Uganda, nor does it cover systems that feed into portfolio output 2 – Improved Monitoring and Inspection Systems or portfolio output 3 – Effective Data Information Systems. The only project previously identified as *evaluable* in the portfolio based in Uganda was the 3623 – AEO Enterprise Management System. However, during the inception phase, we learnt that this project was in the pilot phase, and therefore not evaluable. For Rwanda-based systems, we were informed by TMA and agency stakeholders from RRA of the challenges of accessing beneficiary contact information in Rwanda. Rwanda is known for having particularly stringent data privacy laws, and given that EDI Global is not registered in Rwanda, we felt this process would take up too much resource with no guarantee of success. If beneficiary contact lists were more accessible in Rwanda, we would have adjusted our field team resourcing accordingly to include those systems.

In our analysis, we use evidence from previous evaluations and stakeholder consultations to the fill the gaps the business survey does not reach, and comment on the confidence in the evidence available. Our final business survey sample covers 50% of the largest clustering of evaluable ICT4T projects (portfolio output 1 – Integrated Trade Management Systems) in the ToC, giving us greater confidence to extrapolate findings to the portfolio level for this output.

We followed a three-step approach to draw the final sample.

- ✓ **Step One (purposive):** Purposively sample projects based on data availability and prior evaluation use. Ideally, we wanted all beneficiaries in the quantitative sample to not have been previously surveyed, but this was not possible due to low survey completion rates in various systems.
- ✓ **Step Two (purposive):** Stratify the sample by available criteria within each list. This included business or industry type and varied between systems. The target sample strata for each system is presented in Table 1 below.
- ✓ **Step Three (random):** Within each strata, randomly select the final sample and replacements per system.

Table 1 Target Sample Strata

System	Sample Strata
Integrated Customs Management System **(iCMS)**	✓ Clearing agents 35%, ✓ Transit clearing agents 14%, ✓ Shipping lines 8%, ✓ CFS 2%, ✓ Importers 41%.
CMIS	✓ Agriculture, Livestock, Fisheries and Forestry 39%, ✓ Manufacturing 21%, ✓ Wholesale and retail 9%, ✓ Transport and Logistics 5%, ✓ Food processing 4%, ✓ Remaining categories including mining, healthcare, pharmaceuticals 22%
iSOKO	✓ Traders 61%, ✓ Customers 31%, ✓ Service Providers 8%
ATMIS	✓ Cashew nut Traders 4% ✓ Coffee Traders 42% ✓ Cotton Traders 3% ✓ National Food Security Department Exporters 43% ✓ Pyrethrum Traders 0.6% ✓ Sugar Traders 6% ✓ Tobacco Traders 2%
MIMIS	✓ Individuals 73% ✓ Registered Companies 21% ✓ Government Entity 5%
IMIS	No strata available
IMS	No strata available
SC-PVP	No strata available

The approach presented was our initial approach before making calls to respondents. During the data collection, the approach was adapted as due to poor quality lists with low survey completion rates, our priority became securing as many interviews as possible. This meant many lists were attempted in their entirety in order to get close to the sample target. Our data collection approach is outlined in more detail in ANNEX F.

2.7.2.2. *Sample Demographics*

The breakdown of the final phone survey sample is found in Table 2 and Figure 5. The country split shows 54% of the final sample came from Kenya and 46% from Tanzania. The quality of the lists and willingness of respondents to participate was much stronger in Tanzania (59% survey completion rate)

compared to Kenya (30% survey completion rate). This meant that interviewers in Kenya had to make many more calls per day compared to the Tanzanian team in order to reach daily completed interview targets.

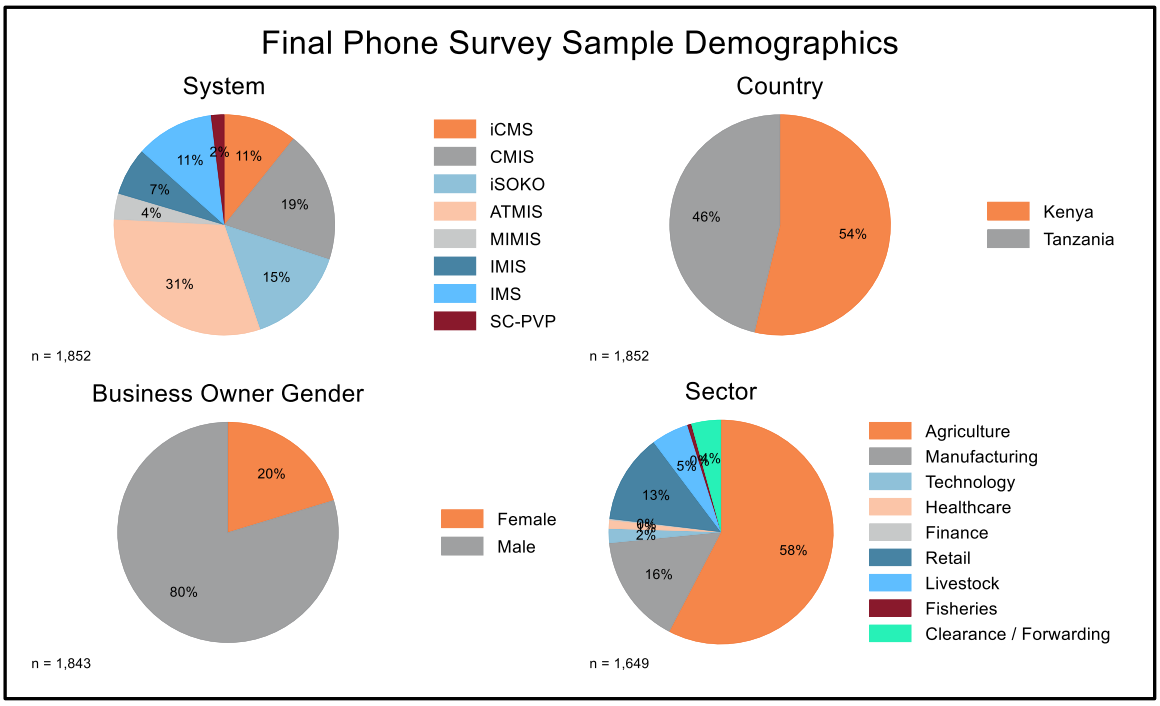
The system with the largest sample size is the Agricultural Trade Management Information System (ATMIS) (575) in Tanzania which represented 31% of the final sample, while the Seed Certification and Plant Variety Protection (SC-PVP) system (36) represents the smallest sample size for a system at 2% of the final sample. The SC-PVP (78%) and Tanzania Chamber of Commerce and Industry Information Management System (TCCIA IMS) (71%) had the two highest survey completion rates, while iSOKO (23%) and CMIS (26%) were the systems with the lowest survey completion rates.

The overall final sample included 20% female-led businesses, with the highest proportion derived from the iSOKO system; a platform specifically targeted at female micro businesses. Although this breakdown does not give a definitive figure on the proportion of total ICT4T users that are women (as per TMA's Intermediate Indicator for the ICT4T portfolio), it does show that female-led businesses and female staff are accessing and interacting with ICT4T systems. The greatest proportion of businesses operated in the agriculture (58%) and manufacturing (16%) sectors.

Table 2 Sample Size Breakdown

Category	Final Sample Size	No. Respondents Attempted	Survey Completion Rate (%)	Total Raw Sample Shared	Final Sample (% Raw Sample)
Full Sample	**1,852**	**4,771**	**39%**	**15,723**	**12%**
Kenya	995	3312	30%	11780	**8%**
iCMS	199	323	62%	6922	**3%**
CMIS	358	1361	26%	1680	**21%**
iSOKO	272	1179	23%	2087	**13%**
AFA IMS	130	403	32%	1034	**13%**
SC-PVP	36	46	78%	57	**63%**
Tanzania	857	1459	59%	3943	**22%**
ATMIS	575	1029	56%	1437	**40%**
MIMIS	70	132	53%	181	**39%**
TCCIA IMIS	212	298	71%	2325	**9%**

Figure 5 Final Phone Survey Sample Demographics



2.7.3. *Qualitative Data Collection*

2.7.3.1. *Sampling Approach*

Our evaluation conducted Key Informant Interviews (KIIs) with agency and TMA stakeholders and in-depth interviews (IDIs) with beneficiaries (ICT4T system users) as part of the primary data collection activities for the evaluation. Our ambition for the qualitative sample was to cover all 21 evaluable projects in the ICT4T portfolio and consult with stakeholders across a cross-section of organisations with which TMA has engaged through its work.

During the evaluation our team completed 25 KIIs which provided qualitative data on 12 ICT4T systems and 16 IDIs which were drawn from the beneficiary contact lists of three ICT4T systems. We present the full stakeholder sample in ANNEX G. Securing in-person interviews with key stakeholders and businesses proved challenging during this evaluation. The time commitment required and the low prioritisation given to talking to evaluators, over other tasks, made it difficult to secure interviews despite considerable effort invested by the evaluation team and TMA staff to arrange consultations. In the case of stakeholders, it is also likely that there was a degree of 'consultation fatigue' given the high number of requests for meetings many receive from TMA. For example, the 2023 Annual Review was ongoing during the time of the evaluation and required consultation with many of the same stakeholders. In the case of businesses, it is always challenging to ask senior people within firms to contribute an hour of their time to research purposes. As noted above, the quantitative survey was successful in reaching a high number of businesses (1852 in total) but the time commitment required there was only 30 minutes and multiple attempts could be made to find the most suitable time for the respondent to talk. Reflecting on how to handle potential respondent fatigue is a key area for TMA as it commissions future evaluations.

2.7.3.2. *SAMPLE DEMOGRAPHICS*

The breakdown of the KII and IDI sample is found in **Error! Reference source not found.** below. The majority of the qualitative sample was sourced in Kenya, with 61% of KIIs and 100% IDIs derived from Kenyan ICT4T systems. This was largely due to respondent availability. We were also able to visit stakeholders in-person in Tanzania and Rwanda, as well as have a remote interview with a stakeholder in Ethiopia.

Table 3 KII and IDI Sample Demographics

Country	KII	IDI	Internal	External
Kenya	13	16	26	5
Tanzania	6	0	4	2
Rwanda	3	0	3	0
Ethiopia	1	0	1	0
Total	**25**	**16**	**34**	**7**

Internal = stakeholder's agency hosts or uses an ICT4T system

External = relevant stakeholder but agency does not host an ICT4T system

3. EFFECTIVENESS

We first explore evaluation questions related to the Effectiveness lens of the OECD-DAC criteria. According to the ToR, Effectiveness is defined as understanding the extent to which the portfolio's objectives were achieved, considering their relative importance. To answer this, we focus on the extent to which TMA-funded ICT4T reduce the time and cost to trade, as well as exploring themes of governance, transparency, accountability and assessing private sector commitment. Although we do cite evidence from previous evaluations, we acknowledge the limited statistical power of project-level evaluations as statistical claims are made using low sample sizes, for example the project evaluation of the ATMIS system surveyed 56 businesses, while the evaluation of the KEPHIS SC-PVP system surveyed only 61 businesses. We therefore rely substantially on this evaluation's business survey of 1,852 businesses and stakeholder consultations to assess overall effectiveness of the ICT4T portfolio.

Table 4 below sets out the main evaluation questions related to effectiveness considered by this evaluation.

Table 4 Effectiveness Evaluation Questions

Evaluation Questions
1. To what extent do portfolio activities under 1.3 lead to reducing trade barriers? To what extent are changes attributable to the programme?
9. How did the portfolio strengthen governance, enhance transparency, efficiency and service delivery for trade, and improve trader competitiveness, and compliance in the countries and the region?
10. Is trade and corridor data effectively disseminated to right audiences?
11. To what extent are governments and the private sector in East Africa committed to the digital agenda?
12. Does the reform process have necessary agency buy-in, financial backing and technical skills to manage transition to digitisation and integration of trade system?
13. To what extent does improved agency competency enable effective high-level collaboration?
14. To what extent has agency revenue collection and regulation enforcement (e.g. health and safety) improved?

3.1. EQ 8. TO WHAT EXTENT DO PORTFOLIO ACTIVITIES UNDER 1.3 LEAD TO REDUCING TRADE BARRIERS? TO WHAT EXTENT ARE CHANGES ATTRIBUTABLE TO THE PROGRAMME?

Evidence gathered from previous evaluations, our business survey and stakeholder consultations shows that the ICT4T portfolio is a significant driver in reducing trade barriers across East Africa. Businesses are clear in highlighting that ICT4T systems play a positive, attributable role in saving time when conducting trade-related activities and reducing associated business costs. In addition,

ICT4T systems are generally effective because they are being used regularly by the trading community, with users generally reporting high levels of satisfaction.

Time Reduction

The first trade barrier we explored in the evaluation is time savings. From previous evaluations we identified time reductions from 10 systems, as presented in Table 5 below.

Table 5 Examples of Time Savings from Previous Evaluations

System	Indicator	Baseline	Endline	Difference	% Change
AFA IMIS[11]	Average time taken (days) before & after the AFA iMIS to acquire a license/Permit/ certificate	8.8	1.9	-6.9	-78%
ITTS[12]	Average time taken (hours) before and after EATTA iTTS to complete a trade cycle	299.3	226	-73.3	-24%
RFLS[13]	Average clearance time (days) at the ICDN for tagged containers	12	4	-8	-67%
SC- PVP[14]	Overall average time taken (days) to process a seed certificate /permit /licence	25	3	-22	-88%
TMDA[15]	Average time (hours) to apply and process certificates / licenses	48	3	-45	-94%
RURA[16]	Average Time (Hours) taken to complete a trade-related activity	106	45.2	-60.8	-57%
RSB[17]	Average time (Hours) taken to complete final approval of the RSB services	7.9	2.6	-5.3	-67%
TCCIA IMS[18]	Time taken to process a certificate of origin (Hours)	72	2	-70	-97%
NAEB[19]	Required time (Hours) to perform tasks per day before and after automation for NAEB	13	4.2	-8.8	-68%

[11] Ayaah Consult, 'Final Report: The Endline Study of TMEA Funded Trade Systems for the Agriculture and Food Authority', (2022).
[12] Ayaah Consult, 'Final Revised Report for the Endline Study of the TMEA Funded iTTS Systems Project', (2022).
[13] Elizabeth Mwangi, Frinton Fenny, Mohamed Gharib, 'Final Evaluation Report: Endline Evaluation of TradeMark East Africa's Cargo Tracking for Rail Project', (2022).
[14] Ayaah Consult, 'Final Report for the Endline Study of the TMEA Funded KEPHIS SC-PVP Systems', (2022).
[15] Talanta International Limited, 'Final Report: Endline Evaluation of TMEA Funded Trade Systems for the Tanzania Ministry of Agriculture, The Tanzania Medicines and Medical Devices Authority, The Confederation of Tanzania Industries, and the Tanzania Chamber of Commerce, Industry and Agriculture, (2022).
[16] CESS, 'End of Project Evaluation of TMEA Funded ICT For Trade Systems in Rwanda', (2022).
[17] CESS, 'End of Project Evaluation of TMEA Funded ICT For Trade Systems in Rwanda', (2022).
[18] Talanta International Limited, 'Final Report: Endline Evaluation of TMEA Funded Trade Systems for the Tanzania Ministry of Agriculture, The Tanzania Medicines and Medical Devices Authority, The Confederation of Tanzania Industries, and the Tanzania Chamber of Commerce, Industry and Agriculture, (2022).
[19] CESS, 'End of Project Evaluation of TMEA Funded ICT For Trade Systems in Rwanda', (2022).

System	Indicator	Baseline	Endline	Difference	% Change
RECDTS[20]	Average transit time (Hours) from Mombasa to selected route destinations, pre-COVID-19 and after programme intervention	152.4	122.8	-29.6	-19%

Table 5 presents a comprehensive range of time reductions from ICT4T systems which cut across multiple countries (Kenya, Tanzania, Uganda and Rwanda), and different sectors (agriculture, health, private sector and infrastructure). The greatest time reductions were observed in the Tanzania-based systems, with the Tanzania Chamber of Commerce, Industry and Agriculture Information Management System (TCCIA IMS) reducing the time take to process a certificate of origin (COO) by 70 hours (-97%) on average, while the average time taken to apply and process a license or permit at the Tanzania Medicines and Medical Devices Authority (TMDA) reduced by 45 hours (-94%).[21] Through the Regional Electronic Cargo and Driver Tracking System (RECDTS), the ICT4T portfolio could also enable time savings during the COVID-19 pandemic as transit times from Mombasa to selected destinations on average reduced by 19%.

Table 6 Time Results from the Business Survey

Variable	Total Observations (after IQR Rule)[22]	Baseline (Mean)[23]	Endline (Mean)[24]	Diff (EL – BL)[25]	Perc Change (%)[26]	Standard Error[27]	Standard Deviation[28]	Welch T-Test (p-value / sig)[29]	Wilcoxon RankSum Test[30]
Time (Hours)	2432	97	31	-65.7	-68%	2.03	100.3	0.000***	0.000***

Primary evidence from the businesses phone survey is unequivocal in presenting significant time reductions since the implementation of the ICT4T systems (see results for in Table 6). As referenced in 2, before running the statistical tests we removed outliers from the baseline and endline samples

[20] Ayaah Consult, 'Independent Evaluation of TradeMark Africa's Safe Trade Emergency Facility (STEF) Programme, (2023).

[21] Talanta International Limited, 'Final Report: Endline Evaluation of TMEA Funded Trade Systems for the Tanzania Ministry of Agriculture, The Tanzania Medicines and Medical Devices Authority, The Confederation of Tanzania Industries, and the Tanzania Chamber of Commerce, Industry and Agriculture, (2022).

[22] Includes the total number of observations at baseline and endline after implementing the IQR rule.

[23] Baseline average (before the ICT4T system was introduced).

[24] Endline average (after the ICT4T system was introduced).

[25] The difference when subtracting the endline average from the baseline average.

[26] The percentage change when dividing the difference from the baseline value.

[27] Standard deviation divided by the square root of the sample size.

[28] The square root of the sample variance which is used to measure the spread across the distribution.

[29] Measures the probability of obtaining the observed results assuming the null hypothesis is true. Here, the model assumption is that the baseline and endline average is the same. If the p-value is below 0.05, we conclude that we reject the null hypothesis in favour of an alternative hypothesis that there is a difference between baseline and endline averages. A Welch T-test model is used due to uneven sample sizes between baseline and endline.

[30] Wilcoxon RankSum is a non-parametric statistical hypothesis test, which is best used with non-normal data.

using the Inter Quartile Range (IQR) rule. The objective of this was to eliminate potential bias in the results, and given that the profile of businesses surveyed range from single-person start-ups to multi-million dollar enterprises, implementation of this rule was necessary. For the time and cost variables we went a step further to run IQR at the activity and system level, to reduce bias between activities within a specific ICT4T system.

Table 6 presents the results from the Welch T-test and Wilcoxon RankSum test which are both statistical approaches comparing the baseline and endline averages from our sample of businesses. **For time reductions, we observe an average reduction of 66 hours to complete a trade-related activity since the introduction of an ICT4T system, which equates to a reduction of 68%.** When running a t-test, we observe this as a statistically significant result for the full sample and for all 8 systems individually. This means that we are highly confident that the baseline and endline averages are different.

As Figure 6 presents, the MIMIS system presented the greatest average time reduction from 139 hours before automation to 10 hours after automation, equating to a 93% reduction. The system with the lowest average time reduction is the IMIS system, which reduced from 254 hours to 127 hours to complete a trade activity, representing a 50% reduction. **We also observed that for businesses who indicated that the time required to complete a trade activity had reduced, the majority attribute this change to the ICT4T system. 99% attributed *'some or all of this change'* to the ICT4T system, with the most common response stating an attribution level of 75%. This is presented in Figure 8.**

We interpret this to mean that businesses who observed a time reduction, most commonly attribute approximately three-quarters of that change directly to the ICT4T system. This gives us added confidence in our t-test results as it reassures us that time reductions have not occurred randomly, but are attributable to ICT4T system interventions.

Figure 6 Average Time (Hours) To Complete a Trade Activity (by System)

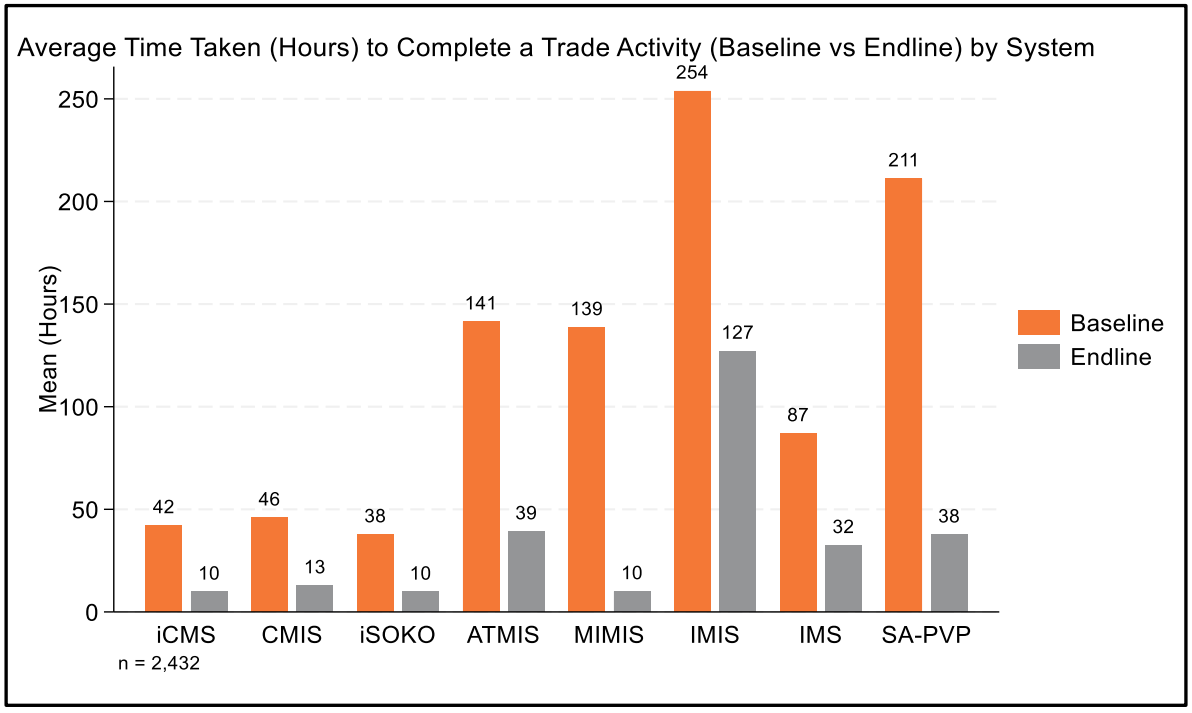
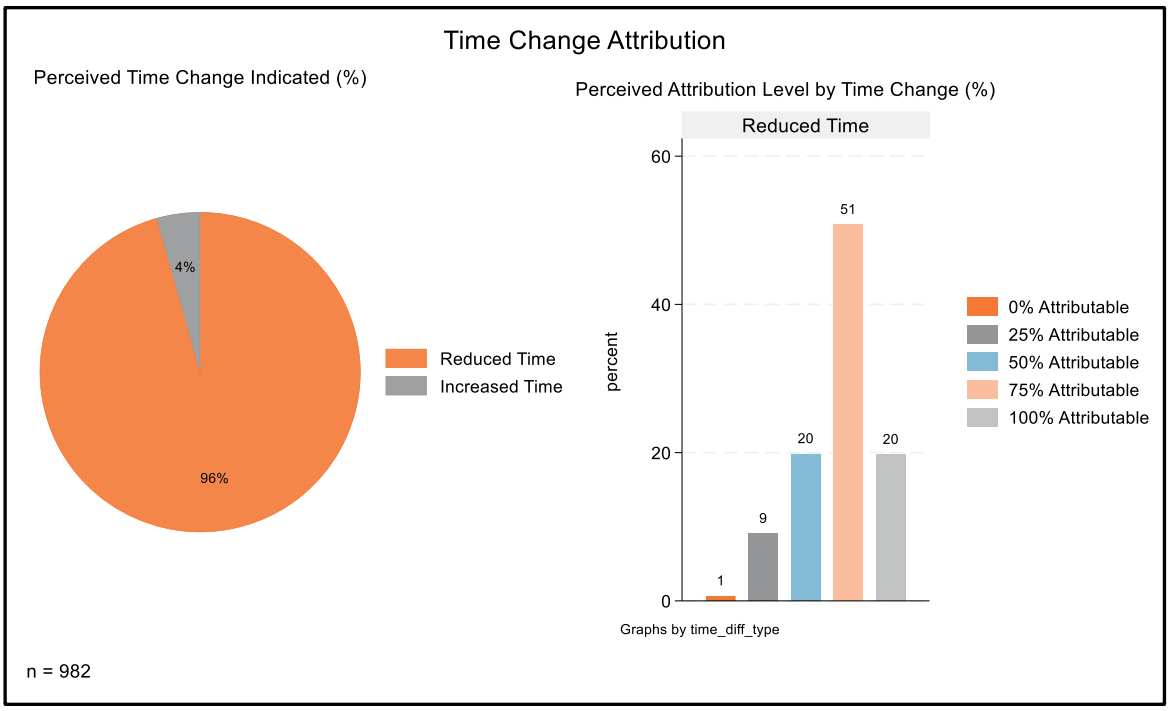


Figure 7 Time Change Attribution



Using statistics from our business survey we can also tentatively assess the total time impact of the reported time reductions within the survey sample, with the results presented in Table 7 below. If we take the average time reduction of -66 hours per trade activity per business reported in the sample, and multiply it by the total sample size (1,852) and the weighted average of applications per business per month (6 = lower bound, 9 = upper bound) and then multiply it by the weighted attribution level of 69%, **we estimate a reduction in the range of -506,041 hours (-21,085 days) to -759,061 hours (-31,627 days) per month taken out of the East African trade system per month, directly attributable to the ICT4T portfolio.** Extending this to annual time saving estimates, we multiply the monthly estimate by 12 to reach an annual time saving of between -6,072,486 hours (-253,020 days) and -9,108,729 hours (-379, 530 days). The time reduction effect is observed across all business sizes; however, the largest effect was seen in micro (-83.07 hours) and small (-88.58 hours) businesses compared to medium (-61.72 hours) and large (-65.59 hours) businesses, suggesting that the scale of time reductions brought about by automated trade systems is most keenly felt by smaller traders.

Table 7 Estimated Total Impact of Time Reductions from the Business Survey Sample

Variable	Sample Size	Difference (Hours) (Endline – Baseline)	No. System Applications per Month	Attribution to ICT4T System	Total Time (Hours) Saved per Month	Total Time (Days) Saved per Month	Total Time (Hours) Saved per Year	Total Time (Days) Saved per Year
Time	1852	-66	6	0.69	-506,040	-21,085	-6,072,486	-253,020
Time	1852	-66	9	0.69	-759,061	-31,623	-9,108,729	-379,530

We acknowledge that these findings presented need to be caveated through various points of error. Firstly, the figures for the difference in hours and attribution level are self-reported and subject to error, while not all of the 1,852 businesses observed time reductions. Secondly, system usage may not always result in an application for a permit or license, but may also refer to a business checking the system to track an application or check data, so the figures may present an overestimate. Despite this, the picture is clear that the ICT4T portfolio is proving effective in taking significant amounts of cumulative time out of the trade system from the business perspective.

From the iCMS system data taken from four months across the period 2021-2022, we calculate an average of 152,906 system users per month. Assuming that most iCMS system users interact with system regularly (as confirmed by our business survey), we assume the total annual unique system users is around this figure. Using this figure we can estimate annual time reductions for iCMS users.

The average time reduction observed for iCMS users in our business survey was -32.33 hours, with users on average attributing 70% of this reduction to ICT4T. If we assume iCMS users experience this time reduction 6 to 9 times per month, we estimate an annual time reduction of **10.38 million to 15.57 million days saved**, attributable to ICT4T for iCMS system users.

Cost Reduction

The second trade barrier that we explored in the evaluation was cost. By business costs, we refer to all associated costs to business to conduct trade activities **excluding the permit, license or registration costs**. We then total and compare these costs before and after automation. Examples of these costs from previous evaluations and our business survey include:

- ✓ Transport costs (cost of travelling to and from agencies to submit trade-related applications);
- ✓ Printing costs;
- ✓ Internet and communication costs;
- ✓ Staff costs;
- ✓ Facilitation costs (consultant costs, legal costs or illegal bribes paid to agency officials).

Knowledge of business cost reductions is evident in previous evaluations with examples shared in Table 8 below.

Table 8 Examples of Business Cost Savings from Previous Evaluations

System	Indicator	Baseline	Endline	Difference	Percentage Change
AFA IMIS[31]	Processing costs (US$) incurred (per transaction) by AFA and traders to acquire licences/ permits/ certificates issued by AFA per directorate.	83	8	-75	-90%

[31] Ayaah Consult, 'Final Report: The Endline Study of TMEA Funded Trade Systems for the Agriculture and Food Authority', (2022).

System	Indicator	Baseline	Endline	Difference	Percentage Change
ITTS[32]	Annual Cost (US$) incurred before and after iTTS by traders in completing a trade cycle	4533	1889	-2,644	-58%
RFLS[33]	Annual Cost cargo owners pay (US$) at the ICDN	52,000,000	3,000,000	-49,000,000	-94%
SC-PVP[34]	Overall average cost incurred to process a seed certificate/ permit/license	39	3	-36	-92%
ATMIS[35]	Associated business costs for Pyrethrum Board Applications for permits / licenses	4	0.5	-4	-88%
RURA[36]	Average cost (USD) to process a product certificate in RURA before and after automation	39	6	-33	-85%
NAEB[37]	Percentage share of transport costs as a total of business costs incurred while seeking services from NAEB	72.2	11.1	-61	-85%

The example of cost reduction in the Rail Freight Logistics (RFLS) system is presented in the project-level evaluation as a clear case of time reductions causing cost reductions. The evidence shows that the RLFS system directly influenced the reduction of clearance time at the Inland Container Depot Nairobi (ICDN) for tagged containers from 12 days in 2018 to 4 days in 2021. This efficiency gain has led to a reduction in the cost cargo owners pay for extra days that cargo is at the ICDN from USD 52M in 2018 to an average of USD 3M in 2021 which is equal to a 94% reduction in costs cargo owners used to incur. While in relation to transport costs required to conduct trade activities, evidence from the NAEB system highlights a 61% reduction in the percentage share of business costs required for seeking services from NAEB. Prior to automation, 72% of the total business cost of using a NAEB service was spent on transport costs, compared to only 11% post-automation. This reduction highlights how businesses no longer need to fund travel to and from agencies and therefore save considerable costs.

Our evidence from the business survey is categoric in supporting project-level reports that ICT4T systems reduce associated business costs to trade in East Africa, and these reductions can be directly attributed to the implementation of the ICT4T portfolio. The evaluation's approach of seeking larger

[32] Ayaah Consult, 'Final Revised Report for the Endline Study of the TMEA Funded iTTS Systems Project', (2022).
[33] Elizabeth Mwangi, Frinton Fenny, Mohamed Gharib, 'Final Evaluation Report: Endline Evaluation of TradeMark East Africa's Cargo Tracking for Rail Project', (2022).
[34] Ayaah Consult, 'Final Report for the Endline Study of the TMEA Funded KEPHIS SC-PVP Systems', (2022).
[35] Talanta International Limited, 'Final Report: Endline Evaluation of TMEA Funded Trade Systems for the Tanzania Ministry of Agriculture, The Tanzania Medicines and Medical Devices Authority, The Confederation of Tanzania Industries, and the Tanzania Chamber of Commerce, Industry and Agriculture, (2022).
[36] CESS, 'End of Project Evaluation of TMEA Funded ICT For Trade Systems in Rwanda', (2022).
[37] CESS, 'End of Project Evaluation of TMEA Funded ICT For Trade Systems in Rwanda', (2022).

sample sizes and running significance tests, provides more confidence in the results compared to previous project-level evaluations. The results are presented in Table 9.

Table 9 Cost Results from the Business Survey

Variable	Total Observations (after IQR Rule)	Baseline (Mean)	Endline (Mean)	Diff (EL – BL)	Perc Change (%)	Standard Error	Standard Deviation	Welch T-Test (p-value / sig)	Wilcoxon RankSum Test
Cost (USD)	2204	27	14	-13.27	-49%	0.52	24.33	0.000***	0.000***

The survey asked businesses to first identify the businesses costs (excluding the cost of a permit / licence / certificate / marketing) required to complete a trade activity and then compare these business costs before and after ICT4T system implementation**. Internet, facilitation, staff, printing and transport costs were the main business costs identified by respondents, and we observed an average reduction in these costs of USD $14 per system application (e.g. permit application) per business, which equates a percentage change of -49%.** To generate these sample level figures, we adopted the same approach as used in the time reduction estimates, using the IQR rule to eliminate outliers (see 2 for more details on the IQR rule).

These average cost reductions were consistent across Kenyan (-23%) and Tanzanian systems (-76%) and by business owner gender male (-53%), female (-31%), all of which were statistically significant results. Although associated business cost reductions are observed for male and female led businesses, female-led businesses encounter greater associated business costs ($19.50 per transaction per business) compared to male-led businesses ($12.79 per transaction per business) post-automation, and this different $6.71 is statistically significant. All business sizes in our sample experienced statistically significant cost reductions, however, the margin of change for micro businesses (-$7.50) was much lower than small (-$16.16), medium (-$16.37) and large (-$17.96). The reasons why business cost reductions are experienced to a greater degree by Tanzanian versus Kenyan businesses, larger businesses, and male-led versus female led businesses are not abundantly clear from the business survey. Further research is required to better understand what is driving these reported differences.

The potential factors influencing these differences are many and require greater investigation of relative business operating costs, potential foreign currency fluctuations, and analysis of the differences between male and female-led businesses. As Figure 8 shows, the system with highest average decrease in business cost per activity post-automation is the ATMIS system, where businesses reported an average decrease of $24 per activity, representing an 80% reduction. While the users of the CMIS system reported a minimal decrease of $1 (5%). Although percentage decrease varies between systems, the key message is that all systems show an average decrease in business costs per trade activity.

Similar to time reduction, virtually all businesses (99%) who reported a cost reduction, attributed some or all of the cost reduction to the ICT4T system, as evidenced in Figure 9. **The most common**

level of attribution was 75%, as businesses on average equate three-quarters of the reduction in associated business costs to ICT4T systems.

Figure 8 Average Business Cost per Trade Activity (Baseline vs Endline) by System

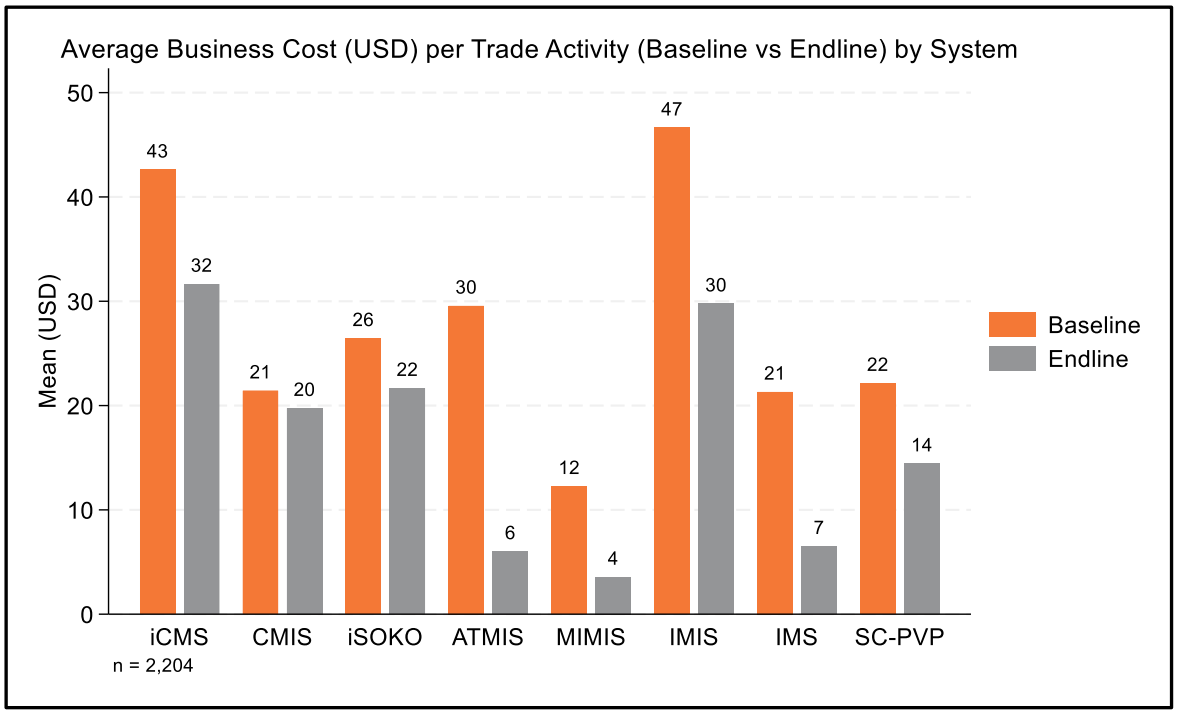
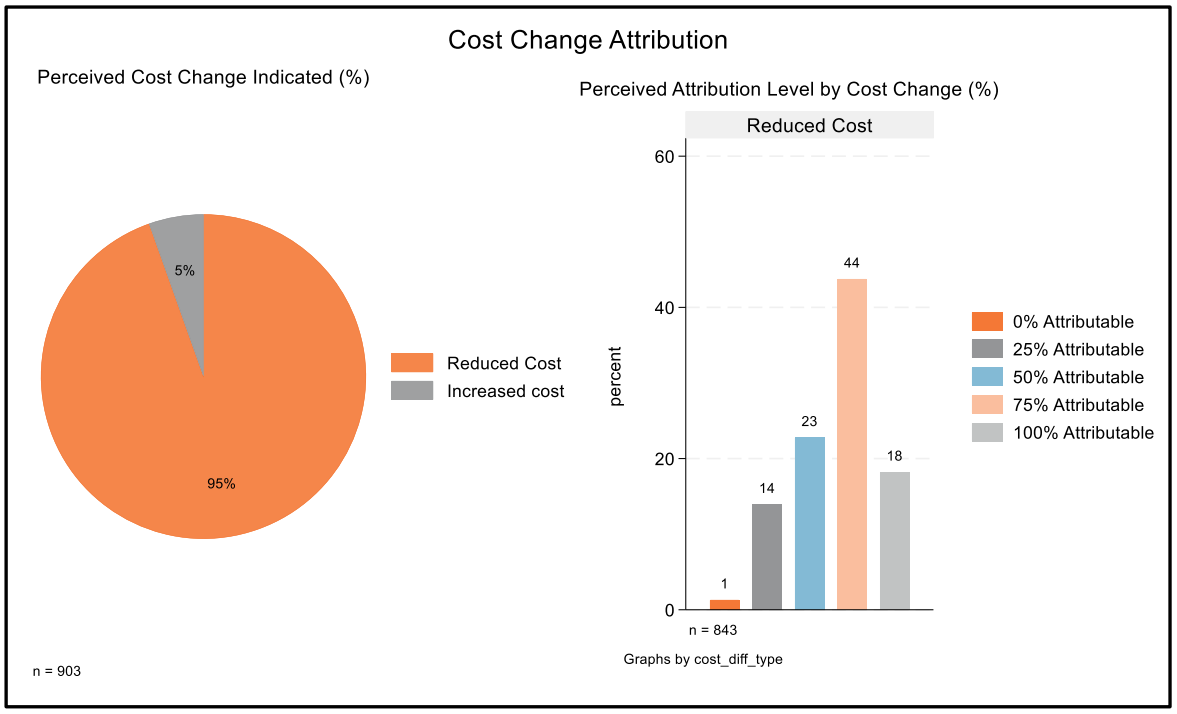


Figure 9 Cost Change Attribution



To estimate the total cost impact at the sample level for cost reductions, we follow the same approach used to calculate time reductions, with the results presented in Table 10. When multiplying the total sample size (1852), by the average business cost saving per trade application per business ($14), by the weighted average of system usage (6 = lower bound, 9 = upper bound), by the weighted attribution level of 59%, **we estimate an associated business cost reduction in the range of $-91,785 to $-137,678 per month and between $-1,101,421 to $-1,652,132 per year for businesses in our sample.** This evidence clearly shows that ICT4T is clearly taking significant levels of costs out of the trade process for the businesses in our evaluation's survey sample.

It's important to bear in mind that these cost reductions refer only to the businesses in our survey sample. It has not been possible to estimate the value of total cost reductions at the ICT4T portfolio level due to a lack of data on the total number of systems users across all ICT4T systems. If the total number of users can be obtained at the portfolio level it may be possible to estimate the level of total cost reductions across the whole portfolio.

Table 10 Estimated Economic Impact of Cost Reductions from the Business Survey Sample

Variable	Sample Size	Difference (USD) (Endline – Baseline)	No. System Applications per Month	Attribution to ICT4T	Total Business Costs (USD) Saved per Month	Total Business Costs Saved per Year
Cost	1852	-14	6	0.59	$ -91,785.12	$ -1,101,421.44
Cost	1852	-14	9	0.59	$ -137,677.68	$ -1,652,132.16

Using the iCMS system data taken from four months across the period 2021-2022, we calculate an average of 152,906 system users. The average cost reduction observed for iCMS users in our business survey was $-10.95, with users on average attributing 59% of this reduction to ICT4T. If we assume iCMS users experience this cost reduction 6 to 9 times per month, we estimate an annual cost saving of **$2.91 million to $4.36 million**, attributable to ICT4T for iCMS system users.

Combining these sources, the evaluation has found quantitative evidence of time and cost reduction from 15 systems out of the 21 evaluable projects in the ICT4T portfolio. We were unable to yield evidence on time from the following systems:

- ✓ Northern Corridor Transport Observatory (NCTO)
- ✓ Central Corridor Transport Observatory (CCTO)
- ✓ Ethiopian Chamber Digital Service (ECDS)
- ✓ Single Customs Territory (SCT)
- ✓ Food and Drug Authority Information Sharing Platform (FDA ISP)
- ✓ Regional Electronic Cargo Tracking System (RECTS)

As the NCTO and CCTO systems are transport observatories which host trade data and don't require users to make applications, it was not possible to collect data on these variables. The ECDS system is

still in an early stage of its development and has no organic users, therefore we could not sample any businesses who could comment on time or cost savings. The SCT system is transporter system where the users are agency officials rather than businesses, while we were unable to sample from the FDA ISP and RECTS systems due to lack of engagement from host agencies during the time available for the evaluation.

Business and Agency Satisfaction

Another way of understanding the effectiveness of ICT4T systems in reducing trade barriers is through assessing overall satisfaction with ICT4T systems both from the perspective of businesses and agencies. **In the current ICT4T portfolio evaluation and in previous evaluations undertaken, businesses have consistently reported high levels of satisfaction with ICT4T systems.**

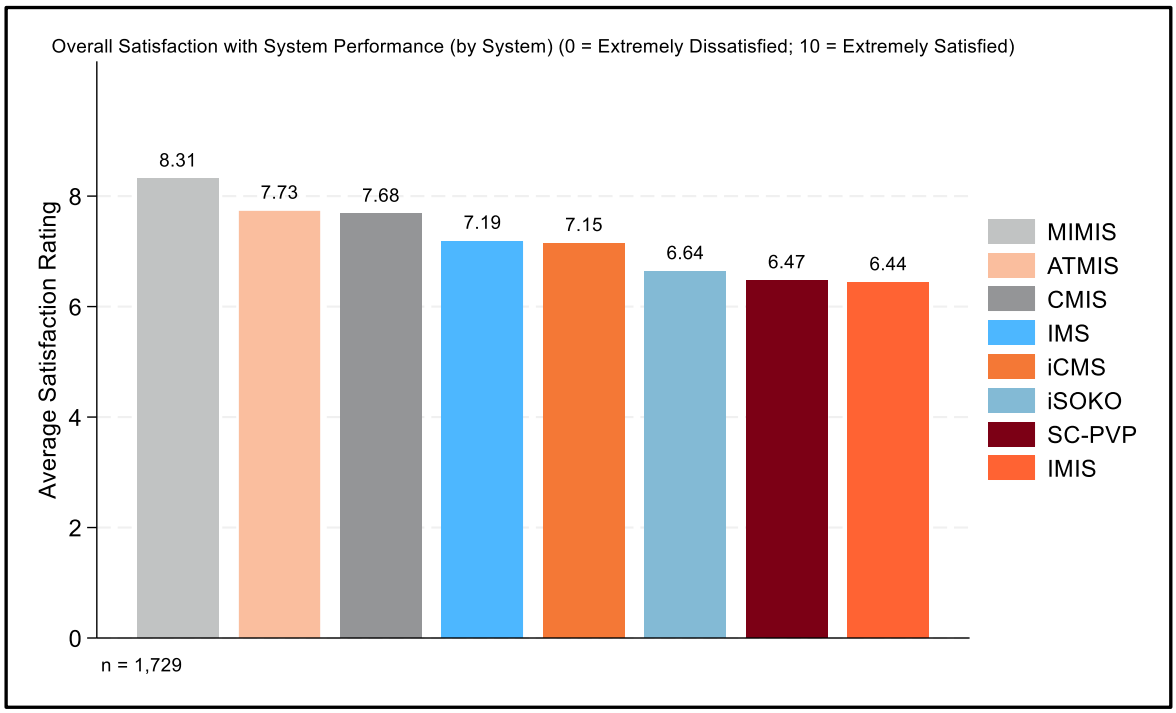
Evidence from previous evaluations of seven systems presented in Table 11 below shows an average percentage of end-users who are satisfied with the respective ICT4T systems at 86%. The highest satisfaction levels were recorded for AFA IMIS (98%) and NAEB (97%) system users, with KEPHIS PVP system users reported lowest satisfaction levels at (71%). This was largely influenced by responses from seed sellers where only 59% reported they were satisfied with system performance in late 2021.

Table 11 System Satisfaction Ratings from Businesses from Project Evaluations

System	Indicator	Result
AFA IMIS	Percentage of AFA trade actors satisfied with the quality of service delivery through AFA MIS	98%
ITTS	Percentage of ITTS stakeholders satisfied with system effectiveness	86%
RFLS	Percentage of end users satisfied with system services	81%
SC-PVP	Percentage of Economic Operators satisfied with the quality of service delivery by KEPHIS Seed Certification and Plant Variety Protection Department	71%
ATMIS	Percentage of End Users satisfied with the ATMIS system	89%
NAEB	Percentage of users satisfied with the NAEB system.	97%
RECDTS	Percentage of users satisfied with the RECDTS platform.	78%
Average	**86%**	

In the business survey we also asked businesses to rate their overall level of satisfaction with the performance of the system (0 = Extremely dissatisfied; 10 = Extremely satisfied). The results disaggregated per system are presented in Figure 10Figure . The sample average is 7.35 which indicates a positive average satisfaction rating of ICT4T system performance. The system with the highest average satisfaction rating was the MIMIS system (8.31), while the system with lowest average performance rating was the 3536 – AFA IMIS (6.44).

Figure 10 System Satisfaction Rating (by System)



These figures highlight that businesses in our survey sample are generally satisfied with the performance of ICT4T systems. High-levels of satisfaction are key to effective trade systems as they encourage compliance and trust between agencies and businesses. We explore these themes further later in the report.

3.2. EQ 9. How did the portfolio strengthen governance, enhance transparency, efficiency and service delivery for trade, and improve trader competitiveness, and compliance in the countries and the region?

Evidence from previous evaluations, our business survey and stakeholder consultations shows that ICT4T systems are effective in improving the governance of the trade system through increasing transparency and accountability of the trade environment, enabling businesses to trust trade processes and trade bodies more.

Transparency, Accountability and Reliability

To assess the extent to which governance of the trade system has improved in East Africa, this evaluation focused on evidence relating to principles of good governance, specifically transparency,

accountability and reliability.[38] In this evaluation we interpret **transparency** to refer to the extent to which trade processes are visible, and whether businesses are able to understand and follow every stage of the process. In terms of **accountability**, we interpret this both in terms of businesses responsibly following the mandate of trade agencies, and conversely the extent to which agencies effectively deliver for businesses. **Reliability** we understand as the extent to which ICT4T systems are trustworthy and consistently perform when businesses need them to.

Figure 11 Percentage of Respondents Reporting Improved Transparency and Accountability (Previous Evaluations)

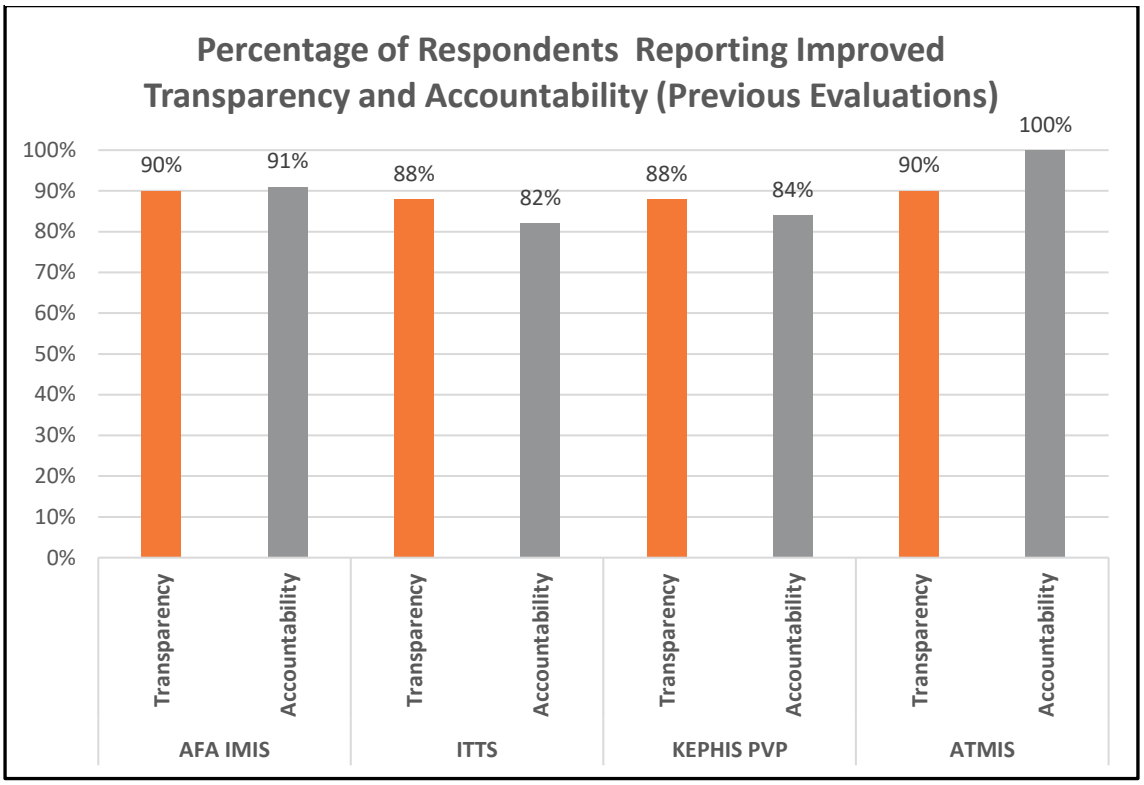


Figure 11 presents results from previous evaluations that measure changes in transparency and accountability resulting from the introduction of ICT4T systems. The figure shows strong levels of improvement in these areas, with the percentage of end-users citing improved transparency ranging from 88% (ITTS) to 90% (AFA IMIS / ATMIS), while improvements in accountability range from 82% (ITTS) to 100% (ATMIS). Although derived from small sample sizes, the findings are clear that businesses have observed improvements in these aspects.

In terms of business views on transparency from this evaluation's primary evidence, the in-depth interviews (IDIs) included an assessment of the change perceptions of transparency before and after automation. The IDIs found 85% of businesses reporting improved trade transparency as a result of ICT4T system implementation, which is consistent with the findings from previous evaluations conducted on projects within the ICT4T portfolio.[39]

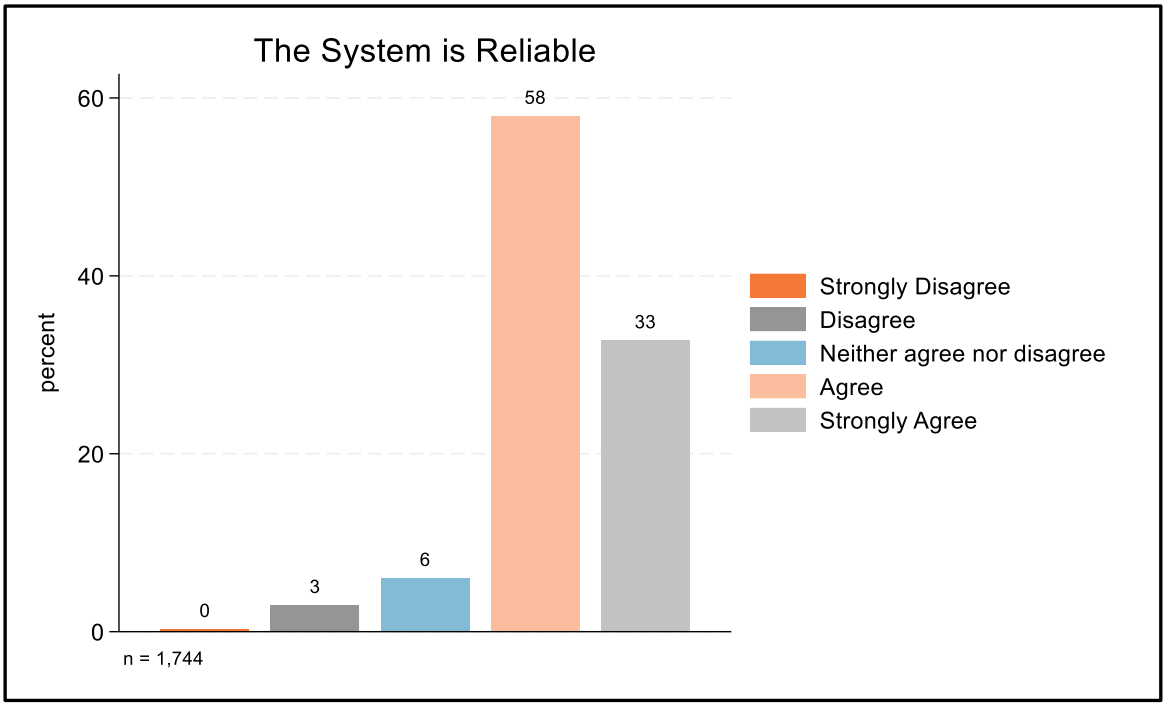
In the business survey, we asked respondents to assess the extent to which the ICT4T system they use is reliable. Figure 12 presents the results from this question using a Likert scale of Strongly Disagree

[38] Council of Europe, 'Principles of Good Governance' (accessible **here**).
[39] These findings are limited as they are derived from a small sample size of 13 IDIs.

(1) to Strongly Agree (5). In total, 91% businesses responded positively, stating they either Agreed (58%) or Strongly Agreed (33%) that the ICT4T system they use is reliable.

Disaggregated by country, we observe 88% of Kenyan businesses and 94% of Tanzanian businesses in our sample reporting positive feedback on system reliability. There was also no major difference in the survey among female-owned businesses (90%) compared to male-led businesses (91%) on ICT4T system reliability.

Figure 12 System Reliability Rating (Business Survey)



This evidence was supported by consultations with stakeholders. In articulating system effectiveness a stakeholder from the SCT system highlighted how the visibility and traceability of transactions is the most significant improvement observed, allowing national revenue authorities to easily track and trace specific cargo across East Africa.

> *"The biggest thing is the visibility and the traceability of transactions, because with the platform the moment you report, you will immediately will be able to tell where the problem is. The other one is, of course, the flexibility, we are only dealing with one party, which is the platform and the moment you are interfaced with that functioning platform, you don't even need to wait for the others."*
>
> (SCT Stakeholder)

Improved system effectiveness was also said to have brought about greater accountability among agencies. In explaining the approval process for the AFA IMIS system, we learnt that AFA sets internal targets of approvals within 48 hours, with any applications taking longer flagged internally. This was cited as a notable agency behaviour shift, given that approvals previously took 5 to 10 days. ICT4T systems are also considered to bring about greater accountability between agencies and lead

government ministries. The NCTO system, for example, which collects and stores data on indicators relating to railway and road transportation, is used to keep agencies such as the Kenya Port Authority accountable to lead ministries.

3.3. EQ 10. Is trade and corridor data effectively disseminated to right audiences?

Our evaluation has found evidence from the NCTO and CCTO systems that observatory data is being effectively disseminated to target audiences, however we have been unable to unearth detailed examples of the data shaping policy decision-making in this evaluation.

ICT4T systems that contribute towards the 'Portfolio Output 3 – Effective Data Information Systems' in the ToC are few, with only the NCTO and CCTO systems identified during the ToC workshop with TMA staff as key contributors. The NCTO and CCTO systems differ from other ICT4T systems as they are designed as data warehouses, where performance data across numerous trade-related indicators such as *Average cargo dwell time in Mombasa port* or *Average Njuki Weighbridge crossing time* is published in digestible formats and made publicly available. A key ToC assumption of this output is that the trade and corridor data generated by the observatories is effectively disseminated to the right audiences. This evaluation defines 'right audiences' as trade agencies and government ministries.

As referenced in the discussion on accountability, **there is evidence from observatory stakeholders that the data and reports they publish are impactful, as they are being used by lead government ministries to hold trade agencies to account, with the example of the Kenya Ministry of Transport and Infrastructure using NCTO data to hold Kenya Port Authority to account.** This process of using NCTO data to monitor performance and hold agencies to account was verified by a KRA stakeholder who commented that this process takes place for performance monitoring of the RECTS system, where the NCTO data "*informs engagement with different stakeholders on how to improve the performance of the corridor…and quarterly, bi-annual and annual corridor reports are shared with a wide range of stakeholders".*

There also signs that the transport observatories are improving in their ability to disseminate data to audiences. A CCTO stakeholder mentioned that a key form of data dissemination has been through transport observatory mobile application, which allows for updates on corridor delays and crossing times, while also digital developments such as the Data Warehouse, Enterprise Service Bus and the Business Intelligence Platform enable greater automation, aggregation, analysis and presentation of data to key audiences. However, beyond the views of key stakeholders, it has not been possible for the current portfolio evaluation to independently verify the extent to which observatory data is actually reaching its intended audiences and being utilised in the development of trade policies. This is an area where further investigation is required.

3.4. EQ 11. To what extent are governments and the private sector in East Africa committed to the digital agenda?

Our evaluation evidence is clear in showing government and private sector commitment to the digital agenda in East Africa, as measured through growing system usage and examples where government agencies have renewed contracts and amended policy frameworks.

To show evidence of strong private sector commitment, the evaluation gathered evidence of system use, as measured by the number of users and the number of applications in the system, covering the period of 2018 to 2023. Despite our best efforts engaging with host agencies, we were only able to attain multi-year usage data from six systems in the ICT4T portfolio, presented in Figure 13 and Figure 14.

Figure 13 Total Number of Users per Year by System

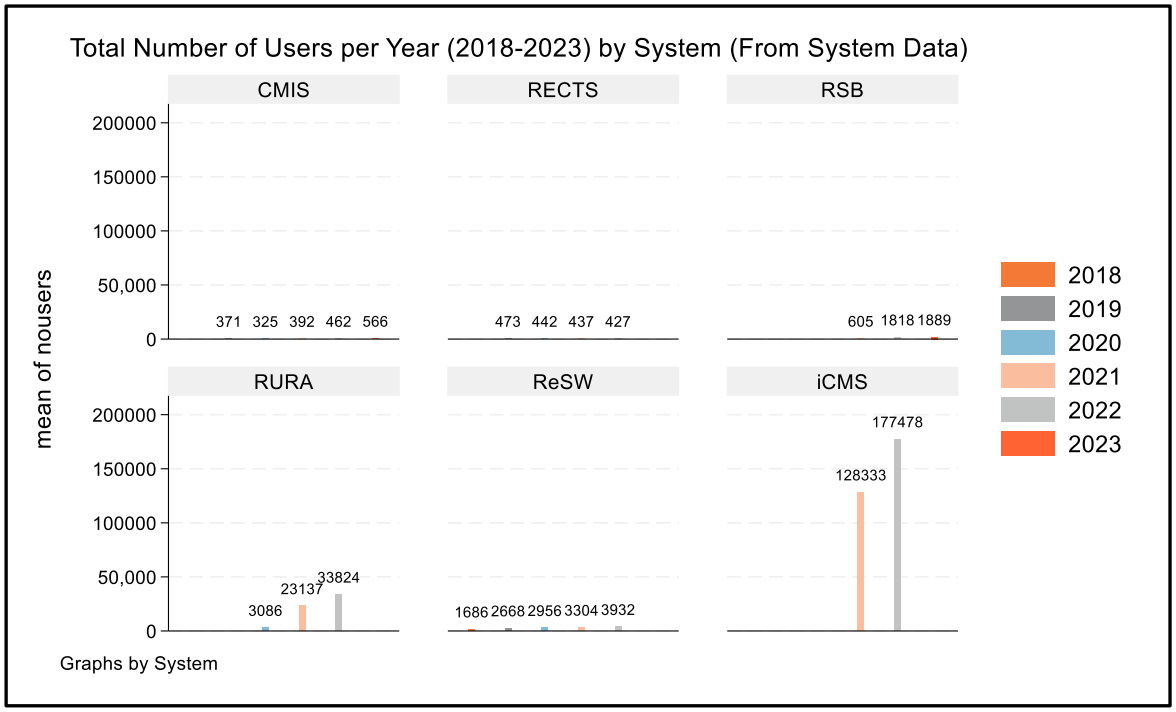


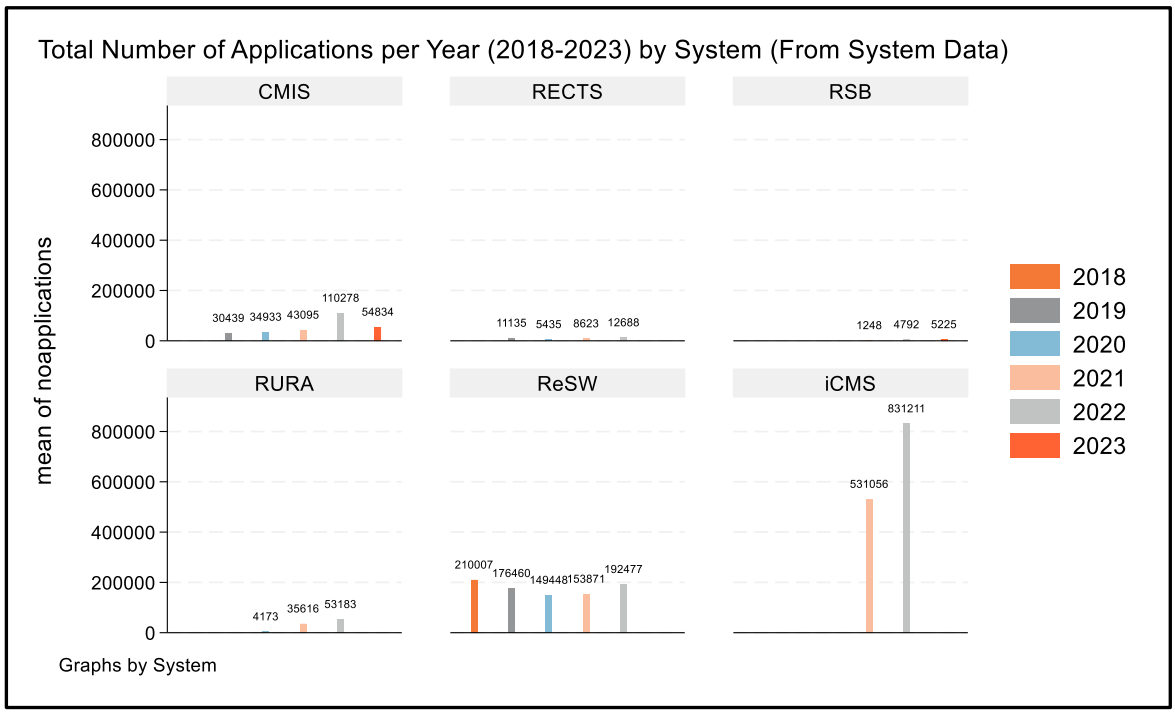
Figure 13 shows a clear increase in the number of users interacting with the six systems where data was available. The iCMS system has by far largest number of individual users, ranging from 128,333 in 2021 to 177,478 in 2022.[40] The RURA system underwent the greatest increase, from 3,086 users in 2020 to 33,824 users by 2022, representing a 996% increase. On a smaller scale, the CMIS system also grew in users from 371 in 2019 to 566 in 2023, representing a 53% increase.

In terms of the number of applications, Figure 14Figure 14clearly shows regular year-on-year application submissions, although the trend does not always show a linear increase. For example, the ReSW system while showing a linear increase in system users from 2018 to 2022, the number of applications in 2018 (210,007) has not been exceeded in subsequent years. This could be in part

[40] The iCMS usage figures presented represent an average from a sample of two months of transaction data in 2021 and 2022.

explained by COVID-19, as a similar dip in applications was observed from the RECTS system in 2020-2021, with signs of improvement in 2022.

Figure 14 Total Number of Applications per Year by System



The business survey undertaken as part of this evaluation further confirmed that businesses are continuing to use ICT4T systems in 2023. Businesses were asked to comment on how frequently they currently use an ICT4T system, with results presented in Table 1212.

The 'Monthly Use Value' presents our quantification of the frequency 'Level', using an lower ('several' = 2) and an upper bound ('several' = 3). For example, we assume a business using a system several times per day is on average using it three times per day. If we multiply three by five working days and then by four weeks in a month, we assume a business uses the system 60 times per month. Table 12 **presents the modal response of businesses using systems as 2 or 3 times per month**. When we calculate a weighted average of frequency of use for the sample, we arrive at an average of 6 system uses (lower bound) and 9 system uses (upper bound) per business per month, which is further evidence of strong private sector engagement with ICT4T systems, among the system users we surveyed.

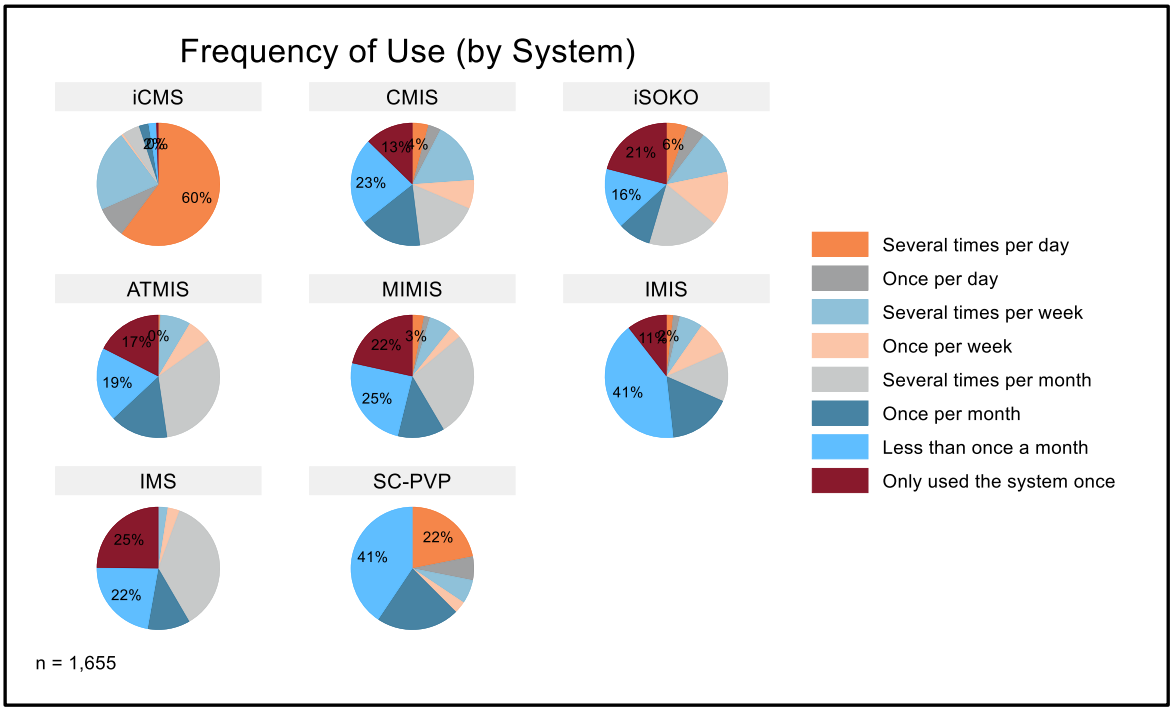
Table 12 Frequency of Use (Business Survey)

Level	Monthly Use Value (Lower Bound)	Monthly Use Value (Upper Bound)	Frequency
Several times per day	40	60	159
Once per day	20	20	45
Several times per week	8	12	182
Once per week	4	4	113
Several times per month	2	3	366
Once per month	1	1	210

Level	Monthly Use Value (Lower Bound)	Monthly Use Value (Upper Bound)	Frequency
Less frequently than once per month	0.5	0.5	330
Only used the system once	0.1	0.1	250
Total			**1655**

Breaking down frequency of use by system, Figure 15 shows our results. The iCMS system is by some distance the most frequently used system among those surveyed in our sample of businesses. Sixty percent of businesses who interact with iCMS use the system several times per day, which we estimate to be between 40 and 60 times per month. Systems such as ATMIS, MIMIS and TCCIA IMS appear to be used less frequently, as businesses typically apply for annual licences or permits.

Figure 15 Frequency of Use (by System)



Continued government sector engagement is observed through various means. Firstly, the fact that government bodies host and fund TMA systems is an example of a commitment to the digitisation agenda, evidenced through the majority of ICT4T systems. Also, continued engagement between agencies and TMA over multiple strategy periods, shows that there is demand among governments and trade agencies for digitisation. This engagement also happens when the TMA funding cycle is finished as agencies seek TMA's support with system enhancements, which also shows a desire to keep pace with technological developments and serve the needs of the private sector.

3.5. EQ 12. Does the reform process have necessary agency buy-in, financial backing and technical skills to manage transition to digitisation and integration of trade system?

Evidence from consultations with stakeholders found that agencies are generally enthusiastic about the transition to 36hey36ization, however, the extent to which they fully back the transition with finances and technical skills is more questionable. The evaluation evidence suggests that without TMA acting as the catalyst for change, agencies were less likely to undertake 36hey36ization unsupported.

Stakeholders who ranged from IT personnel to senior agency management, were universally positive about how their respective agencies bought into the 37hey37ization process. The 'sell' of an efficient online system that served private sector needs, but crucially, brought in agency revenue, was found to be key. This feedback was given for multiple systems including the SCT, AFA IMIS, ITTS, RFLS, SC-PVP, iCMS, CMIS and NCTO systems. Two systems where buy-in appeared to be less ubiquitous were the ECDS and iSOKO systems. One stakeholder commented that other agencies within the Ethiopian Chamber of Commerce were holding up system development, despite multiple engagements and discussions. While a stakeholder highlighted that the roadmap for the agency to host the iSOKO system was still not yet clear.

In terms of agencies willing to provide financial and technical backing to 37hey37ization, the evidence generally more mixed. There were clear cases where agencies have given financial and technical backing, for example KRA is responsible for the maintenance of the RECTS and iCMS systems and it has the in-house capacity to do this effectively. The same is true for the EAC as they cover the hosting costs and manage the maintenance of the SCT system in-house. Other systems such as CMIS and SC-PVP are financially supported by the respective agencies but they do not yet have the technical skills in-house, so they sub-contract out the maintenance contracts to external developers.

While many systems appear to be managing themselves financially through the system-generated revenue and through the in-house or sub-contracted maintenance capacity, some agencies appear unable to fund system development. The clearest case of this is with the TCCIA IMS system. This system is designed to produce electronic Certificates of Origin (e-COO) in Tanzania. Currently, the system allows businesses to make the application online, but it does not have the capacity to make the certificate available online, meaning business are required to visit their nearest chamber of commerce office in person to manually print the certificate.

Although the TCCIA has the IT capacity to manage the system, it is unable to fix this gap in the system on its own. The agency stated a need for further support from TMA to make the upgrades necessary. This example highlights how TMA's work in ICT4T is essentially never ending as there will always be a need for it to a) undertake the next step in systems improvement as technology evolves; and b) step in to fill a funding gap when host agencies have nowhere else to turn when upgrades and improvements are required.

3.6. EQ 13 – To what extent does improved agency competency enable effective high-level collaboration?

There is some evidence of effective high-level collaboration among agencies initiated by the ICT4T portfolio, however, we were unable to gather robust evidence of improved agency competency, and are therefore unable to fully test this assumption. Measurement of agency level competency is resource intensive, and requires complex and detailed assessment of an agency's ability to perform its core functions. While some evidence was gathered in relation to this question, a full assessment was not possible within the scope of the resources available for this evaluation.

In the ICT4T ToC, improved agency competency is a key assumption that enables harmonised trade systems to lead to greater agency coordination in the management of trade procedures and documents. During our review of previous evaluations and our primary data collection, we were unable to gather evidence to adequately assess agency competency levels. Although improved trade

system reliability and high satisfaction could suggest improved competency, we did not focus on it specifically.

There is some evidence however of high-level agency collaboration which has been enabled by the introduction of ICT4T systems. Two of the clearest examples are with the SCT and RECTS systems. The SCT system is hosted by the EAC Secretariat and is effectively a transporter system which sends customs notices between revenue authorities of national governments within the EAC for any cross-border cargo. The lead agencies participating in the system include the Kenya Port Authority (KPA), Kenya Revenue Authority (KRA), Office Burundais des Recettes (OBR), Tanzania Revenue Authority (TRA), Rwanda Revenue Authority (RRA) and Uganda Revenue Authority (URA). Since the system's inception in 2020, SCT system data shows a total of 3,468,590 customs notices were shared between participating agencies within the EAC.[41] This is clear evidence of national agencies collaborating to ensure smoother movement of goods within the SCT.

Another example of effective agency collaboration is with the RECTS system. The RECTS system enables collaboration on the information exchange and the tracking of goods between revenue authorities along the Northern Corridor, including KRA, URA and RRA. There are three Centralized Monitoring Centres (CMCs), one in Kenya, Rwanda and Uganda, which provide 24/7 real-time alerts of all sealed cargo along the Northern Corridor. Additionally, stationed throughout the Northern Corridor countries are 14 response units who can quickly handle emergency cases of drivers veering from the agreed route or being intercepted by criminal entities, for example. RECTS has enabled agency collaboration which would not have been possible without its introduction.

3.7. EQ 14. To what extent has agency revenue collection and regulation enforcement (e.g. health and safety) improved?

It can be tentatively concluded that ICT4T systems have improved agency revenue and regulation enforcement, but overall, the evaluation evidence gathered is limited to stakeholder perceptions. Obtaining statistics on revenue collection from host agencies has been challenging.

Revenue Collection

Throughout the data collection process we tried to engage host agencies in the ICT4T portfolio to share information on the revenue collected through the ICT4T systems. Unfortunately, we only received multi-year revenue figures from a two systems such as those presented for the RURA and iCMS systems in Table 13.

Table 13 RURA and iCMS System Revenue Generation

Year	Revenue generated by the RURA system (USD)[42] (Year)	Revenue generated by the iCMS system (USD)[43] (Month)
2020	$288,504.52	-

[41] Figures taken from SCT system data shared by the EAC Secretariat (2023).
[42] Figures taken from the RURA system and shared by RURA (2023).
[43] Figures taken from the iCMS system and shared by KRA (2023). We received two full months of transaction data from 2021 and 2022. These figures presented are a monthly average for 2021 and 2022.

Year	Revenue generated by the RURA system (USD)[42] (Year)	Revenue generated by the iCMS system (USD)[43] (Month)
2021	$3,248,435.45	$89,631,542.43
2022	$5,855,241.20	$595,960,166.85

The figures for the RURA and iCMS systems are positive and show a massive increase in the revenue collected through the system from 2020 to 2022. Assuming this is replicated across the ICT4T portfolio, which is not unreasonable given this is how the systems are designed, it suggests that ICT4T systems enable greater national revenue collection. However, without additional, concrete revenue collection figures from other ICT4T systems, this remains an assumption only.

The growth in revenue collected observed from our transaction data sample from the iCMS system mirrors the thoughts of KRA stakeholders. During our consultations, 39hey outlined how tax collections from customs have increased from Kshs 510 billion in 2019/20 to Kshs 754 billion in 2022/23, which represents 47% growth. The same stakeholder also attributed 60% of that growth to the iCMS system, although the evaluation has not been able to independently verify this claim.

Stakeholders frequently referred to the revenue capturing benefit of ICT4T systems as a primary motivation for agencies to engage in digitisation. For example, one stakeholder remarked how the faster rate of cargo clearance (and consequently the higher revenue collection) enabled by the iCMS system was a 'key driver' for the revenue authority in adopting the system. Another stakeholder remarked that since the AFA IMIS system system's introduction, AFA's revenue has increased by 20% to 30%. Furthermore, a stakeholder outlined how the improvement of revenue collection from the KNCCI operated COO system has enabled the system to run itself from the revenue it generates. This suggests revenue generation is a key pillar of systems sustaining themselves. However, as above, the evaluation was unable to verify these claims by obtaining the AFA IMIS or KNCCI COO revenue generation figures.

Our inability to substantively capture changes in revenue collection among agencies in the ICT4T portfolio leaves us unable to estimate the economic impact of ICT4T on national and regional revenue collections. This could be a focus in future ICT4T evaluations.

Regulation Enforcement

In terms of regulation enforcement, stakeholders are largely positive about how ICT4T systems have improved compliance with regulations. Some examples cited include how data captured from the NCTO system has encouraged the trading community to comply with cross-border trade regulations, with the example of the reduction of truck overloading incidences identified. Online system validation of licences, certificates and permits also appears to be a crucial driver in improving regulation compliance. For example, the e-COO implemented by KNCCI has reduced the cases of exporters using fake COOs as they come with an online verification. An ITTS stakeholder also identified the link between improved system efficiency and improved system compliance in the tea trade, as tea traders

can easily procure or renew their licences which reduces cases of tea traders operating without the proper accreditation.

4. IMPACT

The evaluation ToR identifies impact as *"the positive and negative primary and secondary long-term effects produced by the portfolio, whether directly or indirectly, intended or unintended"*. For this evaluation we have sought to explore this by defining 'impact' as a consideration of changes in business performance brought about by the ICT4T portfolio with a specific focus on trade volumes, transaction values, annual turnover and employee growth. Previous project-level evaluations predominantly considered impact through the lens of time and cost reductions, but this evaluation has attempted to go a step further and assess the extent to which time and cost reductions translate into perceived changes in business performance. The Eqs for the Impact section are presented in Table 14.

Table 14 Impact Evaluation Questions

Evaluation Questions
18. What was the impact of the ICT 4 Trade Portfolio since the beginning of Strategy 2 in reference to the TOC logic that was established?
19.What have been the benefits established and how do the established results contribute towards effective trade systems and procedures?
20. What deliberate and unintended results – positive and negative – did the intervention produce? How did these occur?
21. Does improved information and reduced non-tariff trade barriers (NTBs) encourage more market players?
22. To what extent does improved agency transparency reduce incidents of regulations violations?

4.1. EQ 18. WHAT WAS THE IMPACT OF THE ICT 4 TRADE PORTFOLIO SINCE THE BEGINNING OF STRATEGY 2 IN REFERENCE TO THE TOC LOGIC THAT WAS ESTABLISHED?

Our approach to answering this evaluation question focuses on the intermediate impact and outcomes of the ICT4T ToC, namely:

- ✓ **Intermediate Impact:** Increased Trade
- ✓ **Outcome 1:** Reduced Barriers to Trade
- ✓ **Outcome 2:** Improved Business Competitiveness

Intermediate Impact – Increased Trade

Primary evidence from the business survey shows that businesses who interact with ICT4T systems report increase trade volumes and achieve higher average transaction values. From the results presented in Table 15, we observe that businesses, on average, have increased their number of monthly trade transactions by 29% and average transaction value has increased by 15% ($133), both of which are statistically significant results at the 5% level. This means we are highly confident that baseline and endline averages for these variables are different. These results mirror the story of EAC economic and trade growth during TMA's Strategy 2 period (2017-2023), presented in Section 1.4.

Figure 19 **Error! Reference source not found.**shows that 83% of respondents perceived that their business trade volumes had increased in the period since they first started using an ICT4T system. Significantly, 91% of businesses who indicated that trade volumes had increased, attributed *some or all of the change* to the ICT4T system.

Although average attribution levels for increased trade volumes are lower than for time and cost variables, a modal response of 50% attribution level highlights that businesses equate significant value to ICT4T systems for enabling increased trade volumes. The differing average attribution levels between time, cost and trade volumes allow us to make an important distinction. While the evidence presents the ICT4T portfolio to be a key driver in taking time and business cost out of the East African trade system, they appear more as facilitators of increased trade for businesses. In other words, ICT4T systems create an enabling environment, but a myriad of other factors referenced such as company investment and macro-economic shifts (beyond the control of individual businesses themselves) also play a key role in changing trade volumes.

Table 15 Trade Volume and Transaction Value Results[44]

Variable	Total Observations (after IQR Rule)	Baseline (Mean)	Endline (Mean)	Diff (EL – BL)	Perc Change (%)	Standard Error	Standard Deviation	Welch T-Test (p-value / sig)	Wilcoxon RankSum Test
Trade Volume (No. per Month)	2193	7	9	2	29%	0.19	9	0.000***	0.000***
Transaction Value (USD per Month)	1855	876	1009	133	15%	27.9	1202.2	0.020***	0.003***

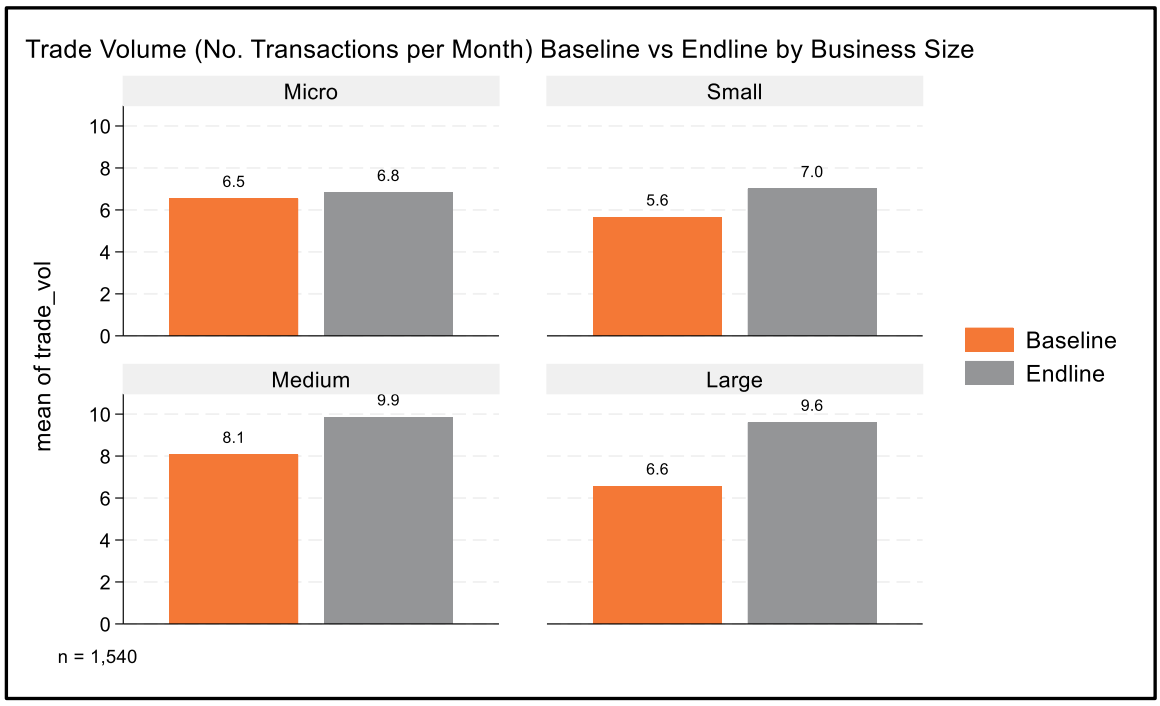
Figure 18 breaks down reported change in monthly transaction volume (baseline to endline) by ICT4T system. Businesses from one system (iSOKO) reported average decreases in monthly trade volumes since automation, while all other systems showed marginal increases in trade volumes. While we cannot infer why businesses using iSOKO present an average decrease in trade volume compared to other systems in the ICT4T portfolio, the overall trend is that of an increase in transaction volume.

If we compare trade volume by business size (based on turnover), we observe statistically significant increases in trade volume for small, medium and large businesses (top 75% turnover in our sample), with the greatest increase observed in large businesses (+45%). For micro businesses we observed a

[44] To standardise values for trade volume and transaction value, we first asked businesses which time period (week, month, quarter or annual) was the easiest for them to recall values. Trade volume refers to the number of trading transactions a business completed (before and after automation), while transaction value refers to the average value (USD) of each trading transaction. We then converted all responses into a monthly trade volume and monthly transaction value in US Dollars for easy comparison. To eliminate outliers from our results on trade volume and transaction value, we implemented the IQR rule.

marginal increase in trade volume, but the difference was not statistically significant, suggesting there is affect of ICT4T in increasing trade volumes for micro businesses (see Figure 16).[45]

Figure 16 Trade Volume Disaggregated by Business Size (Baseline vs Endline)



[45] From our sample of businesses, the breakdown of business size is based on annual turnover broken down as: Micro (up to $5,217), Small ($5,218 to $15,217), Medium ($15,218 to $34,782), Large ($34,783 to $152,173).

Figure 18 Average Monthly Transaction Volume (Baseline vs Endline) by System

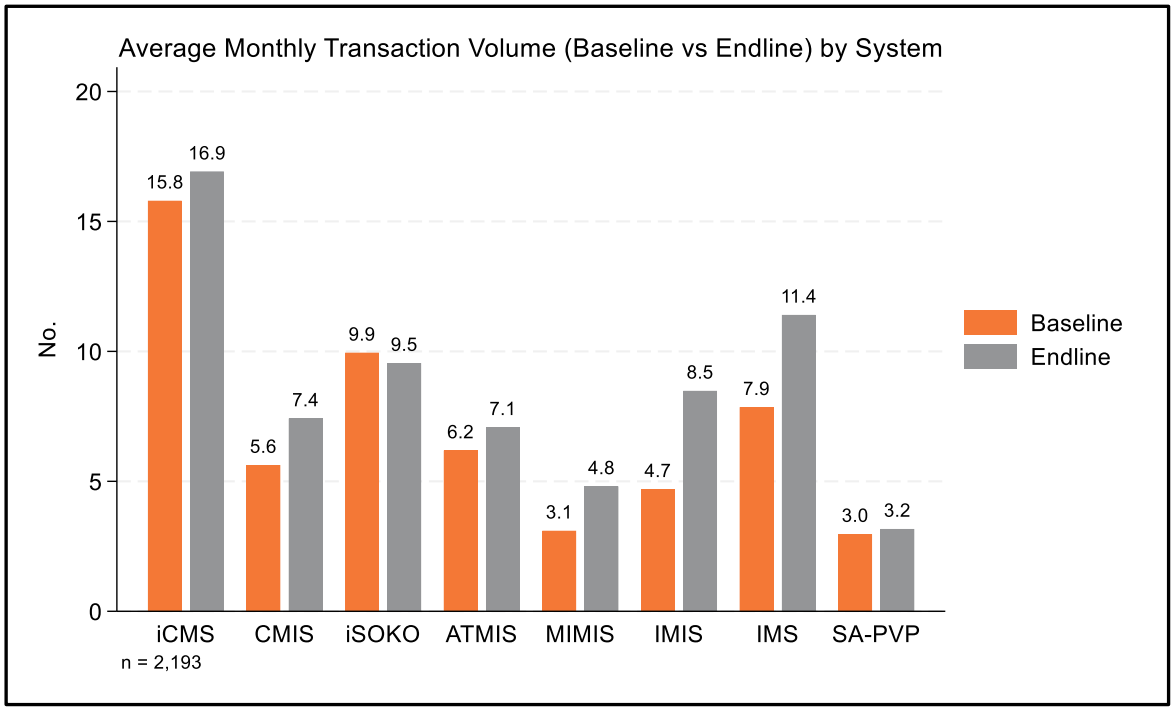
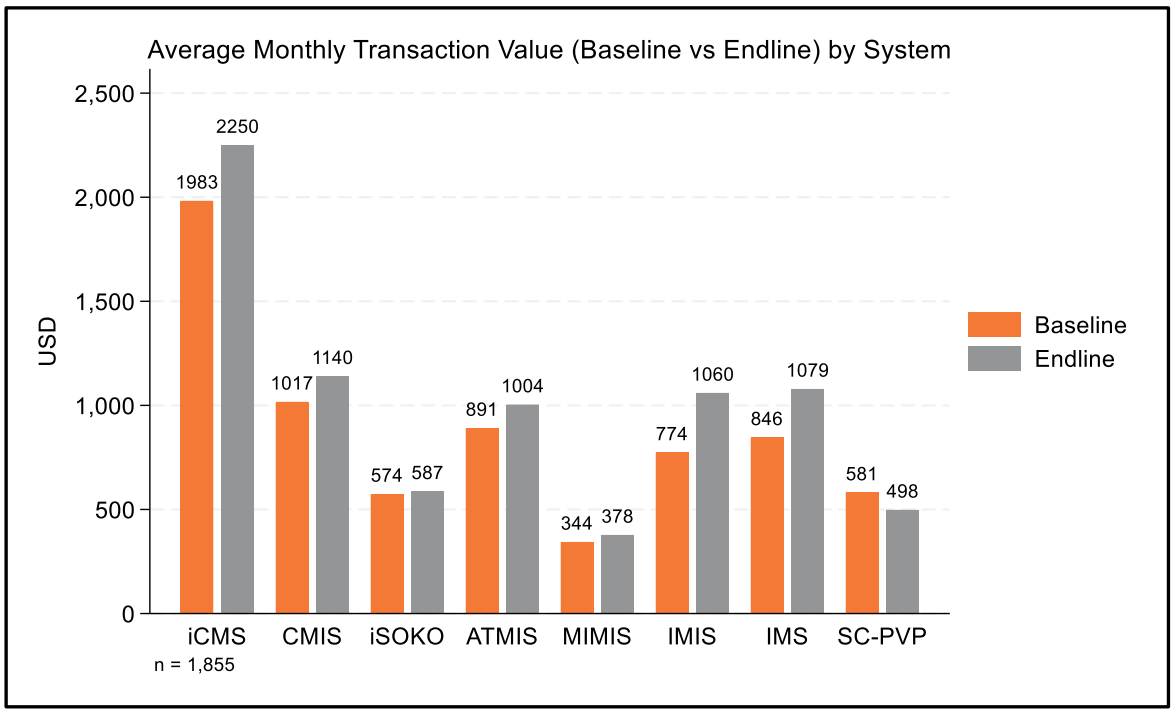
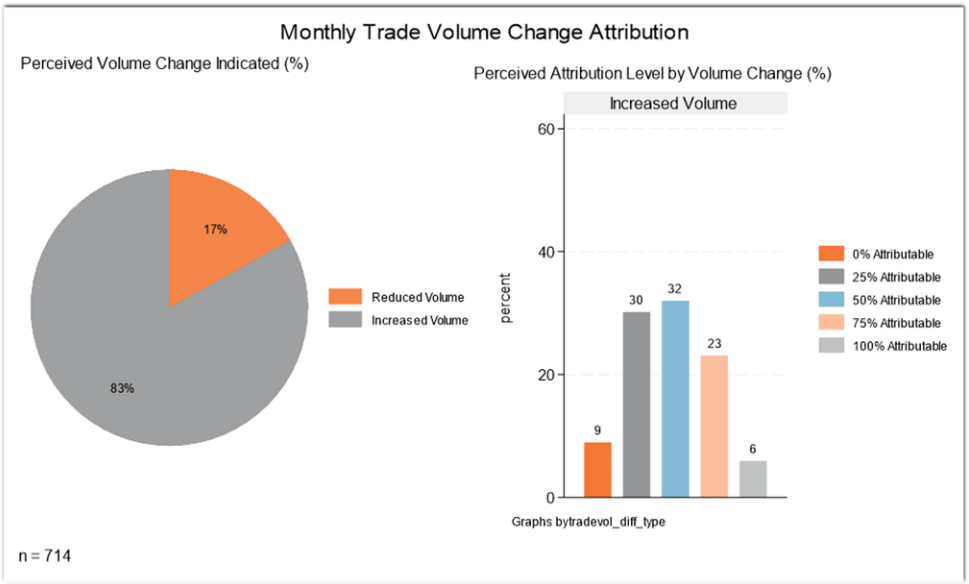


Figure 17 Average Monthly Transaction Value (Baseline vs Endline) by System



In terms of transaction value change by system, Figure 17 presents the breakdown. We observe increases in monthly transaction value across all systems apart from the SC-PVP system which reduces by 7% (from $581 to $498). The largest average increase in monthly transaction value was reported by users of the AFA IMIS system, where average transaction values increased by 37% ($774 to $1060).

Figure 19 Monthly Trade Volume Attribution



In an attempt to quantify the value of the increased trade benefit at the sample level, the average monthly trade volumes were multiplied by the average transaction values by system for baseline and endline. The monthly and annual difference was then calculated, and a weighting based applied on the sample size per system. The weighted attribution level for trade volume of 44% was then applied to extract the estimated change in trade volume, that is attributable to ICT4T for businesses in the survey sample. The results of this analysis are presented in Table 16**Error! Reference source not found.** below.

Using this approach, we estimate businesses in our sample attribute an average of $603 of increased trade volumes per business per month after automation to ICT4T, equating to an annual increase of $7,235 per business on average. If we multiply this annual average increase by the number of businesses in our sample (1,852), we observe a total annual increase in the value of goods traded of $13,398,565 that is attributable to ICT4T systems.

Table 16 Trade Impacts of the Survey Sample

System	Sample Size	Weight	Weighted Baseline (USD per Month)[46]	Weighted Endline (USD per Month)	Weighted Baseline (USD per Year)	Weighted Endline (USD per Year)	Modal Attribution Level	Weighted Month Average (Attributed to ICT4T)	Weighted Year Average (ICT4T)
iCMS	199	0.11	$3,409.22	$3,384.72	$40,910.62	$40,616.63	0.36	-$8.72	-$104.65
CMIS	358	0.19	$1,179.54	$1,542.57	$14,154.53	$18,510.84	0.38	$136.13	$1,633.62
iSOKO	272	0.15	$843.02	$689.69	$10,116.29	$8,276.32	0.53	-$82.00	-$984.03
ATMIS	575	0.31	$1,659.80	$2,182.02	$19,917.60	$26,184.23	0.50	$263.44	$3,161.29
MIMIS	70	0.04	$39.01	$71.44	$468.08	$857.24	0.43	$14.03	$168.39
IMIS	130	0.07	$271.65	$446.44	$3,259.83	$5,357.24	0.44	$77.68	$932.18
IMS	212	0.11	$774.74	$1,358.65	$9,296.86	$16,303.85	0.35	$205.75	$2,469.00
SC-PVP	36	0.02	$33.88	$29.04	$406.57	$348.49	0.71	-$3.43	-$41.14
Total (per business)	**1,852**	**1**	**$8,210.87**	**$9,704.57**	**$98,530.38**	**$116,454.84**	**0.44**	**$602.89**	**$7,234.65**
Total (sample)							**0.44**	**$1,116,547.11**	**$13,398,565.31**

[46] To calculate the weighted baseline and endline average (per month), we multiply the average trade volume (number of monthly transactions multiplied by average value of transactions) by the system weight, which is calculated by dividing the system sample size by the total sample size. To work out the annual estimates, we multiply this figure by 12.

While informative, it should be borne in mind that these figures are subject to error as they are the product of recall by the businesses surveyed. The time period investigated was loosely defined as *before* and *after* automation of the trade system, rather than specific years, as not all users began using each system at exactly the same time. In addition, due to challenges with the obtaining of beneficiary contact lists from host agencies (as explained in Section 2) the evaluation only surveyed businesses in Kenya and Tanzania. In addition, while the evidence of increased trade volume and transaction value yields statistically significant results the evaluation was unable to independently verify claims against individual business records (i.e. audited financial statements).

Despite these limitations, the evaluation evidence highlights the attributable role of ICT4T systems in increasing trade. The majority of businesses surveyed perceived themselves to be trading more, with increased average transaction values, and attribute a proportion of this change to an ICT4T system. This validates the ICT4T ToC assumption, where effective trade systems and procedures reduce trade barriers and enable more trade.

Outcome 1 – Reduced Barriers to Trade

As discussed in Section Error! Reference source not found.**, evidence from previous evaluations and the business survey are categoric in showing that the ICT4T portfolio has made significant strides in reducing barriers to trade by reducing the average time (-68%) and average cost (-49%) for businesses to conduct trade-related activities.** In addition, the evidence presented in Section **Error! Reference source not found.** confirms improved system reliability, increased trade transparency and improved agency governance, which is further support for ICT4T reducing trade barriers and enabling a stronger trading environment for businesses.

Some additional insights on trade barrier reduction was also found in the stakeholder consultations. Agency stakeholders frequently cited how businesses no longer need to visit offices to submit licence or permit applications, which on the one hand reduced transport, printing and staff costs by up to 5,000 KSHs per licence (in the case of AFA IMIS), but also reduced application times as *"the queues used to be very long during license renewal times"* as one key informant put it. Time reductions were also articulated by stakeholders through the time it takes trucks to travel across the Northern Corridor. The RECTS system especially was singled out, as its whole purpose is to enable more effective tracking of cargo across the EAC region.

Another barrier to trade that ICT4T has contributed significantly towards reducing is improving the transparency of the trade system. This was keenly reported by stakeholders using the ITTS, who felt access to tea trade information through the system has significantly improved the transparency, accountability, and governance of the tea trading. This impact was reportedly not only felt in Kenya but for across nine regional countries involved in the East Africa tea trading process.

Outcome 2 – Improved Business Competitiveness

Evidence from the business survey shows tentative signs of improved business competitiveness as businesses reported average increases in turnover of $5,647 (24%) per annum since automation (Table 1717). Although this metric is insufficient on its own to prove increased competitiveness, it is a positive sign that businesses interacting with ICT4T systems are on average increasing their annual turnover. Moreover, **84% of businesses did attribute some or all of this increase to the ICT4T systems, with a modal attribution level of 25%.** Although this level of attribution is lower as compared

to other outcome variables such as time, cost and trade volumes, it confirms a relationship between ICT4T system usage and improvements in businesses' reported annual turnovers.

Despite average increases in annual turnover, this does not translate to increases in the number of employees in businesses surveyed. **The business survey results show no change in the average number of employees (8) reported by businesses since they began using ICT4T systems.** This highlights that while ICT4T systems may enable increased trade through enabling greater trade volumes, reducing trade barriers through taking time and cost out of the system, and improving business competitiveness through increasing annual turnover**,** our evidence suggests that ICT4T has had no impact on job creation to date.

Table 17 Turnover and Employee Growth Results [47] [48]

Variable	Total Observations (after IQR Rule)	Baseline (Mean)	Endline (Mean)	Diff (EL – BL)	Perc Change (%)	Standard Error	Standard Deviation	Welch T-Test (p-value / sig)	Wilcoxon RankSum Test
Turnover (USD per Year)	1672	24010	29657	5647	24%	800.4	32729.4	0.000***	0.004***
Employees (All)	2126	8	8	0	0%	0.16	7.3	0.514	0.348

To estimate the cumulative turnover impact of ICT4T on business turnover in our sample a similar approach to the other outcome variables was followed, with the results presented in Table 18. To find out the average turnover change attributed to ICT4T by businesses in our sample, we first multiply the average turnover change ($5,647) and multiply it by the weighted attribution level for turnover (36%) (see Figure 20). **This calculation leads us to estimate that businesses in our sample, on average equate an annual turnover increase of $2,033 to ICT4T. Escalating this up to the sample level by multiplying $2,032 by our total sample of 1,852, we estimate turnover increases attributable to ICT4T of $3,764,968.**

[47] The turnover figures in Table 17 may appear low due to implementation of the IQR rule, which is our approach to eliminate outliers which we have applied consistently throughout the quantitative analysis. For the case of turnover, the IQR rule removes 17% of observations. If we were to run the t-tests without the IQR rule, the baseline mean for turnover (USD) is $1,158,564 and the endline mean for turnover (USD) is $3,339,379. Similarly, the figures for employees without IQR are 44 employees at baseline and 178 at endline. For the final draft, we can consider also presenting these figures for further comparison.

[48] Table headings already referenced.

Table 18 Turnover Impacts of the Survey Sample

Sample size	Average Difference in Turnover	Weighted Attribution Level	Estimated Turnover Change Attributable to ICT4T (per Business)	Estimated Turnover Change Attributable to ICT4T (Total Sample)
1,852	$5,647	0.36	$2,032.92	$3,764,967.84

As noted in the analysis of other outcome variables, caution should be exercised with these estimates as they include some assumptions which may be prone to error. Similar to the estimates on trade values and transactions, the turnover estimates are based on businesses self-reporting values rather than verified business records and also use a dated dollar conversion, which may underestimate turnover increases if reported in local currency. However, the findings are clear in showing that businesses in our sample experienced increases in turnover following implementation of the ICT4T systems. At the individual business level, these increases are fairly modest, which may go some way to explaining why we see fairly static employee growth levels (see discussion below). When we disaggregate by business size, we observe no significant differences in employee growth trends, regardless of business size.

Using figures from the iCMS transaction data, we can tentatively estimate turnover change for a larger volume of businesses. If we isolate the average difference in turnover (+$12,340) for businesses using iCMS from our business survey, and multiply this by 152,906 (the estimate for unique iCMS users based on four months of transaction data shared by KRA), and then apply the attribution level of 0.24 (derived from iCMS users from the business survey), we estimate the change in annual turnover that is attributable to ICT4T, to be in the region of **$452 million**. **This estimate is tentative, as the cited turnover increase (+$12,340) for iCMS users is not a statistically significant result, and therefore reduces confidence in the estimation.** A greater sample of iCMS users would be needed to re-run this estimation more confidently.

Error! Reference source not found. presents the attribution results for turnover, Sixteen percent of businesses who reported increased annual turnover, did not attribute any of this change to an ICT4T system. Although attribution levels are generally lower for turnover compared to other outcomes, 84% of businesses did attribute some or all of the increase to the ICT4T systems, with a modal attribution level of 25%.

Figure 20 Annual Turnover Change Attribution

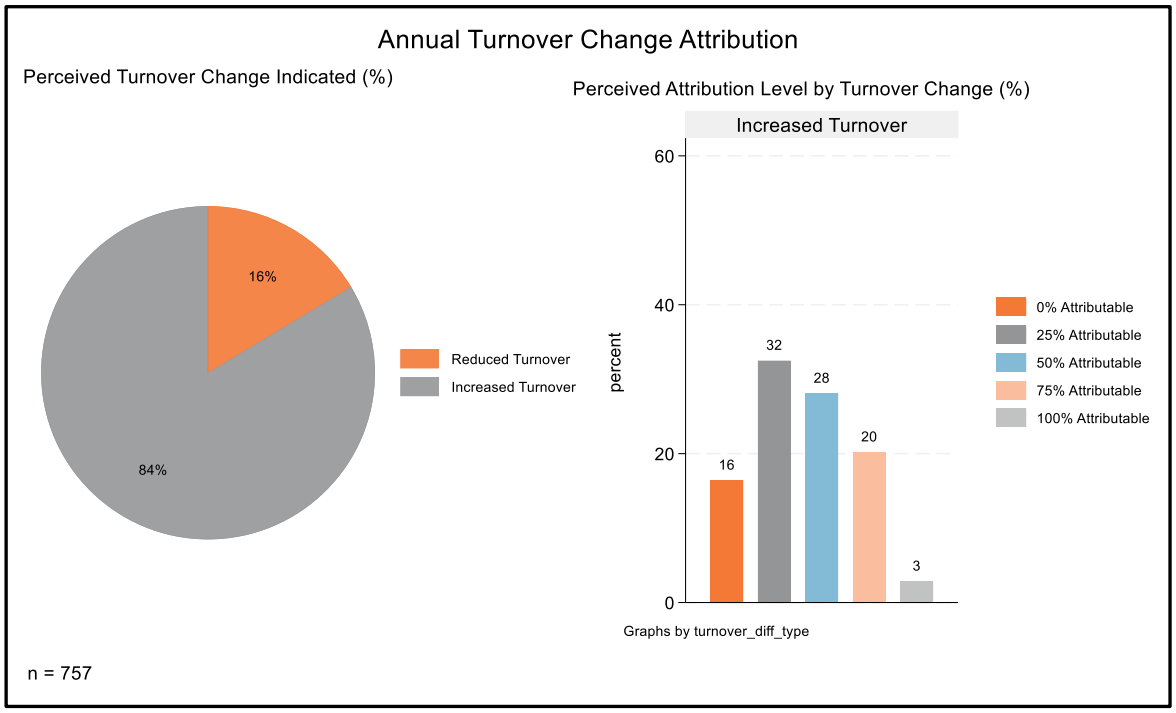
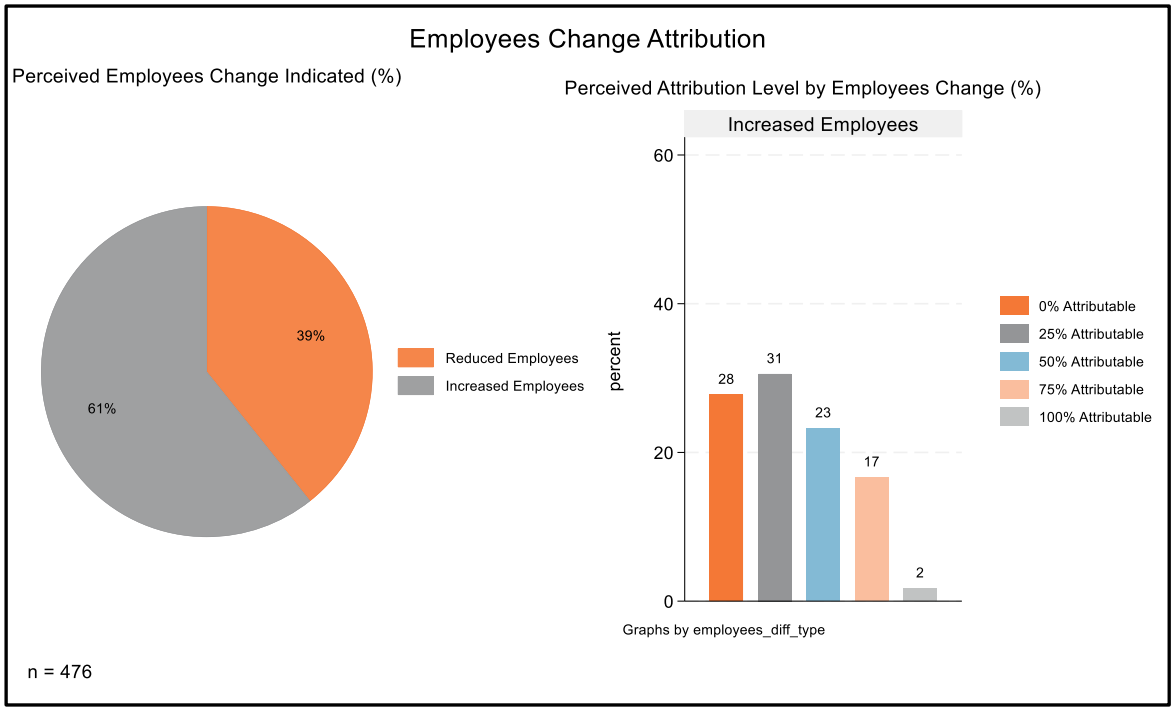


Figure 21 Annual Employees Change Attribution



In terms of employee growth, the evaluation found no change between the baseline (8 employees) and endline (8 employees) from our business sample, and therefore conclude that the ICT4T

portfolio has had no substantive impact on employment to date.[49] Fifty three percent of businesses who could compare employee growth before and after automation, stated the number of employees in the business had remained the same. As Figure 21Figure 20 shows, of the businesses who observed a change in the number of employees, 61% cited an increase, compared to 39% who cited a decrease. In terms of attribution level, employment growth yields the lowest level of attribution of all outcome variables included in the evaluation. Twenty eight percent of businesses who observed an increase in the number of employees in their business placed no attribution of an ICT4T system towards the outcome.

This evidence is aligned with previous evaluations and KIIs, where stakeholders rarely mentioned employee growth as an impact resulting from ICT4T systems. Although the introduction of IT systems has created some additional demand within agencies for technical skills to support with system upgrades and maintenance, this demand is not felt among businesses who use the system, as the systems are designed to make trade processes easier rather than add complexity.

That said, the evaluation did find some anecdotal evidence of businesses who interact with an ICT4T system reporting employment growth. One business who interacts with the RFLS system, highlighted that since automation, the business has leased 12 more trucks enabling them to hire more drivers. Linking business growth and system efficiency, the same respondent also cited that *"there is an increase in competition in the logistics business, so you have to be very efficient in your operations for customers in order to get repeat business and referrals".*

If we isolate iCMS businesses as an example, we observe a non-significant decrease in employees from 8.2 (prior to iCMS) to 7.1 (since iCMS), resulting in an average decrease of 1.1 employees per business. Multiplying this decrease by 152,906 businesses (average number of unique users derived from four months of iCMS transaction data shared by KRA) and an attribution level of 0.21 (derived from our business survey), iCMS could be responsible for the reduction of around 35,322 job losses. **We are not confident in this figure as the cited decrease of -1.1 is not a statistically significant result.** However, a re-run of the exercise with a larger sample of iCMS users may serve to support this evidence.

In summary, the evidence gathered from the 21 evaluable projects in this evaluation shows that ICT4T systems are not significant job creators at the business level. Even though businesses are increasing trade (through the volume and value of transactions) the system is doing the heavy lifting, so businesses don't necessarily need to hire more people to cope with increased volume (at least on the processing side). Likewise, as the employment figures remain static for businesses in our sample, ICT4T may contribute to job retention, but further interrogation with businesses is required to understand these dynamics. Secondly, given the fairly small average turnover increases reported (<$6k), we wouldn't necessarily expect to see large increases in employment reported. Even at typical pay rates in East Africa, this increase is likely insufficient to fund a new position and the associated employer on-costs (i.e. employer taxes, statutory contributions, etc).

[49] 'Baseline' refers to the period before the business started interacting with the ICT4T system. 'Endline' refers to the current employee figures. These periods will differ between businesses.

4.2. EQ 20. WHAT DELIBERATE AND UNINTENDED RESULTS – POSITIVE AND NEGATIVE – DID THE INTERVENTION PRODUCE? HOW DID THESE OCCUR?

The impact results the evaluation has presented above can all be classed as 'deliberate' and 'positive' in that the ICT4T portfolio was intentionally designed to deliver such impacts. Reading from the ICT4T TOC, its broad aim was to improve trade processes to reduce barriers to trade and improve business competitiveness. This evaluation, and previous ones, have found evidence that TMA has been largely successful in achieving this. Although exact quantification of the magnitude of these effects is more challenging.

One result, cited in previous evaluations, is how reduction in face-to-face contact brought about by ICT4T systems has had a positive effect on trade system efficiency and nimbleness. In the case of the RFLS, a byproduct of the digitisation has been a reduction in the opportunities for bribery encounters resulting in enhanced trust in the transportation and tracking of freight in East Africa.[50] Similarly, evidence from the TMDA system evaluation, highlights how contactless engagements, have enabled a nimbler trade system as applications can now be submitted from anywhere.[51]

Relatively few unintended consequences were identified through consultation with stakeholders. One example referenced was that although the iSOKO system was specifically targeted at female traders, there has also been positive uptake from male traders to the platform. This was confirmed in our business survey, as 33% of the randomly selected iSOKO sample was male. This finding highlights the non-exclusive nature of ICT4T systems and confirms that once operational they are open to all.

Another impact reported was that agencies now report less complaints or issues from the business community. For example, a stakeholder from AFA IMIS noted that agency staff were required to intervene frequently in system issues prior to automation, and since automation these have significantly reduced. This in turn enhances the reputation of agencies such as AFA within the business community.

[50] Elizabeth Mwangi, Frinton Fenny, Mohamed Gharib, 'Final Evaluation Report: Endline Evaluation of TradeMark East Africa's Cargo Tracking for Rail Project', (2022).

[51] Talanta International Limited, 'Final Report: Endline Evaluation of TMEA Funded Trade Systems for the Tanzania Ministry of Agriculture, The Tanzania Medicines and Medical Devices Authority, The Confederation of Tanzania Industries, and the Tanzania Chamber of Commerce, Industry and Agriculture, (2022).

5. EFFICIENCY

The evaluation ToR identifies efficiency as "*how economically resources/inputs (funds, expertise, time, equipment, etc.) were converted into results*". For this evaluation we have sought to explore this by assessing how the financial resources including project costs have been planned and utilised to achieve the intended outputs. We also assess how economically the financial and human resources were allocated and identify challenges in delivering economically. Further, we go beyond economy and assess how valuable these results were to users in terms of reduction in trade barriers, ease of system use, and satisfaction with services. Finally, we compare the economic benefits achieved due to the ICT4T portfolio and compare them against project expenditure to assess the efficiency in achieving these results.

Table 19 Efficiency Evaluation Questions

Evaluation Questions
15. How economically resources/inputs (funds, expertise, time, equipment, etc.) were converted into results?
16. How valuable were the results to service providers, clients, the community and/or organizations involved?
17. Have the portfolio results been achieved with good Value for Money (regarding costs and benefits)?
25. To what extent does the positive impact justify continued investments?

5.1. EQ 15. HOW ECONOMICALLY WERE RESOURCES/INPUTS (FUNDS, EXPERTISE, TIME, EQUIPMENT, ETC.) CONVERTED INTO RESULTS?

This evaluation assesses "how economically were resources converted into results" in three stages –

- ✓ Assessing allocation and utilisation of financial resources per project including assessment of over and under spending;
- ✓ Assessing human resource allocation, agency level coordination and challenges in allocation; and
- ✓ Assessing the extent to which these resource allocations have been converted into results i.e., planned outputs and outcomes at a project level.

TMA's ICT4T portfolio meets the definition of 'good' economy – based on the programme's 4E framework presented in the inception report. Financial resources were found to be well-allocated across projects in the portfolio, demonstrating effective budget management. Human resources were also effectively distributed within the portfolio, minimising duplication of efforts and there was minimal evidence of resource wastage within the portfolio.

Based on the 22 evaluable projects included in the VfM analysis, TMA has exhibited both positive and negative aspects in converting resources into outputs. With the overall expenditure exceeding the

budget by 7% for the 22 evaluated projects, which suggests a potential challenge in managing

	Actual project cost in '000 USD									Share of cost (			
me	2013/17 + NUPAC (2013-18)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total	Total (Strategy 2 only)	2017/18	2018/19	2019/20	2020
	18,499 (2013-17) 3,688 (NUPAC)		3,209	2,641	2,736	982	1,072	**32,828**	**10,636**		29.4%	40.6%	25.7
Logistics Services			4,654	651	244	502		**6,052**	**6,052**		42.6%	10.0%	2.3
		0.3		311	3,235	22		**3,569**	**3,569**	0.0%		4.8%	30.4
Reg-Tech Interventions				28	1,535	329	392	**2,285**	**2,285**			0.4%	14.4
Tea Trading System		335	401	407	721	282	94	**2,240**	**2,240**	50.2%	3.7%	6.2%	6.8
oms Territory Information Sharing		114	115	188	99	403	875	**1,794**	**1,794**	17.0%	1.1%	2.9%	0.9
ic Single Window- Phase III		30	1,262	3	266			**1,562**	**1,562**	4.6%	11.6%	0.1%	2.5
Food Authority		8	305	715	360	45	10	**1,443**	**1,443**	1.1%	2.8%	11.0%	3.4
rise risk mgt sys			17	154	299	195	534	**1,199**	**1,199**		0.2%	2.4%	2.8
		120	178	245	117	306	104	**1,071**	**1,071**	18.0%	1.6%	3.8%	1.1
rugs Authority Information Sharing		8	212	381	29	114	299	**1,043**	**1,043**	1.1%	1.9%	5.9%	0.3
stock & Fisheries SWIFT				19	30	491	377	**917**	**917**			0.3%	0.3
orridor Transport Observatory		10	82	130	92	284	91	**689**	**689**	1.5%	0.8%	2.0%	0.9
PVP		36	138	210	112	69	65	**629**	**629**	5.4%	1.3%	3.2%	1.0
lities Reg Authority (RURA)			1	118	268	125		**512**	**512**		0.0%	1.8%	2.5
edicine and Medical Devices Authority		5	229	56	30			**320**	**320**	0.8%	2.1%	0.9%	0.3
nber Management Information System					176	93	15	**283**	**283**				1.6
agement Information System			9	18	84	126	6	**243**	**243**		0.1%	0.3%	0.8
Phase II		1	88	72	11	69	1	**241**	**241**	0.1%	0.8%	1.1%	0.1
CCIA SWIFT			3	103	106			**212**	**212**		0.0%	1.6%	1.0
ndards Board			14	55	84	1	-11	**143**	**143**		0.1%	0.8%	0.8
ricultural Export Development Board			13	5	25	10		**52**	**52**		0.1%	0.1%	0.2
	18,394	**667**	**10,929**	**6,509**	**10,658**	**4,451**	**3,923**	**55,531**	**37,137**	**100%**	**100%**	**100%**	**100**

resources. Overspends raise some concerns about cost-effectiveness. Therefore, a comprehensive analysis considering both overspends and underspends is necessary to assess the overall effectiveness of resource conversion into outputs.

Table 20 shows TMA's ICT4T programme expenditure on the 22 evaluable projects, from FY 2017/18 to 2022/23 (i.e. over the Strategy 2 period). The table shows that projects have varied start and end dates over Strategy 2. Half of the evaluable projects started in 2017/18. The table also shows that TMA spent $37.1m on the 22 evaluable projects in the ICT4T programme. The Kenya programme, specifically the Kenya Revenue Authority Integrated Customs Management System (KRA iCMS - $10.6m) and Rail Freight Logistics Services ($6.1m) combined account for more than 50% of the evaluable projects' expenditure.

Following approval of the final evaluation report. TMA requested the figures for 3548 – iCMS be revised. Table 20 now presents a column indicating investment in iCMS from 2013-17, totalling $22.2

million. Adding these figures to the Strategy 2 expenditure, results in a total iCMS expenditure of $32.8 million.

Table 20 TMA ICT4T Portfolio actual expenditure by project 2017/18 – 2022/23

			Actual project cost in '000 USD									Share of cost (strategy 2)						
Programme	Project code	Project name	2013/17 + NUPAC (2013-18)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total	Total (Strategy 2 only)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
Kenya	3548	KRA iCMS	18,499 (2013-17) 3,688 (NUPAC)		3,209	2,641	2,736	982	1,072	**32,828**	**10,636**		29.4%	40.6%	25.7%	22.1%	27.3%	**28.6%**
Kenya	3539	Rail Freight Logistics Services			4,654	651	244	502		**6,052**	**6,052**		42.6%	10.0%	2.3%	11.3%		**16.3%**
Kenya	3541	RECTS		0.3		311	3,235	22		**3,569**	**3,569**	0.0%		4.8%	30.4%	0.5%		**9.6%**
Safe Trade	5503	Safe Trade Reg-Tech Interventions				28	1,535	329	392	**2,285**	**2,285**			0.4%	14.4%	7.4%	10.0%	**6.2%**
Kenya	3537	Integrated Tea Trading System		335	401	407	721	282	94	**2,240**	**2,240**	50.2%	3.7%	6.2%	6.8%	6.3%	2.4%	**6.0%**
Regional	2703	Single Customs Territory Information Sharing Platform		114	115	188	99	403	875	**1,794**	**1,794**	17.0%	1.1%	2.9%	0.9%	9.1%	22.3%	**4.8%**
Rwanda	3825	Rw Electronic Single Window- Phase III		30	1,262	3	266			**1,562**	**1,562**	4.6%	11.6%	0.1%	2.5%			**4.2%**
Kenya	3536	Agricultural Food Authority		8	305	715	360	45	10	**1,443**	**1,443**	1.1%	2.8%	11.0%	3.4%	1.0%	0.3%	**3.9%**
Uganda	3623	AEO Enterprise risk mgt sys			17	154	299	195	534	**1,199**	**1,199**		0.2%	2.4%	2.8%	4.4%	13.6%	**3.2%**
Tanzania	3723	CCTO		120	178	245	117	306	104	**1,071**	**1,071**	18.0%	1.6%	3.8%	1.1%	6.9%	2.7%	**2.9%**
Regional	2706	Food and Drugs Authority Information Sharing Platform		8	212	381	29	114	299	**1,043**	**1,043**	1.1%	1.9%	5.9%	0.3%	2.6%	7.6%	**2.8%**
Tanzania	3729	Dept of Livestock & Fisheries SWIFT				19	30	491	377	**917**	**917**			0.3%	0.3%	11.0%	9.6%	**2.5%**
Kenya	3531	Northern Corridor Transport Observatory		10	82	130	92	284	91	**689**	**689**	1.5%	0.8%	2.0%	0.9%	6.4%	2.3%	**1.9%**
Kenya	3535	KEPHIS SC - PVP		36	138	210	112	69	65	**629**	**629**	5.4%	1.3%	3.2%	1.0%	1.6%	1.6%	**1.7%**
Rwanda	3823	Rwanda Utilities Reg Authority (RURA)			1	118	268	125		**512**	**512**		0.0%	1.8%	2.5%	2.8%		**1.4%**
Tanzania	3726	Tanzania Medicine and Medical Devices Authority		5	229	56	30			**320**	**320**	0.8%	2.1%	0.9%	0.3%			**0.9%**
Ethiopia	5423	ECCSA Chamber Management Information System					176	93	15	**283**	**283**				1.6%	2.1%	0.4%	**0.8%**
Kenya	3549	KNCCI Management Information System			9	18	84	126	6	**243**	**243**		0.1%	0.3%	0.8%	2.8%	0.2%	**0.7%**
Tanzania	3728	MoA SWIFT Phase II		1	88	72	11	69	1	**241**	**241**	0.1%	0.8%	1.1%	0.1%	1.6%	0.0%	**0.7%**
Tanzania	3730	TCCIA & ZNCCIA SWIFT			3	103	106			**212**	**212**		0.0%	1.6%	1.0%			**0.6%**
Rwanda	3828	Rwanda Standards Board			14	55	84	1	-11	**143**	**143**		0.1%	0.8%	0.8%	0.0%	-0.3%	**0.4%**
Rwanda	3827	National Agricultural Export Development Board			13	5	25	10		**52**	**52**		0.1%	0.1%	0.2%	0.2%		**0.1%**
		Total	**18,394**	**667**	**10,929**	**6,509**	**10,658**	**4,451**	**3,923**	**55,531**	**37,137**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: EDI analysis of TMA financial data

Table below shows TMA's ICT4T expenditure against budget for the 22 evaluable projects. Overall, TMA spent 7% more than expected on the 22 projects included in this evaluation. Table 21 and Figure 22 shows some significant budget variances across projects; such as significant overspends on the Integrated Customs Management System (iCMS – 421%), Regional Electronic Cargo Tracking system (RECTS - 185%), Safe Trade Reg-Tech Interventions (178%), Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA) & Zanzibar Chamber of Commerce, Industry and Agriculture (ZNCCIA) Single Window Information for Trade (TCCIA & ZNCCIA SWIFT - 146%) and significant underspends on the Kenya Plant Health Inspectorate Service - Seed Certification and Plant Variety Protection System (KEPHIS SC-PVP - 43%), the Food and Drugs Authority Information sharing platform (FDA ISP - 49%) and the Integrated Tea Trading System (iTTs - 65%).

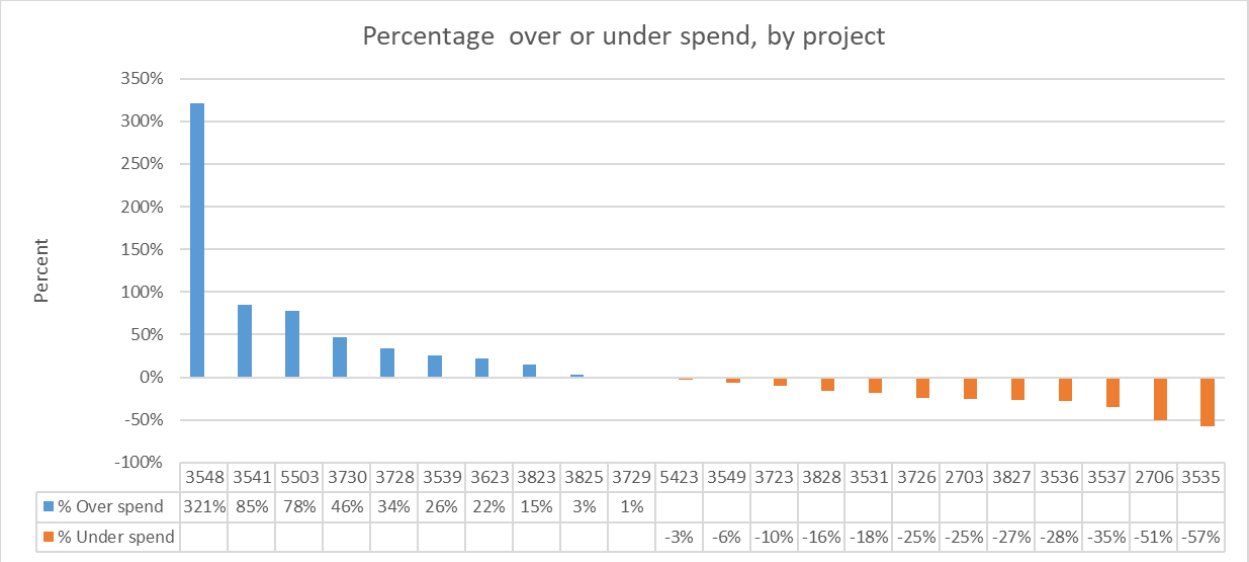
Consultation with TMA on project finances cautioned that budget figures are indicative of annual business planning. As such, project teams' flexibility to request reallocations within or across projects, are not accounted for in the budget numbers, thus the variances. However, large overspends suggest a potential challenge in achieving value for money as the actual costs exceeded the initially allocated resources, raising some concerns about cost-effectiveness and efficient resource utilisation.

Table 21 TMA ICT4T spend by project, actual vs budget

Programme	Project code	Project name	Budget ('000 USD)	Actuals ('000 USD)	% Spend
Kenya	3548	KRA iCMS	7,790	32,828	421%
Kenya	3541	RECTS	1,928	3,569	185%
Safe Trade	5503	Safe Trade Reg-Tech Interventions	1,284	2,285	178%
Tanzania	3730	TCCIA & ZNCCIA SWIFT	145	212	146%
Tanzania	3728	MoA SWIFT Phase II	180	241	134%
Kenya	3539	Rail Freight Logistics Services	4,817	6,052	126%
Uganda	3623	AEO Enterprise risk mgt sys	980	1,199	122%
Rwanda	3823	Rwanda Utilities Reg Authority (RURA)	446	512	115%
Rwanda	3825	Rw Electronic Single Window- Phase III	1,521	1,562	103%
Tanzania	3729	Dept of Livestock & Fisheries SWIFT	907	917	101%
Ethiopia	5423	ECCSA Chamber Management Information System	293	283	97%
Kenya	3549	KNCCI Management Information System	258	243	94%
Tanzania	3723	CCTO	1,191	1,071	90%
Rwanda	3828	Rwanda Standards Board	169	143	84%
Kenya	3531	Northern Corridor Transport Observatory	840	689	82%
Tanzania	3726	Tanzania Medicine and Medical Devices Authority	424	320	75%
Regional	2703	Single Customs Territory Information Sharing Platform	2,403	1,794	75%
Rwanda	3827	National Agricultural Export Development Board	71	52	73%
Kenya	3536	Agricultural Food Authority	2,003	1,443	72%
Kenya	3537	Integrated Tea Trading System	3,471	2,240	65%
Regional	2706	Food and Drugs Authority Information Sharing Platform	2,112	1,043	49%
Kenya	3535	KEPHIS SC - PVP	1,467	629	43%
		Total	**34701.535**	**37136.537**	**107%**

Source: EDI analysis of TMA financial data

Figure 22 Percentage of overspend and underspend by project



Allocation of financial resources - TMA

Consultations with TMA found that the allocation of financial resources across projects within the ICT4T portfolio follows TMA's structured process which involves collaboration among various programme leads, the Board and the finance team, to ensure effective resource distribution. Some of the considerations that influence the decision-making process regarding financial resource allocation include: TMA's overarching strategy, which serves as a guiding framework for all activities and resource allocations, donor requirements for earmarked projects, and project work plans for non-earmarked projects, where programme teams assess and prioritise projects based on their needs, impact, urgency, and alignment with TMA's strategy.

Allocation of human resources (staff and experts) - TMA

According to TMA, the distribution of human resources, staff, or experts across projects is a strategic process aimed at aligning personnel with specific project needs while ensuring cost accountability. Beyond the initial identification of personnel required to deliver a project during the proposal phase, TMA told us that donor engagement and resource provision significantly impacts the distribution of human resources across projects. While TMA emphasised the pivotal role earmarked donors play in determining resource allocation, specific examples on preferences and their impact on the allocation of human resources were not provided. However, TMA told us that continuous analysis is integral to their resource allocation strategy. A comprehensive assessment of all earmarked resources and their allocations across various projects is regularly conducted. This analysis delves into evaluating how much of the earmarked resources have been allocated, what remains available, and the feasibility of redistributing resources to other projects. It aims to ascertain the realism and sustainability of resource allocation to different initiatives.

Allocation of resources – Implementing agencies

Interviews with implementing agencies show that overall, TMA's allocation of funding toward software aspects as well as IT hardware and Technical Assistance, mark a strategic focus on critical components necessary for the ICT4T portfolio's success. The breadth of resource allocation extended beyond only financial support.

TMA's involvement in facilitating meetings for requirements development, conducting testing and enhancements, and engaging in collaborative initiatives reflects its commitment to optimal use of resources. Additionally, TMA's involvement in contracting developers and allocating budgets directly contributed to the development and refinement of the solution, ensuring its alignment with project objectives. According to implementing agency stakeholders, challenges to resource allocation for ICT4T interventions within government agencies are multi-faceted and complex, often stemming from institutional reluctance, budgetary constraints and skill shortages.

Duplication of effort

TMA told us that its structure is designed to mitigate redundancies such as duplication of efforts across various activities within the ICT4T portfolio. Each programme operates with designated leads who play a pivotal role in proposal development, leveraging their comprehensive understanding of the domain and first-hand involvement in project execution to identify potential overlaps or duplications. This approach ensures centralised oversight, allowing these leads to manage activities across both projects and programmes effectively. However, heavy workloads were cited with this structure, due to involvement in multiple projects.

On the other hand, TMA's financial management approach adheres to a strategic allocation of project funding from donors. Each project undergoes a careful association of costs and revenue recognition to maintain transparency and avoid discrepancies in financial reporting. During revenue recognition, diligent measures are taken to prevent the misreporting of expenses to different donors. TMA ensures that each expenditure is accurately attributed to the respective donor, avoiding the duplication of reports for the same expense to multiple donors. This approach maintains the integrity of financial reporting, assuring donors that their contributions are carefully tracked and allocated in accordance with their designated projects.

Resource wastage

From the evaluation's interviews, direct observation of resource misallocation or wastage appears to be limited, particularly in relation to procurement activities. Evidence from previous evaluations shows that across multiple ICT4T projects such as the iTTS systems[52], KEPHIS SC-PVP[53], AFA iMIS[54], Safe Trade Emergency Facility (STEF)[55], Rail Freight Logistics Solution (RFLS)[56], Rwanda Utilities Regulatory Authority (RURA), RSB, the Central Corridor Transport Observatory (CCTO), and the Northern Corridor Transport Observatory (NCTO)[57], competitive procurement processes were a cornerstone strategy in ensuring quality acquisitions at market-appropriate prices. Several projects emphasised the importance of competitive bidding and stringent adherence to procurement guidelines to achieve optimal value. The focus on technical and financial proposals (AFA iMIS, iTTS Systems, KEPHIS SC-PVP, STEF) ensured the acquisition of high-quality inputs at reasonable costs. Though TMA's competitive procurement procedures are perceived as a robust framework that

[52] Ayaah Consult, 'Final Revised Report for the Endline Study of the TMEA Funded iTTS Systems Project', (2022).
[53] Ayaah Consult, 'Final Report for the Endline Study of the TMEA Funded KEPHIS SC-PVP Systems', (2022).
[54] Ayaah Consult, 'Final Report: The Endline Study of TMEA Funded Trade Systems for the Agriculture and Food Authority', (2022).
[55] Ayaah Consult. 'Final Report: The Independent Evaluation of Trademark East Africa's Safe Trade Emergency Facility (STEF) Programme, (2023).
[56] Elizabeth Mwangi, Frinton Fenny, Mohamed Gharib, 'Final Evaluation Report: Endline Evaluation of TradeMark East Africa's Cargo Tracking for Rail Project', (2022).
[57] CESS, 'End of Project Evaluation of TMEA Funded ICT For Trade Systems in Rwanda', (2022).

significantly mitigates the possibility of resource wastage, the process was regarded as sometimes slow by some stakeholders we consulted with.

The utilisation of diverse funding sources, including grants and in-kind contributions, supported various programme aspects, enabling comprehensive support across different projects. For instance, STEF[58], which was introduced in 2020 by TMA in response to the global COVID-19 pandemic, utilised funding from established donors and new grants to facilitate initiatives spanning contracting activities, stakeholder engagement, and infrastructure development.

Delivery efficiency (extent to which allocated resources were converted into results)

Efficiency judgement: Overall, the portfolio adequately delivered its expectations within the designated timeframes and operating environments as reflected in successive annual reviews.

Achievement of outputs

Given the weaknesses and limitations in TMA's monitoring system (see section 2.6), the evaluation team could not assess the extent to which project work plans and monitoring plans were effectively implemented by the projects under evaluation. This has made it difficult to assess the extent to which project outputs have been achieved using monitoring data. As a result, the assessment of output achievement in this section is primarily based on the annual review findings and primary data collected by the evaluation team through key informant interviews associated with the respective ICT4T systems.

We have collated the scores awarded for achievement of outputs related to TMA's Output 1.3: "Effective trade systems and procedures" for the FY 2022-23 (see Table). The scores are calculated based on the achievement of targets for each relevant output at country level.

Table 22 Overall scores for achievement of outputs from FY 2022-23 TMA Annual Review

TMA output 1.3 Effective Trade systems and procedures	Country Programme Score FY 2022-23					
	Tanzania	Kenya	Uganda	DRC	Burundi	Regional
Trade Community Information Systems (TCIS) established and utilised	A					
Integrated Trade Management Systems (ITMS) established / Operational	A	A				
Customs efficiency enhancements implemented / operational					B	
AEO enterprise-wide risk management system implemented			A			
UESW extended to additional agencies and interfaced with IBM			A+			
Airport cargo community management system operational			N/A			
DRC Customs Management System (CMS) upgraded				A		

DRC Electronic Cargo Tracking System (RECTS) operational				A		
Cross-border information sharing framework operationalised						A+
Overall Score (Including other outputs in the country result frameworks)	A	A	A	A	A	A+

Source: TMA country programme annual reviews

Table 23 TMA Annual Review Score Description

Score	Annual Review Score description
A++	Outputs substantially exceeded expectation
A+	Outputs moderately exceeded expectation
A	Outputs met expectation
B	Outputs moderately did not meet expectation
C	Outputs substantially did not meet expectation

Annual Review evidence shows that ICT4T project outputs in Tanzania, Kenya, Uganda, DRC and the Regional programme either moderately exceeded or met expectations in TMA's last financial year. One output in the Burundi country programme moderately did not meet expectations. The annual review for the Burundi programme attributed poor performance to the failure to officially operationalise the electronic Single Window (eSW) in addition to other challenges such as deficient internet connectivity, power outages, and incomplete deployment of modules, leading to manual processing and failure to meet expectations[59]. Overall, TMA's ICT4T output 1.3 adequately met expectations across the programme.

The primary data collected by the evaluation team through KIIs also provides some insights into project implementation and achievement of outputs in several ICT4T projects. These are summarised below.

- ✓ The RURA project was reported to have achieved its objectives and remained broadly within scope and timeline. The collaboration between the project team and the vendor was marked by responsiveness and cooperation, ensuring alignment with both project goals and the critical government deadline for timely completion. Efficiency hurdles surfaced primarily due to partners' prolonged decision-making processes during various project stages. Delays in decision-making forced the vendor to reallocate resources elsewhere, thus impacting the project's overall efficiency.
- ✓ The TCCIA & ZCCIA SWIFT project experienced successful and timely completion of both systems. A critical aspect that contributed to the project's success was TMA's support in procuring IT hardware and infrastructure. However, the persistence of manual processes within the TCCIA system has led to frustrations among businesses striving to obtain the correct documentation to export. Even with the ZCCIA, logistical challenges persist. This poses a threat to the established system, potentially disrupting the current streamlined process.
- ✓ The implementation of the TMA-supported Ethiopian Chamber Digital Service (ECDS) system within Ethiopian Chamber of Commerce & Sectoral Associations (ECCSA) remained closely aligned with both the designated timeline and the allocated budget. From the initiation of the system's development post-contract signing, TMA was reported to have fulfilled its obligations, resulting in substantial

[59] TradeMark Africa (TMA) Burundi Country Programme (BCP), (September 2023).

progress towards project completion. ECCSA proactively addressed challenges, by utilizing internal resources, and promptly engaging external expertise.

- ✓ The implementation of the ICT4T solution within RECTS was successful in terms of meeting the timeline, yet faced challenges regarding the allocated budget. The project adhered to its scheduled timeline, achieving the milestone of completion within the designated timeframe. However, the project encountered an expansion in scope, necessitating coverage for geographies beyond the initially outlined territory. This extension was essential to encompass areas within the Single Customs Territory, contributing to the widening of the project scope.
- ✓ The Kenya National Chamber of Commerce and Industry project (KNCCI) encountered a series of challenges, significantly impacting its progress and efficiency, notably stemming from recurrent disruptions during leadership elections at KNCCI. An additional challenge arose concerning communication and collaboration with developers, notably with the development of the iSOKO system. Unusually, direct engagement between the developers and KNCCI did not occur. The absence of perceived influence over the relationship by KNCCI posed challenges in fostering effective communication channels. The project team felt constrained by the perceived lack of flexibility in the implementation process. The feedback highlights an instance where the approach taken by TMA to implementation was seen as somewhat rigid.
- ✓ Efforts were directed towards automating processes for all 13 bodies under the Tanzania Ministry of Agriculture Single Window Information for Trade (SWIFT) Phase II. This ambitious goal aimed to streamline operations but also presented complexities due to the diverse nature of these bodies. A significant challenge arose from user perception. Some users perceived the system implementation as a threat to their roles, leading to apprehension and resistance. This resistance caused delays in the roll-out phase as efforts were redirected towards addressing these concerns and ensuring user buy-in.

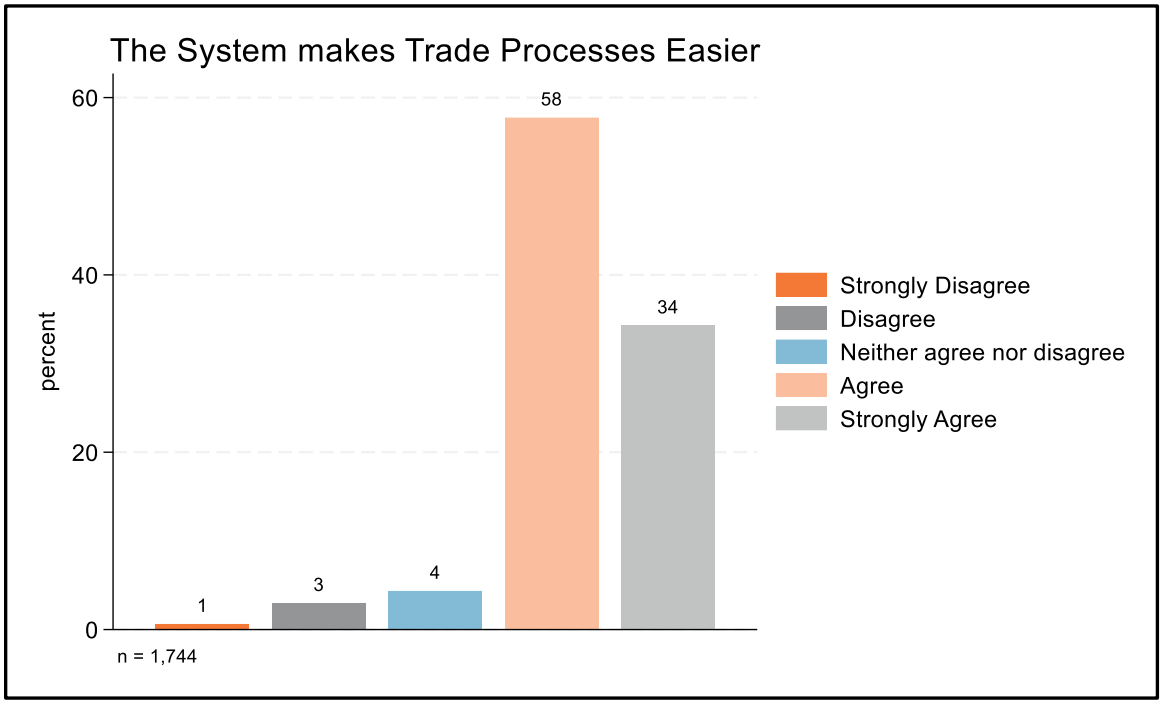
5.2. EQ 16. How valuable were the results to service providers, clients, the community and/or organizations involved?

One of the main ways to consider the value of the results of TMA's ICT4T investments in systems development is to assess the ease of use, reduction in trade barriers, overall satisfaction and reliability of ICT4T systems across systems users. Businesses have shared that the ICT4T systems have made trade processes easier and helped ease of use, with satisfaction with the systems reflecting the value created.

Role of ICT systems in making trade processes easier

The business survey found that 92% of respondents perceived that ICT4T systems have made trade processes easier. Furthermore, for each of the systems, at least 83% agreed that the trade processes have improved, with highest perceived improvement found among ATMIS system users (97%) and the lowest reported by IMS system users (83%).

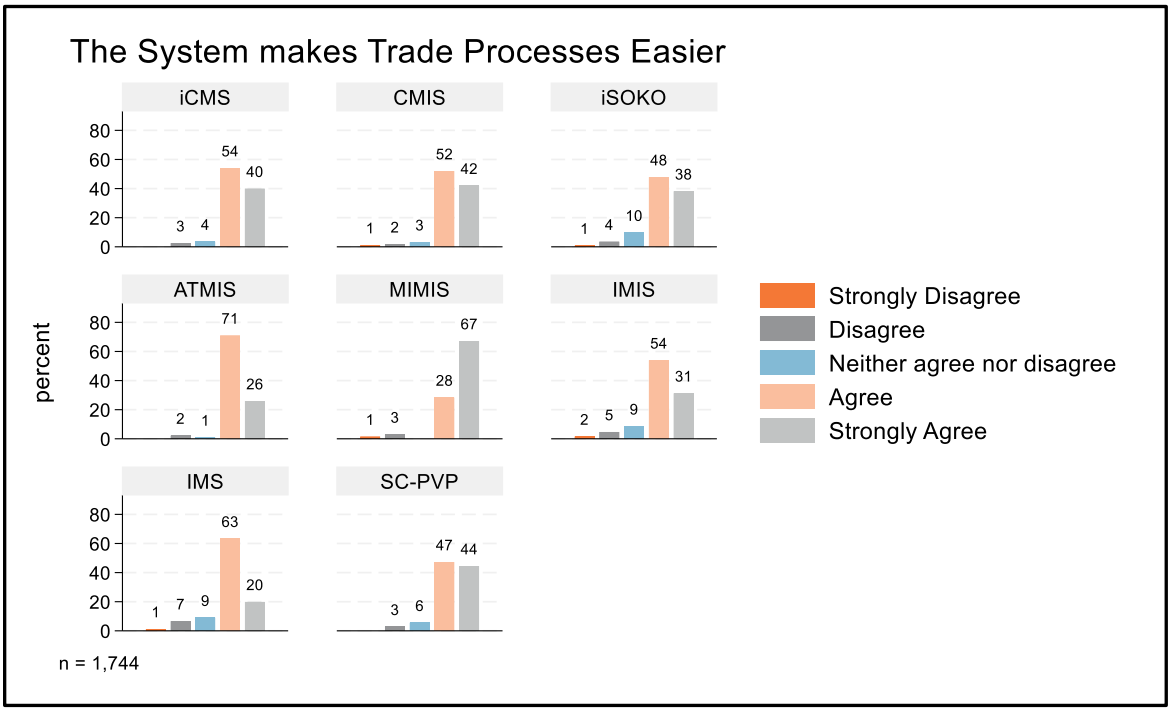
Figure 23 Perceived Role of ICT Systems in making Trade Processes Easier



The results are further confirmed by feedback from stakeholders connected with TMA's ICT4T portfolio. Interviews with key informants showcase that the systems provided information which was previously unavailable, such as information on NTBs (non-tariff barriers) through bodies like the NCTO. Furthermore, availability of system-based information on application requests and support documentation reduced paperwork. For example, before the KNCCI system, in order to process Certificates of Origin for tea traders the certifying agency had to obtain the bulk of the paperwork from each user for each application. Through the KNCCI system, the process has been significantly simplified as the supporting material and documentation is uploaded within the system, which has also reduced processing time. The direct beneficiaries of the systems corroborate that the availability of ICT systems and services has reduced turnaround time for cargo which has positively impacted their business. One business consulted stated:

> *"The iCMS and Cargo tracking has been very important for our business. We are improv[ing] our turnaround time for cargo from two to three weeks to just one week."*
> (RFLS beneficiary)

Figure 24 System level disaggregation of perceived improvement in trade processes

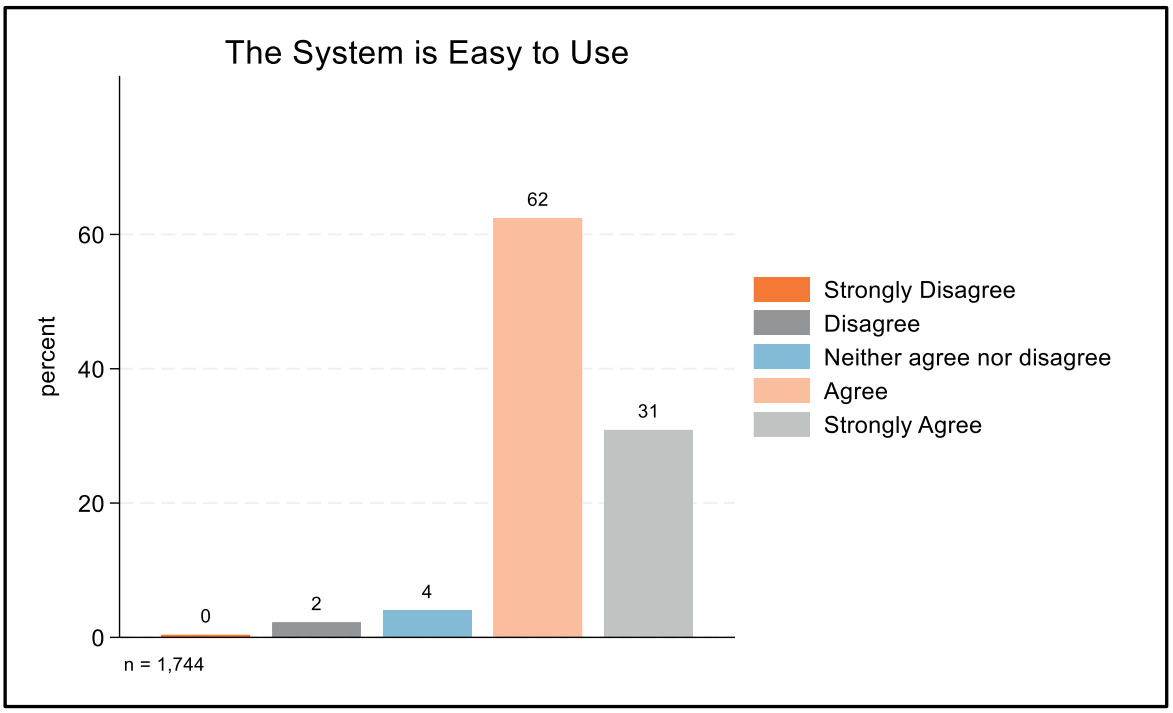


Ease of Use

The business survey found that 93% of respondents perceive that ICT4T systems are easy to use. The secondary data analysis and qualitative interviews support the results observed in quantitative data, with high convenience (92%) and satisfaction (86%) observed among ITTS beneficiaries in a previous evaluation. Similarly, previous evaluation reports corroborate and highlight that beneficiaries of the RFLS system were very satisfied with the cargo tracking services offered[60].

[60] Elizabeth Mwangi, Frinton Fenny, Mohamed Gharib, 'Final Evaluation Report: Endline Evaluation of TradeMark East Africa's Cargo Tracking for Rail Project', (2022).

Figure 25 Perceived ease of system usage



Reliability and System satisfaction

The business survey results presented in Figure 10 show medium to high satisfaction ratings for system performance across the eight different projects. The highest satisfaction with system performance was observed for the MIMIS system (8.31/10), while the lowest satisfaction was for SC-PVP systems (6.44/10). The results confirm that the time and cost efficiencies achieved through ICT systems play a major role in overall system satisfaction among users, contributing to the causal linkages in the ICT4T portfolio theory of change i.e., greater system reliability and efficiencies in time and cost of trade processes contribute to reduced trade barriers.

The business survey results also show that more than 91% of ICT4T users perceived the systems to be reliable in providing the services they need as represented in Figure 12. Reliability entails availability of system (up time vs down time), and consistency of services available. The survey results show that the beneficiaries are satisfied with system reliability.

Previous evaluations present mixed results regarding reliability of the ICT systems for service providers, particularly regarding agency level inefficiencies. For instance, the ATMIS system could not capture all the requirements of the coffee board, didn't incorporate users such as cooperative societies, and had inaccurate approval roles.

Overall, the study results show that the beneficiaries perceive very high reliability (91% of the respondents) of the ICT systems, suggesting that the beneficiary level challenges have been resolved. In addition, the mixed feedback from agencies suggests the need for feedback and adaptation mechanisms that support agency level user experience and system functionalities.

5.3. EQ 17: HAVE THE PORTFOLIO RESULTS BEEN ACHIEVED EFFICIENTLY (COSTS AND BENEFITS)?

This evaluation assesses the benefits achieved by the TMA portfolio and individual projects in comparison to the investments and expenditure made to implement the projects. This assessment provides broad guidance on the extent of progress in creating value for the businesses and agencies through 2 approaches –

- ✓ **Comparison of annual project benefits with project expenditure -** This is based on cost savings reported in business survey, approximate system users to arrive at system level annual benefits created. The purpose of this exercise is to assess the extent of progress rather than produce an absolute quantified value.
- ✓ **Break Even Analysis** – This is based on overall portfolio level benefits calculated through a systematic approach of estimating time and cost benefits for all system users, converting benefits into economic value followed by estimating net present value of the benefits. The net present value of the project expenditure is also calculated to arrive at breakeven estimation for each of the systems and overall portfolio. The purpose of this approach is to obtain a quantified return on investment for the ICT4T portfolio. However, the BEA approach has been greatly limited by unavailability of comprehensive system level benefits data.

Overall, the exercises shows that TMA investment in ICT4T portfolio has resulted in benefits for businesses that are likely to go beyond the project expenditure.

Comparison of economic benefits for businesses and project expenditure

This exercise assesses the extent to which the system level expenditure has yielded benefits to the businesses using ICT4T systems. The annual benefits for businesses through cost savings is estimated from -

- ✓ Cost reduction from before to after ICT4T systems as reported by businesses;
- ✓ Reported attribution of the reduced costs towards ICT4T systems, that has been reported on a five-level scale from 0% to 100%;
- ✓ Frequency of usage of the ICT4T systems, that has been estimated based on response to a scale detailed in Table 12, which also includes sensitivity analysis[61];
- ✓ Average system users estimated from lists provided by TMA, system data and qualitative discussions.

Estimated annual benefits	=	*Reduced business costs per transaction* X *Number of transactions* X *Attribution to ICT4T system* X *Number of system users*

This approach while presenting an indicative estimate does not serve as a replacement for economic methodologies such as CBR, BEA and NPV. However, it is a useful proposal to overcome the methodological and data limitations faced in arriving at a portfolio level metric that synthesises costs and benefits. The challenges in portfolio level estimation, limitations and mitigations of this approach are detailed below:

[61] For the purpose of economic benefit estimation, we used conservative estimate in converting reported frequency to monthly usage as detailed in Table 12.

Benefit estimation – The benefits of the trade systems apply to implementation agencies and businesses. While the systems data captures changes in fee, it does not capture benefits accrued to the businesses in terms of reduction in transaction costs. This approach focuses on the business benefits as self-reported by business owners as the most accurate representation in the absence of monitoring data.

Diversity in portfolio and services – The portfolio is comprised of 22 projects, each with different periods of implementation and breadth of services offered. In order to calculate economic benefits for each year, accurate system data on number of transactions and users is necessary at service level across years and projects. The current estimates take an "average year" and "most frequently used service" as the basis for calculating benefits. Hence, it is an approximation rather than a comprehensive estimation of benefits over the years. In order to avoid over estimation (as number of services and users varied through implementation period) the calculation uses only self-reported frequency of transactions.

Estimation of system users – With the varying number of users per year, an average of platform users during the implementation period has been considered for ease of estimation. The breakdown of users per year, would require services used and benefits for each year which cannot be captured due to lack of monitoring data. This exercise uses sample from business survey and extrapolates to system level using - lists provided by TMA as "minimum number of users", "average number of users" where system data is available.

Table 24 Comparison of economic benefits and expenditure

System	Sample	Cost savings (USD)	Annual usage frequency	Attribution of benefits to ICT systems	Annual benefits from cost savings (USD)	Estimated system users per year	Annual system level benefits	Overall expenditure (all years)
iCMS	196	19	331	57%	$ 708,290.99	152,906	$ 552,560,930	$ 32,828,047
CMIS	331	20	55	58%	$ 211,111.86	423	$ 269,789	$ 242,544
iSOKO	253	22	62	56%	$ 194,645.82	4000	$ 3,077,404	
ATMIS	503	43	24	56%	$ 293,080.30	1140	$ 664,238	$ 241,413
MIMIS	65	14	36	74%	$ 23,950.31	17,149	$ 6,318,830	$ 916,983
IMIS	114	38	30	72%	$ 94,883.65	1,034	$ 860,611	$ 1,442,966
IMS	161	15	16	61%	$ 22,731.43	2,325	$ 328,264	$ 211,795
SA-PVP	32	8	133	69%	$ 23,455.76	57	$ 41,781	$ 629,005
Systems with business survey data	Respondents for cost and time savings	Business savings from before to after ICT4T systems	Frequency of transactions using ICT4T system (Sensitivity*)	% of cost savings attributed to system by the sample	Cost savings for the respondent sample	Number of users from TMA list System data Qualitative data	Annual system level benefits calculated for estimated users per average year	Estimated annual benefits exceed expenditure Estimated annual benefits yet to exceed expenditure

This exercise shows that indicatively majority of the projects estimated have produced economic benefits for the businesses that have exceeded the expenditure for project implementation. Specifically, for iCMS, KNCCI (CMIS and iSOKO), ATMIS, MIMIS, the indicative annual benefits at system level demonstrate more than double the overall expenditure incurred for project implementation. This indicates that the project has been able to create value for the businesses beyond the incurred cost. In the case of IMIS, the indicative annual benefits estimated are below the project expenditure. However, considering the years of implementation and increase in number of system users the benefits created annually could be improved. Similarly, for SC-PVP the number of annual users is low that impacts the estimated benefits. Further, while the percentage reduction in costs is high, the value of reduction (cost savings) is low considering the nature of services offered in the system. **Overall, the comparative analysis showcases that positive economic benefits have been created for the businesses in comparison to the project expenditure.**

5.4. EQ 25. To what extent does the positive impact justify continued investments?

BEA was identified as an approach that could provide a quantified assessment of the ICT4T portfolio's estimated return on investment. BEA uses the same general analytic structure as Cost Benefit Analysis, to identify the breakeven point for each project and portfolio. BEA thus enables assessment, of the prospect of TMA ICT4T benefits equalling or exceeding costs. While this BEA approach includes a Benefit-to-Cost Ratio (BCR), considering the broad assumptions made in methodology, it aims at quantifying whether project and portfolio broke even rather than establishing a standalone return on investment metric. This has been executed by utilising:

- ✓ Total level of time and costs reduced by a particular project, and then calculating the monetary value of these reductions represented through the present value (PV) of project benefits;
- ✓ Adding together TMA ICT4T project costs (direct and indirect) calculating the PV of project costs; and
- ✓ Setting these project benefits and costs against each other to assess whether the project is likely to break even.

Table 25 NPV Explanation

Costs	Benefits
Net Present Value of lifetime project expenditure (direct and indirect costs)	Net Present Value of (Time saved X monetary value of hours saved) + Net present value of (Cost saved per transaction x Vol. of apps)

As part of the BEA assessment, there are a few methodological and data limitations associated with the approach. While the evaluation team has utilised informed assumptions and steps to mitigate the limitations, it is important for the reader to consider the below limitations:

- ✓ **Uniformity and availability of systems data:** The ownership of systems currently lies with the agencies hosting the systems as per the projects. With the support of TMA staff, the evaluation team was able to capture and obtain useful system data supporting the analysis from RECTS, ECCSA, MIMIS, ReSW, RSB, NCTO, SCT and CMIS systems. However, the data obtained was not comprehensive enough to inform complete BEA calculations, with one of the major constraints being lack of volume of transactions data for all systems.
- ✓ **Limited availability of cost and time data for projects:** The average cost and time for transaction before the availability of ICT systems is obtained through qualitative and quantitative primary data collection, and is hence limited to the 8 systems of primary research. In consideration of all the relevant data available, the BEA approach was administered to six projects i.e., KNCCI, MLF MIS, RURA, RSB, RECTS and ReSW.

The BEA presented in Table considers the ICT4T projects where data was complete enough to reasonably estimate the time and cost savings produced per project. **Overall, the exercise shows a positive NPV for most projects, leading us to conclude that this sample has already delivered a positive return on investment.** This is shown strongly in the KNCCI, MLF MIS and RURA projects where the estimated Benefits-to-Costs Ratio (BCR) is above 14. However, due to the data limitations mentioned above it has not been possible to calculate an NPV at the ICT4T portfolio level. The tentative conclusion based on this analysis is that if these benefits are replicated across other systems, then based on the observed level of return per system, the overall ICT4T portfolio is likely to be net positive. But that cannot be fully confirmed without further analysis.

Table 26 Break even analysis - TMA ICT4T Summary table

Project code	TMA ICT4T Project	Time and cost reductions			
		PV of TMA total costs ('000 $)	PV of Benefits ('000$)	NPV ('000$)	Overall Project BCR
3548	KNCCI**	$ 249.00	$ 3,901.00	**$ 3,652.00**	**15.68**
3536	MLF MIS**	$ 910.00	$ 12,936.00	**$ 12,027.00**	**14.22**
3823	RURA**	$ 530.00	$ 8,550.00	**$ 8,019.00**	**16.12**
3828	RSB*	$ 154.00	$ 41.00	**$ -113.00**	**0.27**
3541	RECTS*	$ 4,074.00	$ 2,246.00	**$ -1,828.00**	**0.55**
3825	ReSW*	$ 1,650.00	$ 2,640.00	**$ 990.00**	**1.6**
Total		**$ 7,567.00**	**$ 30,315.00**	**$ 22,748.00**	**4.01**
*** Includes time and cost savings, * Includes time savings only*					

Source: EDI analysis

6. SUSTAINABILITY

According to the evaluation ToR, sustainability is defined as *"the continuation of benefits from the portfolio after TMA support ends…and the extent to which the supported interventions were both environmentally and financially sustainable"*. Our approach to understanding the sustainability of ICT4T is primarily through a review of previous evaluations and our stakeholder and business consultations.

Table 27 Sustainability Evaluation Questions

Evaluation Questions
23. How will the completed projects remain viable and operational post TMA support?
24. To what degree is the ICT4T portfolio promoting green growth?
25. To what extent does the positive impact justify continued investments?

6.1. EQ 23. HOW WILL THE COMPLETED PROJECTS REMAIN VIABLE AND OPERATIONAL POST TMA SUPPORT?

Evidence from previous evaluations and our primary evidence shows positive signs that ICT4T systems remain viable post-TMA support, but operational viability has its limitations. Host agencies appear willing and able to maintain the ICT4T systems they host, but they are generally unable to develop and improve their systems without TMA's funding and expertise. Technological interventions such as ICT4T cannot remain static, but need to keep up with the pace of technological change and the evolving needs of the private sector, otherwise they quickly become outdated. This needs to be an area of focus for ICT4T in Strategy 3, to enable agencies to standalone in the upgrading of ICT4T systems.

Our qualitative evidence revealed some mixed responses regarding the operational sustainability of systems within the ICT4T portfolio after TMA funding ends. Our evidence suggests operational sustainability is largely linked to the level of funding and host institution size. The systems evaluated are also at different stages of their collaboration with TMA, with some operating without TMA funding for several years, while others are still dependent on its financial and technical assistance.

Positive examples of operational sustainability post-TMA support emerge from the iCMS and SCT systems. A KRA stakeholder commented on how the maintenance of the complex iCMS system is now managed through KRA's in-house IT team. While a stakeholder from the SCT system described it as *"not a very complicated system which does not cost much to run...and the hosting is now funded by the EAC".* These two systems are two of the largest individual ICT4T programme investments (iCMS = US$10,639,000 and SCT = US$1,794,000) and they are hosted by two sizable, and well-resourced institutions in KRA and the EAC. Additionally, revenue authorities have an added incentive to maintain and develop ICT4T systems to fulfil their core mandate of revenue collection. This is not always the primary mandate of other agency types in the portfolio, so the incentives for system maintenance and upgrade may be less.

On the other side, we observe systems which are hosted by less prominent institutions, and which have received lower TMA funding to struggle more with operational sustainability. For example, the TCCIA's IMS system has been running independently from TMA since 2021. This system generates revenue from issuance of the certificates of origin (COO) at $3 per certificate and is now hosted on internal TCCIA servers. However, the system was said to outdated and only semi-automated, meaning that users still have to visit TCCIA offices

in-person to collect the final COO certificates. TCCIA expressed concerns that given the fast pace of technological change, support from TMA will still be required to fully automate and periodically update the COO system. Also, it was noted that the ZNCC which runs the IMS system in Zanzibar, had *"no substantive or tenable in-house IT professional"* and relied on external consultants for technical support when funding is availed.

Another example where operational sustainability appears less clear is with the ECDS system hosted by the Ethiopian Chamber of Commerce, which is earlier in its development as the system is yet to be marketed and has no organic users. A stakeholder expressed some concerns about system maintenance as they appear dependent on the external developer's expertise to troubleshoot system issues, and this is currently funded exclusively by TMA. An agency representative proposed a one-to-two-month training for the existing internal IT team, or to make two expert hires to enable operational sustainability.

The evaluation has found that some agencies are able to hire and self-fund the Technical Assistant(s) that TMA initially provided, which demonstrates their capacity to fund this position as well as a commitment to maintaining technical expertise. However, this is not uniform across the portfolio which means some agencies are left with minimal IT expertise to maintain and develop the ICT4T systems.

6.2. EQ 24. To what degree is the ICT4T portfolio promoting green growth?

The evaluation evidence from previous evaluations and this evaluation's own primary evidence is weak in showing that ICT4T has a prominent role in promoting green growth. The majority of evaluation reports and stakeholder consultations reference the reduction of paper and reduction of fuel emissions as a result of automation, but beyond these insights, no tangible secondary evidence of 'green growth' promotion is available. Multiple references to reductions in paper usage and reduction of fuel emissions imply a positive environmental impact, but currently there is no effective way of quantifying this.

In addition, references to green growth, climate change mitigation and environment sustainability are minimal in the existing ICT4T ToC and in the project design documentation (PARs) we have reviewed as part of the evaluation. If TMA is serious about promoting green growth in its ICT4T interventions in Strategy 3 bring clear in its design documentation on how it plans to achieve this is essential.

Reduction in Paper Use

One example of quantification of paper reduction was provided by a stakeholder overseeing the ITTS system. Prior to automation, the tea trading process required substantial printing for tea trading catalogues used by brokers. It was estimated that approximately 120 buyers produced a five-page catalogue three times per week for 14 brokers. As an annual estimate, this works out at 25,200 pieces of paper used per year. According to the carbon offset company, 8 Billion Trees, it is estimated that one tree produces between 10,000 to 20,000 sheets of paper.[62]

Using these estimates, the transition from a manual to automated trade system in the tea trade and the consequently reductions in paper usage in the system, equates to a saving of one to two trees per year. If we were to tentatively assume, each evaluable project in the ICT4T portfolio yielded a similar saving in paper use, the ICT4T portfolio could be attributable to the saving of 21 to 42 trees per year, and over the lifetime of a six-year strategy this equates to a range of 126 to 252 trees saved. This application to the whole portfolio

[62] 8 Billion Trees, (access **here**, 2024).

needs to be caveated heavily in the absence of stronger evidence of paper reductions, but it serves more as a potential approach to the quantification of paper reductions, should more evidence be available.

Reduction in Transportation

Quantitatively capturing reductions in transportation and its concomitant emissions through the automation of ICT4T systems is a priority for Strategy 3. Within the scope of this evaluation, we were unable to gather sufficient evidence to make strong claims on the environmental impact of reduced transport during the trade application process. A separate study is needed to fully grasp the dichotomy that exists, namely, that although ICT4T systems may well reduce CO_2 levels through preventing hundreds of thousands of journeys for businesses to and from agencies, the impact of ICT4T (as presented in Section 4) is that businesses are trading more. More trade means more ships arriving at Mombasa and Dar-es-Salaam ports and more trucks transporting goods along the Northern and Central Corridors across the EAC, which in turn leads to greater CO_2 pollution. Equating the potential reductions in CO_2 levels at the front-end (through automated trade systems) and comparing with potential increases at the back-end (more trade), could be the best approach to understanding the net extent to which ICT4T contribute towards green growth.

7. RELEVANCE

The ToR for the evaluation defines relevance as *"the extent to which the objectives of the portfolio as laid out in the TMA Strategy 2 and TOC were consistent with recipients' requirements, country needs, global priorities and partners' policies"*. In this section we consider the relevance of TMA's ICT4T interventions with reference to the evaluation questions in Table **Error! Reference source not found.** below.

Table 28 Relevance Evaluation Questions

Evaluation Questions
1. To what extent did the programme address the needs (sector / trade system) identified at the formulation and design stages? At country level and regional EAC level. 2. To what extent is the ICT4T portfolio inclusive and diverse?

7.1. EQ 1 - TO WHAT EXTENT DID THE PROGRAMME ADDRESS THE NEEDS (SECTOR / TRADE SYSTEM) IDENTIFIED AT THE FORMULATION AND DESIGN STAGES? AT COUNTRY LEVEL AND REGIONAL EAC LEVEL.

Evaluation of the ICT4Trade systems implemented by TMA underscores their overall relevance and alignment with the needs that were identified by the trade community and host agencies at the design stage. An in-depth examination of secondary data, including project appraisal reports, evaluation reports, and feedback from key stakeholders, has revealed that these systems have effectively addressed the objectives set at inception. Consultations with TMA and other stakeholders involved in the design of the ICT4T systems identify three broad areas of needs and challenges that the ICT4T systems seek to address (i) inefficient trade systems; (ii) lack of transparency; and (iii) high transaction costs. However, the nature of each of these needs is unique to each sector and institution. In the following section we discuss some of the general needs identified by the trade communities and host agencies to demonstrate how the systems supported by TMA have helped address them.

Addressing inefficient trade systems

Inefficiencies within trade systems have long been a concern for East African businesses, governments, and stakeholders involved in both regional and international trade. Cumbersome manual processes, bureaucratic hurdles, and a lack of transparency can lead to delays, increased costs, and hinder economic growth. Indeed, recognition of these barriers was the main driver behind the establishment of TMA in the first place. ICT4T leverages digital tools and automation to streamline trade processes, reduce paperwork, enhance data accuracy, and facilitate cross-border transactions. In this section we highlight some of the inefficiencies identified at the inception of the ICT4T trade portfolio and how the systems have contributed to addressing these inefficiencies.

Manual Documentation: At the inception of the ICT4T portfolio many government processes related to trade were manual requiring a significant amount of staff time for document processing for host agencies and for document preparation and submission by businesses users. The manual documentation also led to significant delays and human errors in document processing. The ICT4T systems have digitised documentation submission and processing, enabling the electronic submission, processing, and storage of trade-related documents. Feedback from stakeholders show that manual documentation has been eliminated in most cases where TMA has intervened, although there are a few isolated cases where some level of manual documentation is still in

existence. For example, with the TCCIA Certificate of Origin (COO) system in Tanzania traders reported still having to travel in person to a TCCIA office to obtain a physical copy of the certificate[63].

In addition, with regards to the AFA IMIS system one key informant interviewed during the evaluation reported:

> *"The system has removed all the manual documentation across all the directorates. The role of AFA staff has been reduced to verification. We have access to the national registration bureau, business registration records and tax registrations records which we use for verification of documents and therefore we don't require the business owners to present any physical documents."*
>
> (AFA Stakeholder)

***Inefficiencies in payment processes**:* Before the implementation of the ICT4T systems payment for government services were often limited to cash and direct deposits which required someone to present themselves at government offices or a bank. Cross-border payments were even more complex and costly, particularly because the East Africa region operates multiple currencies and banking systems. TMA-funded ICT4T platforms have facilitated secure and cost-effective electronic payment solutions, such as online payments using credit/debit cards, electronic banking and mobile money payments that are more efficient for those involved in trade. For businesses operating in multiple countries in the region they can make payments across the region through online platforms created by the ICT4T systems which allow for multiple currencies without having to look for the local currency of individual countries. One stakeholder interviewed remarked:

> *"Businesspeople or clearing agents don't have to leave their desks to make payments. We have a wide range of payments options (bank, M-PESA, card) and they can use whichever is convenient for them depending on the value of transaction. Most of the small value transactions are now done on M-PESA (mobile money) which is very convenient. You don't have to queue at the bank like before."*
>
> (KRA Stakeholder)

Inefficient Border Management: Inefficiencies at border crossings, such as long queues and redundant inspections, were identified as major causes of trade disruptions prior to the establishment of TMA. ICT4T solutions have enabled single-window systems that facilitate exchange of information between revenue authorities and other border management agencies, which in turn, has harmonised border procedures and improved cross-border coordination in the region. This was reported to have significantly reduced border crossing time. With regards to the Single Customs Territory (SCT) system one consultee stated:

63 Endline Evaluation Of TMA Funded Trade Systems For The Tanzania Ministry Of Agriculture, The Tanzania Medicines And Medical Devices Authority, The Confederation Of Tanzania Industries, and The Tanzania Chamber Of Commerce, Industry And Agriculture

"The system has streamlined communication, enhanced efficiency, and improved overall collaboration between entities. By leveraging advanced technological solutions, we've experienced notable advancements in project coordination, data management, and the overall effectiveness of service delivery to our key stakeholders."

(SCT Stakeholder)

Addressing lack of transparency

Limited visibility of trade transactions: Lack of visibility on transactions within trade facilitation institutions, and between the institutions and businesses created opportunities for rent seeking behaviour by some public officers which has reportedly led to corruption and unfair practices. ICT4T solutions have enhanced visibility of transactions and created transparency by reducing the loopholes that enable such behaviours. In addition, ICT4T systems have improved access to information on trade regulations, tariffs, and transaction histories reducing information asymmetry between service providers and service recipients.

Reduced the complexity of regulatory compliance: Navigating complex trade regulations and compliance requirements can be challenging. ICT4T systems have provided tools for streamlining compliance checks making it easy for businesses to comply with the regulatory requirements in different sectors. For example, feedback from stakeholders consulted as part of this evaluation indicated that the KEPHIS-SVP system has streamlined the documentation for compliance with seed certification rules in Kenya, which has reduced the compliance burden for businesses in the seed sector.

Limited trade information sharing: Collaboration and information sharing among trade facilitation agencies was reported to be generally insufficient before implementation of TMA supported ICT4T systems. The ICT4T systems have established platforms for information exchange and coordination among government agencies and private sector entities. For example, users of the iSOKO system highlighted how they had difficulty in determining a reasonable market price for their products and struggled to market products to new customers prior to the introduction of the system. While a user of the Integrated Tea Trading System (ITTS) revealed how before a recent system update which enabled multi-hall capabilities (partially funded by TMA) they were unable to attend more than one auction room at the same time. An illustration of how integration has improved information sharing and efficiency was provided by a private sector body representative:

"Before the single window platform was developed you were required to submit customs clearance documents to multiple agencies depending on the nature of your cargo. You would be required to submit documents to the revenue authority, the standards body and port authority, etc. Now you only submit the documents once and all the agencies are able to access them. This saves a lot of time."

(Private Sector Representative)

Information for internal decision making within institutions: Previous evaluations[64] commissioned by TMA provide some evidence that manual trade systems caused challenges when it comes to agency management reporting and informed decision making. These concepts were not very prominent in the ToC workshop discussion with TMA, but it is worth re-emphasising that secondary evidence shows ICT4T sought to address outstanding issues both with (i) businesses and (ii) host agencies. During the ToC workshop the evaluation team sort to clarify ToC for the ICT4T portfolio to inform the scope evaluation by allowing TMA participants to articulate and clarify the long-term goals and desired outcomes for the portfolio based on their deep knowledge of the portfolio and context. While the outcomes related to the trading community and improvement in trade systems were clearly articulated, the outcomes for the host agencies were not easy to aggregate across agencies. Feedback from across agencies does show that data generated by the ICT4T systems is used to inform internal decision-making including tracking of revenue targets and efficiency in delivery of services. However, the practice is not consistent across the agencies and there are no clear indicators for measuring the extent of utilisation of data or assessing the impact on decision making. The separation between the outcomes expected for the trading communities and those expected for the host agency could be made stronger when monitoring ICT4T performance during Strategy 3.

Addressing high transaction costs

Cost of documentation and submission: Traditional paper-based documentation processes were time-consuming and costly. ICT4T enables the digitization of trade documents, reducing the need for physical paperwork and associated expenses. Where TMA has intervened to implement an ICT4T system, most of the processes are now paperless and this has significantly reduced the costs of documentation for most trade processes. Data on the estimated value of these cost reductions is presented in Section 3 **Error! Reference source not found.**.

Cost of disputes in trade processes: The heavy reliance on human intervention in trade processes led to many disputes due to subjectivity that is inherent in processes that involve human judgement. For example, there was a lot of subjectivity in the interpretation of regulation and compliances and in the valuation of custom goods prior to automation. The evaluation has found that disputes emerging from this subjectivity could lead to unnecessary delays and costs. The ICT4T systems have reportedly standardised procedures and requirements, significantly reducing the subjectivity in trade facilitation processes. For example, the business intelligence tools within ICMS now allow custom officers to access international and up-to-date databases that inform valuation of custom goods. This was found to remove subjectivity from the process, and as a result, the disputes associated with custom valuations. Before this innovation, this could create significant delays costing the business community substantial costs in storage costs at East African ports, such as Mombasa and Dar-es-Salaam.

In summary, this evaluation has found evidence that ICT4T systems have responded effectively to the issues identified at the design stage. The systems have successfully addressed three broad areas of needs and challenges identified by trade communities and host agencies: inefficient trade systems, lack of transparency, and high transaction costs. The ICT4T systems have considerably eliminated manual documentation processes, reducing delays and human errors in application and approval processes. They have

[64] The Endline Study of TMEA funded trade systems for the Agriculture and Food Authority (AFA MIS); Endline Evaluation of TMEA funded trade systems for the Tanzania Ministry of Agriculture, Tanzania Medicines and Medical Devices Authority, Confederation of Tanzania Industries, and the Tanzania Chamber of Commerce, Industry and Agriculture.

also facilitated secure electronic payment solutions, making transactions more efficient. Furthermore, the systems have harmonized border procedures, reducing border crossing times.

On transparency, ICT4T systems have enhanced visibility of transactions, reducing opportunities for corruption. It has also simplified regulatory compliance processes, making it easier for businesses to adhere to regulations. Additionally, the systems have established platforms for information exchange and coordination among government agencies and private sector entities, improving information sharing and efficiency. On high transaction costs, the ICT4T systems have reduced the costs associated with documentation and submission by digitizing trade documents. It has also standardized procedures and requirements, reducing subjectivity in trade processes and minimising disputes.

7.2. EQ 2 - To what extent is the ICT4T portfolio inclusive and diverse?

ICT4T systems can play a pivotal role in promoting inclusivity in trade and trade systems by addressing key challenges and barriers that often exclude certain stakeholders from participating fully in trade. Evidence of the inclusivity of the ICT4T portfolio demonstrates an overall positive trend. However, it is notable that much of this inclusivity has been achieved by default rather than by intentional design, which is often the case with digital interventions as they are typically inclusion agnostic. The evidence indicates that while ICT4T systems have managed to reach a diverse user base, including women, marginalised groups, SMEs and a variety of stakeholders, this outcome often occurred organically rather than as a result of deliberate and targeted efforts.

For example, evaluation reports of key ICT4T systems in the portfolio show that 30% of the users of key systems are women-owned enterprises. Data for some of the systems in the portfolio also show that SMEs are key beneficiaries. Sixty-one percent of TCCIA users and 54% of KNCCI systems were found to be SMEs[65]. This is mainly driven by most members of the Chambers being SMEs rather than deliberate measures being taken to include SMEs. The participation of SMEs and women-owned enterprises varies significantly between sectors. This 'unintentional inclusivity' underscores the potential for greater impact if deliberate strategies and design considerations are applied to enhance the participation and engagement of traditionally underserved or marginalised communities in trade-related activities facilitated by ICT4T systems. The only outlier where 'intentional inclusivity' has clearly taken place is with the iSOKO system, which was deliberately designed to target female SMEs and featured targeted capacity building training.

The evaluation has also found evidence of inclusivity from the system user perspective. Our findings suggest that the ICT4T portfolio is reaching a diverse set of system users, with evidence showing minimal barriers to accessing ICT4T systems by any group. Twenty-one percent of businesses in our survey sample were female-led businesses.[66] The business survey also found that female ownership was higher among Kenyan businesses, where 31% of system user respondents were female-led, compared to just 8% in Tanzania. Interestingly, these females led country-level figures broadly concur with the national averages for female-led formal businesses in Kenya and Tanzania.[67] [68] It is worth noting that the majority of female-led businesses in the sample are derived from the iSOKO system which is primarily targeted at supporting small and micro female businesses.

ICT4T systems were also found to be technologically inclusive with 93% of businesses reporting that they find the systems *easy to use* when conducting trade related activities. As Figure 26 indicates, this inclusivity

[65] Enterprises with less than 50 employees
[66] The sample of 2,061 in **Error! Reference source not found.** refers to all respondents who answered this initial question in the survey tool. Of the 2,061, 209 respondents failed to complete the full survey.
[67] Cherie Blair Foundation (2023, accessed **here**.)
[68] UN Women Africa (2023, accessed **here**.)

is felt across male and female-led businesses, with a slightly greater proportion of female-led businesses (37%) strongly agreeing that the system is easy to use compared to 29% of male-led businesses. Evidence from the KIIs and IDIs reveal some deliberate steps taken by TMA and its partners to encourage inclusive access to ICT4T systems. For example, remarking on the marketing strategy for the iSOKO system, one stakeholder commented:

> *"What has been good about that system is as we were doing the sensitisation we were not focused so much on the urban centres. We've also gone to the rural centres to help the women get exposed to technology for those that didn't have technology. They came with their children, and their children would help them understand the platform better and put their products on the platform."*
>
> (iSOKO Stakeholder)

Examples of other indicators of inclusivity are that most of the ICT4T systems have manuals that are free to download online, such as the MIMIS system. In addition to training and manuals, TCCIA also introduced a helpdesk to assist those who are less 'tech-savvy' to navigate the e-COO system.

Figure 26 Business Ownership Gender Disaggregated by System

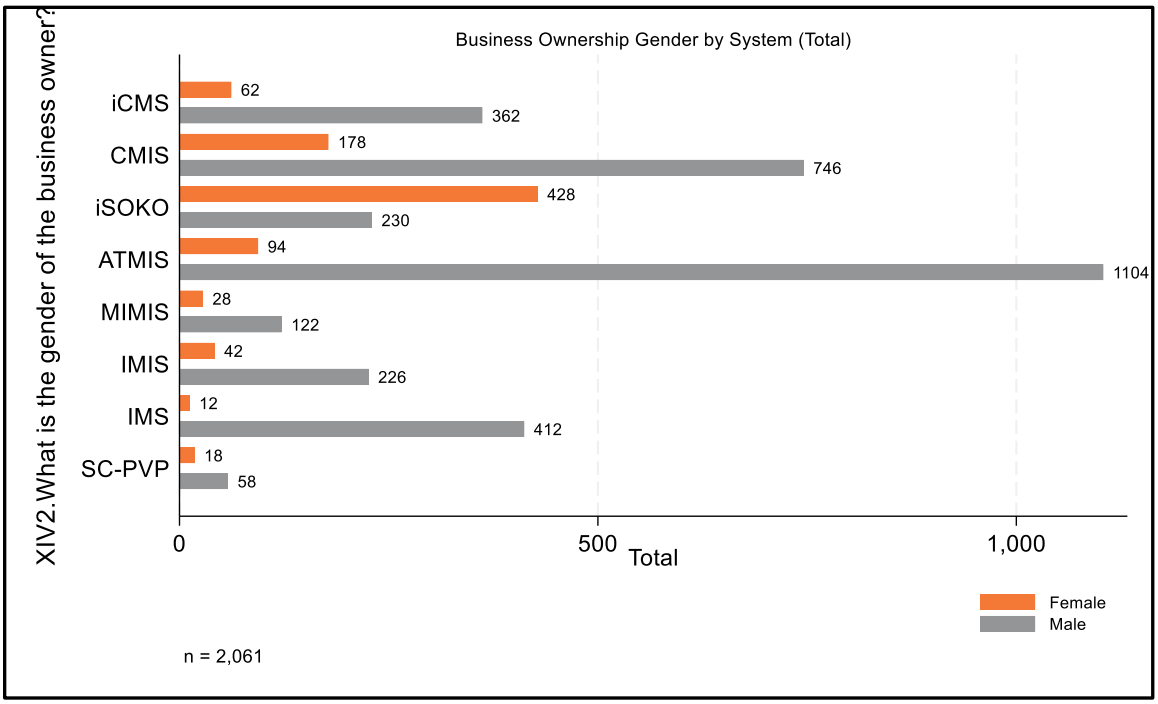
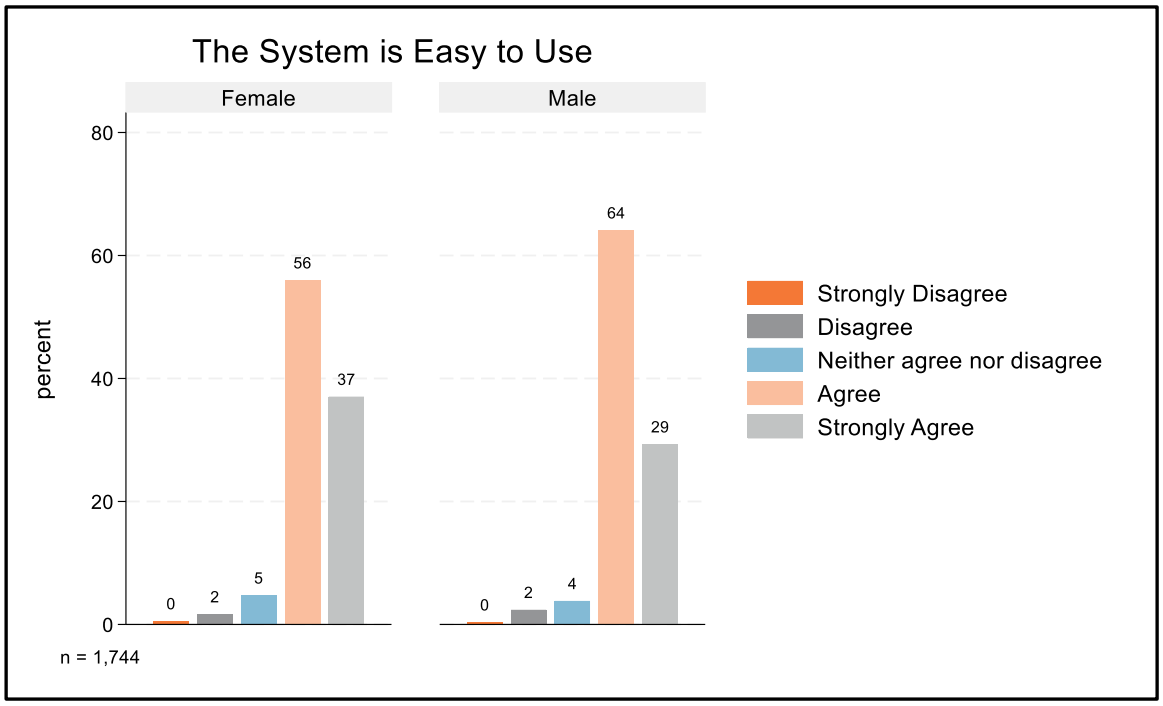


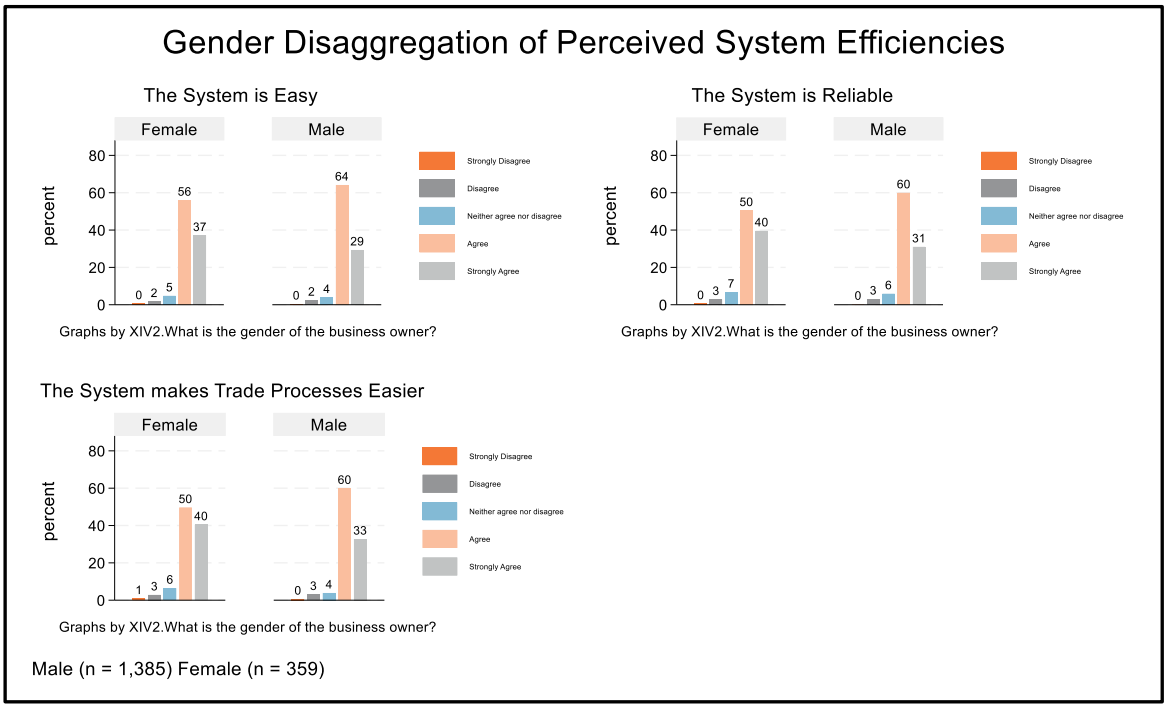
Figure 27 Rating System Ease by Owner Gender



The perceived efficiencies of ICT4T systems in making the trade processes easier was reported positively with more than 90% of male and female respondents each agreeing that the systems are *easy to use, reliable* and *make the trade processes easier*. These results were found to be gender agnostic, with no significant difference in usage experience between genders as presented in Figure 28. Qualitative discussions corroborated that the access to ICT4T system services was uniform irrespective of gender, size of firm or transaction. One stakeholder commented:

> *"The system is designed to use the principle of "first come, first served" regardless of gender or the size of transaction. Thirty percent of the total users are women and both large and small firms use the system."*
>
> (RFLS Stakeholder)

Figure 28 Gender Disaggregation of Perceived System Efficiencies



However, the evaluation also identified the following shortfalls regarding inclusivity in the implementation of the ICT4T portfolio.

Limited gender and social inclusion analysis for the ICT4T portfolio: Across all the systems, the evaluation has found little evidence that gender and social inclusion needs analysis was routinely undertaken to inform the design of ICT4T systems. Most of the needs analysis our evaluation has reviewed are general in nature and there is limited evidence that effort was made to understand the specific challenges and barriers faced by women and marginalised groups when designing the trade systems. There are exceptions for systems that were developed specifically with women in mind, such as the iSOKO trading platform, developed to facilitate online trading by women. In this instance, the needs analysis involved extensive engagement with women traders to better understand their needs. There is also limited consideration of gender and social inclusion within the ICT4T theory of change and result measurement metrics for the different ICT4T systems that were reviewed as part of this portfolio evaluation. Identifying and addressing gender and social inclusion issues in the theory of change will allow TMA to develop targeted interventions that specifically address the unique challenges and opportunities faced by different groups. Inclusion of gender and social inclusion in the results measurement framework also enhances accountability and transparency.

Lack of gender disaggregated system data: Across the previous evaluation reports we have reviewed inclusivity is broadly defined as enabling access to an ICT4T system regardless of gender, business size or location. The positive appraisal of inclusivity of ICT4T by evaluation reports is mainly based on the non-discrimination in access to systems, with services being provided to all on a *first-come-first-serve*d basis. This is evidenced by statistics on the range of business sizes using the system and the representation of female-owned businesses in the general user community. However, most ICT4T systems fail to effectively capture gender and inclusion information in the system itself. Of the 9 systems that we received aggregate data from, only one system (3828 – Rwanda Standards Board) was able to provide a gender breakdown of system users

(in this case 28% client accounts are female). Likewise, we did not receive any metrics on business size from systems that shared data. Also, when interrogating the system-level results chains produced by TMA, our research found zero reference to 'inclusivity', 'equal', 'equity', 'women' or 'gender', which suggests inclusivity was not a priority when designing the system and tracking results of the portfolio at a system-level.

8. COHERENCE

For this evaluation, we define coherence refers as the "*extent to which the various components, strategies, and interventions within the ICT4T portfolio work together in a coordinated and harmonious manner to achieve the intended objectives and outcomes*." It involves ensuring that all elements of the ICT4T portfolio are consistent, integrated, and mutually reinforcing, rather than working in isolation or in conflict with each other.

Table 29 Coherence Evaluation Questions

Evaluation Questions
4. How does ICT4T trade contribute towards the Sustainable Development Goals and policy priorities in the East African Community?
5. To what extent were the projects included in the ICT4T portfolio designed in collaboration with Government partners and achieve necessary buy-in?
6. Are ICT platforms and systems aligned with legal mandate and regulatory framework at national and regional levels?
7. To what extent do regulatory frameworks describe the application of ICT to accomplish inter-agency collaboration?

8.1. EQ4 - HOW DOES ICT4T TRADE CONTRIBUTE TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS AND POLICY PRIORITIES IN THE EAST AFRICAN COMMUNITY?

From the review of TMA strategy documents and individual project appraisal reports for projects in the ICT4T we have identified the following SDGs that are broadly relevant to the ICT4T portfolio:

- ✓ SDG 1: No Poverty
- ✓ SDG 2: Zero Hunger
- ✓ SDG 5: Gender Equality
- ✓ SDG 10: Reduced Inequalities
- ✓ SDG 8: Decent Work and Economic Growth
- ✓ SDG 13: Climate Action
- ✓ SDG 17: Partnerships for the Goals

ICT4T systems are powerful tools with the potential to drive transformative change and significantly contribute to the achievement of the Sustainable Development Goals (SDGs). In an increasingly interconnected world, ICT4T systems play a pivotal role in shaping trade dynamics, fostering economic growth, reducing inequalities, and advancing sustainable development. These systems leverage digital technologies to streamline trade processes, facilitate access to markets, empower marginalised communities, enhance transparency, and promote inclusive economic practices. The evaluation has found evidence on the contribution of the ICT4T Portfolio to the SDGs through engagement with stakeholders in the trade environment in the region.

However, quantitative data on the contribution of the ICT4T systems to the SDGs is generally lacking. Although some previous evaluation reports we have reviewed as part of the evaluation do cite alignment with SDGs,

there is no evidence that TMA and its agencies meaningfully designed the ICT4T systems around the SDGs. The clearest example of direct alignment between the ICT4T portfolio and the SDGs is through the 3531 - NCTO and 3723 - CCTO systems, which contribute to numerous SDGs including SDG 1 on Poverty through facilitating transit of goods across borders; SDG 13 on climate change through providing data on emissions to aid formulation of polices and best practices in the logistics sector.

ICT4T systems have also played a critical role in contributing to SDG 2 (Zero Hunger) by facilitating the seamless flow of essential goods, including foodstuffs, within the EAC region and from other parts of the world. The COVID-19 pandemic vividly demonstrated the importance of efficient trade processes enabled by ICT4T systems. At the height of the pandemic in 2020, delays in the verification of COVID-19 vaccines and test certificates at border points led to disruptions in the flow of food items across the EAC region. This interruption resulted in food shortages and significant increases in the cost of food, particularly in countries like Kenya and Uganda, which rely on food imports to supplement their own domestic production. TMA-funded ICT4T systems can mitigate such challenges by expediting customs clearance, reducing trade-related bottlenecks, and enhancing the overall efficiency of trade flows. By ensuring that food and essential goods can move swiftly and safely, ICT4T systems contribute to food security and support the overarching goal of eliminating hunger, as outlined in SDG 2. The Safe Trade Reg-Tech Interventions system that was supported by TMA at the height of the COVID-19 pandemic played an important role in restoring normal operations at key East African border points including Busia and Malaba. This was achieved by the introduction of the RECDTS which expedited verification of health documentation at the main border crossings within the EAC. This helped to unblock the bottlenecks which, in turn, contributed to the lowering of food prices in East Africa.

A review of project evaluations and feedback from the business community underscore the pivotal role the ICT4T systems have played in addressing inequalities within the trade environment contributing to SDG 5 and SDG 10. Through the implementation of ICT4T systems, significant strides have been made in enhancing access to services for all segments of the trading community, irrespective of gender or business size. Literature suggests that SMEs are disproportionately affected by Non-Tariff Barriers (NTBs) compared to their larger counterparts, primarily due to their limited access to vital information and the networks necessary for navigating and mitigating these barriers. The integration of ICT4T solutions has played a transformative role in reducing information asymmetry between large and small enterprises. These systems have ushered in more transparent and accessible channels for engaging with trade facilitation processes, eliminating the need for extensive institutional networks. As a result, ICT4T has emerged as a powerful tool in levelling the playing field, ultimately contributing to a more equitable and inclusive trade environment.

A review of previous evaluations of specific ICT4T systems had identified strong coherence and alignment between the systems and national / regional policies and strategies. For example, the 3539 - Rail Freight Logistics Services project, which aimed to enhance trade efficiency holds some synergies with both the 'Treaty for the Establishment of a common market and customs union in East Africa' and the 'EAC Development Strategy of 2021 – 2026' which aims to transform the EAC into a stable, competitive, and sustainable lower-middle-income region by 2030. The evaluation report for the Rwandan systems detailed the alignment of the ICT4T systems with 'Rwanda's Vision 2050'.[69] For example, one of the foci of the second strategic pillar 'Competitiveness and Integration' is 'strengthening export competitiveness and trade connectivity', to which the Rwanda Standards Board (RSB) and Rwanda National Agricultural Export Board (NAEB) systems directly contribute. Feedback from key stakeholders at the Port of Mombasa also found that the iCMS and NCTO

[69] CESS, 'End of Project Evaluation of TMEA Funded ICT For Trade Systems in Rwanda', (2022).

systems have been key contributors to improvements in the efficiency of the Port. This is a key priority for the Government of Kenya and all EAC countries because the Northern Corridor is a main logistics channel for the region. Data generated by the NCTO has informed policy discussions and decisions at both regional and the national level, such as changes in cargo handling procedures at the port and the removal of weighbridges along the Northern Corridor.

8.2. EQ5 - To what extent were the projects included in the ICT4T portfolio designed in collaboration with Government partners and achieve necessary buy-in?

The evaluation has found evidence that ICT4T systems were designed in collaboration with government partners and, as a result, there is generally strong ownership of the ICT4T systems by host government institutions. Across the portfolio, there is evidence that stakeholder engagement was undertaken as part of the inception of the systems and documented in the Project Appraisal Reports (PARs). There is evidence of consultations, workshops, and meetings that were organised to understand the specific needs, requirements, and priorities in host organisations and their contribution to trade facilitation. This ensured that their voices were heard and pertinent concerns were addressed in the design of ICT4T systems.

In addition, there is evidence of engagement between TMA and higher levels of government, beyond the host institutions, to ensure that ICT4T systems were aligned with national priorities including engagement with political leaders in different TMA countries. TMA involvement has also been instrumental in building linkages between difference agencies particularly where integrations were required and in many instances in helping build partnerships to facilitate the integration of systems. For example, TMA support for Kentrade was found to be instrumental in the integration of the KRA-ICMS system with the Kentrade Single Window system in Kenya. TMA also facilitated the integration for number of institutions in Tanzania through the support provided under the Tanzania Electronic Investment Single Window (TeISW) that was implemented in partnership with the Tanzania Investment Centre (TIC). In developing the ICT4T systems TMA has also ensured that they are developed in manner that makes them integration ready to make easy to implement integration across institutions and facilitate collaboration.

TMA was said to be perceived as a *'neutral broker'* and is therefore able to break past government bureaucracies to facilitate collaboration between different agencies. For example, there was an instance relayed to us where one government agency was hesitant to integrate with another because they considered the need for information exchange as an opportunity to provide a paid service to the other agency to earn some revenue. TMA was instrumental in brokering a partnership between the two agencies that allowed for the integration of the two systems for seamless operations.

Two quotes from stakeholders consulted as part of the evaluation demonstrate the collaborative approach to systems design taken by TMA:

> *"The ITTS platform was designed with participation of relevant public agencies and secured buy-in from governments in Kenya and also other countries in Eastern and Southern Africa. Presently, 10 countries conduct trade using the system."*
>
> (ITTS Stakeholder)

"We have been intensively involved in every stage of the system development; business process analysis, definition of specifications, development, testing, user training, etc. TMA provided a technical assistant to manage the project delivery but the project implementation team composed of AFA staff from the different directorates who were fully involved."

(AFA Stakeholder)

8.3. EQ6 - ARE ICT PLATFORMS AND SYSTEMS ALIGNED WITH LEGAL MANDATE AND REGULATORY FRAMEWORK AT NATIONAL AND REGIONAL LEVELS?

Collaboration with government agencies has also ensured that ICT4T systems have been customised to align with the regulatory and procedural frameworks of national governments. This ensures that ICT4T systems are compatible with existing government systems and can seamlessly integrate. This minimises disruptions and encourages government agencies to embrace the technology. The evaluation has found instances where TMA has responded to changes in the regulatory frameworks that happened during the implementation of systems by updating them to ensure they are aligned with new regulations. For example, after changes were made to the anti-counterfeit regulations in Kenya, TMA helped to review the scope for the Anti-Counterfeit Authority (ACA) system to reflect the updated the regulations. Adaption was also made to the AFA system to reflect the changing mandates of the different directorates under AFA.

At the regional level, the ICT4T systems were also found to be broadly aligned with the legal mandate of different institutions. For example, the NCTO system is well aligned with the mandate of the Northern Corridor Transit and Transport Agreement (NCTTA) which was established by a multilateral treaty to facilitate the effective transit of cargo between the Kenyan Port of Mombasa and the hinterland of member states namely Burundi, Democratic Republic of Congo, Rwanda, Uganda and South Sudan. Prior to the treaty, transit trade operated through bilateral agreements, which did not offer a coherent framework for standardised services and transit trade procedures across the different member state territories.

"The establishment of the NCTO is based on a multi-modal (rail, road, pipeline and inland waters) agreement signed by six countries to facilitate trade, and movement of persons, vehicles, and goods in domestic, regional, and international transport. agreement between many member states."

(NCTO Stakeholder)

8.4. EQ7 - TO WHAT EXTENT DO REGULATORY FRAMEWORKS DESCRIBE THE APPLICATION OF ICT TO ACCOMPLISH INTER-AGENCY COLLABORATION?

The evaluation has failed to find strong evidence that a sufficiently robust regulatory framework exists to facilitate inter-agency collaboration, particularly at the national level. There are currently no laws or regulations that explicitly mandate government agencies to collaborate using ICT tools and platforms for specific purposes, such as trade facilitation or public service delivery across the EAC countries. There are some exceptions, for example, all government agencies that have ICT4T systems which facilitate payments are required to integrate with the government payment gateway in Tanzania.

As a result of the shortfalls in the legal and regulatory frameworks, integrations and data exchange between government agencies is mostly anchored on data sharing agreements signed between individual government agencies, rather than through an overarching framework which guides collaboration and exchange between agencies by defining the scope, standards and responsibilities of each agency in collaborative efforts. The process of brokering specific data exchange agreements between agencies was reported to be sometimes very slow and to significantly affect the effectiveness of ICT4T systems. In many instances, TMA has again acted as a neutral broker in negotiating information exchange agreements between agencies, mainly because disputes can stand in the way of timely delivery of ICT4T systems. One stakeholder we consulted commented:

> *"Interventions that involve more than one entity (say two or thress) can be problematic. Issues on who is ultimately responsible often arise. Often there is nobody stepping up and taking it on, and if they do, other parties sometimes believe there are doing so due to their own vested interests."*
>
> (ICT4T Stakeholder)

Most EAC countries have recently implemented data protection laws and regulations that will address data privacy and security concerns, ensuring that sensitive information is protected during inter-agency collaborations. This initiative is still at an early stage and there is limited understanding of the laws and regulations to date, but this move is expected to address some of the challenges that have hindered inter-agency collaboration in the past.

9. Conclusions and Recommendations

In this final chapter we pull together the body of evidence presented through this evaluation to offer some overall conclusions and recommendations for TMA's consideration. In doing so, the evaluation will also attempt to jointly answer the three main learning questions set, namely:

- ✓ EQ 26. What are the key achievements, challenges, and lessons learned from the programme? What has worked well/not worked well, and why?
- ✓ EQ 27. How was the portfolio adaptive to changes and uncertainty internal and external to the programme?
- ✓ EQ 28. What good practices did the programme introduce to achieve better results?

9.1. Conclusions

This evaluation set out to gather primary data from a large sample of businesses who use the range of ICT4T systems funded by TMA. It succeeded in doing this and gathered information from nearly 2,000 East African businesses on the difference ICT4T systems had made to their operations. In doing so, TMA has gathered unprecedented insights into the views of the business constituency it seeks to support.

The evaluation has found that ICT4T systems have contributed to reducing the time and cost of trade for businesses in East Africa. This is consistent with the findings of previous evaluations undertaken within the ICT4T portfolio. However, in contrast to previous evaluations, where sample sizes were small (often less than 100 beneficiaries), this portfolio evaluation has gathered data from 1,852 users across eight ICT4T systems, giving TMA and its donors a high level of confidence in the findings.

The evaluation has found that ICT4T systems have contributed to increasing the volume and value of trade engaged in by East African businesses. Although the attribution levels are lower than for time and cost reductions, the evaluation found evidence that businesses have engaged in more trade and higher value trade as direct result of engaging with ICT4T systems.

The evaluation has found that ICT4T systems have contributed to increasing the revenue generated by East African businesses. As to be expected given the complexity of factors which influence business performance, the reported attribution levels are lower for financial turnover than for other variables such as time, cost, trade volume and value. Yet, a significant proportion of businesses in our survey sample reported that their turnover was now higher as a direct result of using TMA-funded ICT4T systems.

The evaluation has found that the ICT4T portfolio represents value for money, with the estimated benefits it delivers to the East African business community estimated to outweigh the costs of its implementation. Notwithstanding some methodological challenges in valuing the benefits of the full ICT4T portfolio, the value-for-money analysis shows that the systems evaluated are highly likely to have paid for themselves within a few years of implementation. Furthermore, given the nature of ICT4T systems, the benefits will increase exponentially as the number of system users increase, and will keep accruing every year that the system is in operation. The scalable potential of ICT4T systems is what makes them such an effective development intervention.

The ICT4T portfolio was found to be relevant to the needs of the trade community and host agencies, both at the country and regional East African Community (EAC) levels. The evaluation found evidence that ICT4T

systems effectively addressed the identified needs of trade actors, including inefficient trade systems, lack of transparency, and high transaction costs.

The ICT4T portfolio was found to be broadly coherent with legal and regulatory frameworks at the national and regional level. However, there is evidence that further work is required in some areas to better align with regulatory frameworks and facilitate greater collaboration and integration between institutions.

In summary, the evaluation has found that TMA has played a catalytic role in digitising trade processes in East Africa during Strategy 2. TMA's ICT4T support was found to be largely unique among donors in the trade space. If TMA ceased to play the role that it does, it is unclear who else would step in to fill this gap. TMA offers the full package of concept generation, funding, technical expertise and project management capability. The combination required to turn ideas into reality. While there are some minor concerns about agencies' dependence on TMA's expertise, most host agencies consulted understood the importance of 'graduating' TMA support and running their ICT4T operations unsupported one day. Indeed, this evaluation found evidence of numerous agencies which had already taken steps to do so.

9.2. Revised Theory of Change Validation

Error! Reference source not found.Error! Reference source not found. provides a high-level mapping of the evidence gathered by this evaluation on to the ICT4T portfolio ToC co-created with TMA during the inception phase of this evaluation. This looks specifically at the causal pathways and assumptions from the ICT4T projects through to the Corporate Impact, and assesses the extent to which the pathways and assumptions presented in the ToC are validated. In the ToC diagram we use the following coding, visually presented through the pathway arrows to present our judgement:

- ✓ red arrows = weak evidence supporting the pathway
- ✓ amber arrows = medium evidence supporting the pathway
- ✓ green arrows = strong evidence supporting the pathway

We present our judgement below using the ToC Portfolio Outputs.

9.2.1. Integrated Trade Management Systems

We conclude that the **Integrated Trade Management Systems (ITMS)** pathway has **strong evidence**, especially through the 'Improved Efficiency and Effectiveness' project level IO, where the evaluation found strong and ample evidence from primary and secondary sources for the majority of projects in this pathway. Crucially, this included evidence of significant time and cost reductions from 12 out of 14 ITMS projects.

The ITMS pathway through the 'Improved Governance' IO has been assessed as having evidence of **medium strength**. Although evidence of improved governance at the project level exists, we found it challenging to assess governance at the portfolio level. Project level reports reference various cases of improved agency governance brought about by the design and implementation of ICT4T systems. For example the creation of robust governance and reporting systems which include a Project Steering Committee, Project Coordination Committee and Project Implementation Group for the AFA IMIS, ITTS, SC-PVP and ATMIS systems. Beyond these positive cases, we are unable to assess the extent to which ICT4T has improved governance of the overall trade system. To achieve this, it would require further analysis of the dynamics between the private sector, trade agencies, national governments and the EAC, and assessing the extent to which automation and

digitisation has impacted the relationships, accountability and governance structures between these stakeholders.

In terms of the assumptions for the ITMS pathways, we also conclude they are largely validated based on the evaluation evidence. For example, the evaluation has presented evidence of government and private sector commitment to the reform agenda through evidence of ICT4T system uptake; cited examples of agency buy-in to the reform process through acknowledgement of ICT4T systems' revenue-generating potential; and shown examples of high-level cooperation through the SCT system which brings together multiple East African Revenue Authorities. Other assumptions such as improved reliability in revenue collection and reductions in regulation violations yield more tentative validations, due to limited evidence.

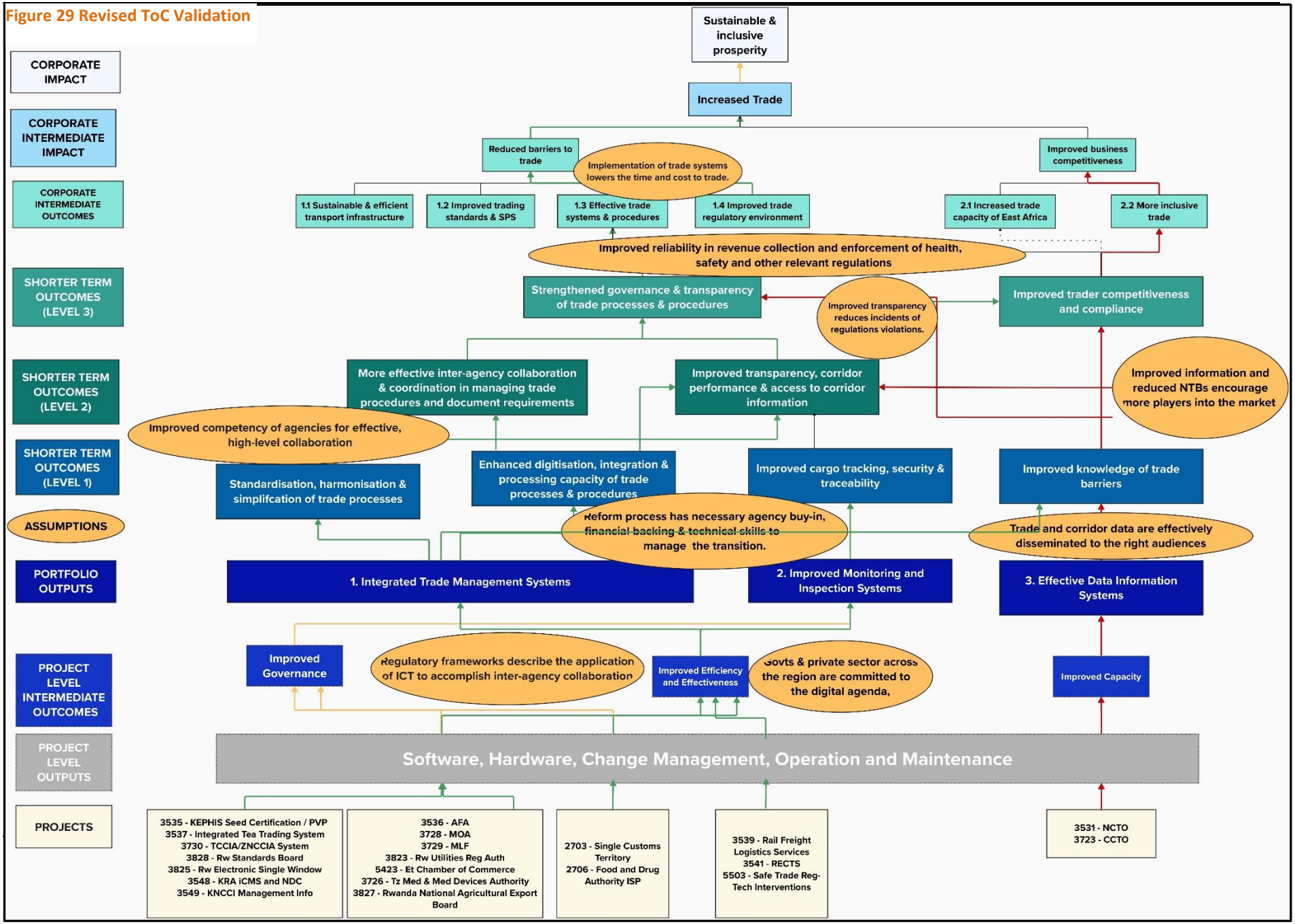
9.2.2. *Improved Monitoring & Inspection Systems*

Although there are only a few projects where the evaluation was able to gather sufficient evidence, the **Improved Monitoring & Inspection Systems** pathway is validated as the evaluation has found mainly **strong evidence** that the projects in this pathway contribute to Improved Efficiency and Effectiveness, which in turn leads to Improved Monitoring & Inspection Systems, and Improved Cargo Tracking, Security and Traceability. Evidence used to validate this pathway was found through evaluating the RECTS, RECDTS and RFLS systems.

9.2.3. *Effective Data Information Systems*

In terms of the Effective Data Information Systems pathway, while we have testimony from the NCTO and CCTO stakeholders that the datasets published within the systems are being used, we were unable to test the assumption that the data is reaching the right audiences and that, as a consequence, there is an overall improvement in knowledge of trade barriers. Therefore, we have classified this pathway as having **weak evidence**, mainly due to the evidence we collected not being strong enough to validate this pathway.

Figure 29 Revised ToC Validation



9.3. RECOMMENDATIONS

While the evaluation has succeeded in finding evidence of TMA's achievements, several areas where the improvements can be made were also identified. These observations lead to three recommendations around data.

Recommendation One – TMA's ICT4T and Results Teams must take urgent and immediate steps to improve project and portfolio monitoring and the use of monitoring data.

Previous evaluations, including the Strategy 1 programmatic evaluation funded by FCDO, have recommended that TMA improve its capture and usage of monitoring data. This evaluation lends its weight to that call through this recommendation. TMA's internal monitoring data for the ICT4T portfolio had so many gaps in it that it was largely unusable in this evaluation. The evaluation team found most project monitoring plans to be incomplete. Project results chains and monitoring plans were drafted in most cases, but often baselines for key indicators had not been measured nor regular monitoring data collected and recorded. Not only does this mean that ICT4T project managers are not informed on how projects are performing to adaptively manage them, but it also means that TMA is unable to authoritatively tell its own story on what it's achieving - relying instead on evaluations such as this one to provide estimates of what the ICT4T portfolio has accomplished. Independent evaluation is important, but it's not a substitute for robust programme monitoring. Where data gaps have not been filled at an early stage by a programme itself, it's often not possible for a summative evaluation like this one to do so several years later.

Greater organisational resources and leadership focus on improving TMA's monitoring system is therefore the number one recommendation of this evaluation.

In terms of practically implementing this recommendation, this evaluation suggests three main areas where TMA could focus:

1. **Stronger emphasis from TMA leadership on the importance of robust project monitoring** – while effective project implementation is vital to demonstrating to TMA's donors that the project is investing their resources, of equal importance is evidencing what is being achieved with those resources through robust project monitoring. The responsibility for delivering results lies with TMA's ICT4T implementation team, not the results team. The results team can provide technical assistance on how to set and measure indicators and to set up the monitoring systems, but the ultimate responsibility for gathering and using this data lies with ICT4T project managers. This evaluation believes that this message needs to be reinforced by TMA senior leadership and performance measures put in place which track how ICT4T project managers are performing against this requirement.

2. **Build the capacity of ICT4T project management staff to be more effective at project monitoring** – in undertaking the evaluation, our team developed an appreciation of the broad scope of work which needs to be performed by ICT4T project managers. From project design, to managing contractors and independent consultants, to managing budgets, and complex partner relationships, their remit is extensive. Project monitoring is just one of many things project management staff need to master. TMA should therefore commit to providing frequent training and mentoring on monitoring to ICT4T project implementation staff to help them build skills and confidence in this critical area. As a one-off training is rarely effective, therefore, a curated programme of training which takes place at regular intervals throughout the year is what this evaluation recommends.

3. **Adequate allocation of monitoring and evaluation funds and greater protection of such funds for their intended purpose** – when reviewing the ICT4T project monitoring data, the evaluation team found numerous instances where project baselines had not been measured or midline/endline monitoring exercises had not been completed. When digging deeper, it was often found that funds had not been available (or prioritised) for these specific M&E purposes. One practical step that TMA can take is to ensure that adequate M&E funds are budgeted at the outset of each ICT4T project, and financial controls are put in place to ensure that these protected funds can only be spent on M&E activities, and not to meet shortfalls in implementation budgets.

Recommendation Two – TMA's ICT4T team must ensure that it puts data sharing agreements in place with all host agencies that it provides with financial and technical assistance.

This evaluation has attempted to break new ground by gathering primary data from a large sample of businesses who use ICT4T systems. This was not without its challenges. Obtaining the contact details of systems users was not straightforward. Understandable concerns around data privacy, lack of engagement from host agencies, and slow response and approval times, all conspired to ensure that the evaluation received beneficiary contact lists from only eight of the 21 evaluable projects. In addition, it was assumed that given the evaluation was concerned with IT systems, that systems-level data (i.e. total number of users, transactions, trade values, etc, overall and by year) would have been available for the majority of systems. On this the evaluation fared slightly better than with the contact lists, but still only managed to obtain systems-level data from nine of the 21 ICT4T systems. This has limited the strength of the conclusions that can be drawn and inferences which can be made at the ICT4T portfolio level, including estimating the economic impact (increased trade and turnover changes) and the value-for-money calculations (extrapolating to the system level and the portfolio).

Given that TMA collectively provides host agencies with tens millions of dollars of financial and in-kind support over a strategy period, it is not unreasonable to expect that agencies will accommodate TMA's requests for information to satisfy the accountability needs of its donors. One way that this could be achieved is by ensuring that a data sharing agreement is a pre-condition of TMA's support to any agency prior to support commencing. TMA may want to repeat a large-scale survey such as this in future. It will run into the same challenges as those encountered by this evaluation without some formal data sharing agreements in place. Failure to do so will continue to limit TMA's ability to assess its true impact.

Recommendation Three – TMA's ICT4T team should work with host agencies to capture and report on gender disaggregated data.

Allied to recommendation two above, working with host agencies to emphasise the importance and value of capturing, reporting, and reflecting upon gender disaggregated data will be important in assisting TMA to fulfil its inclusivity mandate. Of the systems data we received, only one – RSB – was able to provide it disaggregated by gender. And none of the beneficiary contact lists that we received were disaggregated meaning that it was not possible to stratify the survey sample frame by gender.

The evaluation has found that ICT4T systems are inclusive, providing an equal platform for women, men, marginalised groups and a wide variety of stakeholders to access the services they provide. However, it has also found that this has been by default rather than design. Another way of framing this is that ICT4T systems are not unconsciously 'exclusive' but are not consciously 'inclusive' either.

The same was found to be true for climate change and environmental considerations too. A by-product of digitisation of the trade system is that less carbon-emitting travel and products (e.g. paper) are required to obtain the permits and certification required to trade. Less dwell time of trucks at key trade nodes due to more seamless integration between border agencies and other relevant bodies is also often cited as an environmental benefit of automation. But beyond anecdotal reports the link between these items does not appear to have been well documented by TMA and its partners.

Finally, changing donor priorities since the start of Strategy 2 has brought more focus to the contribution of programmes like TMA to poverty reduction. This evaluation has found scant evidence that TMA's ICT4T programmes have a discernible link to poverty reduction. Perhaps one of the most obvious ways this could be observed through ICT4T systems is through job creation, with the simple logic being that more jobs create more opportunities for people to lift themselves out of poverty. Job creation is a top government priority in every country where TMA operates.

However, our evaluation found that while some businesses are reporting increased turnover directly attributable to ICT4T systems, this does not appear to be translating into increases in employment, with no significant employment increases reported between baseline and endline in our survey sample. Systems such as iSOKO represents a departure from the more traditional ITMS systems developed by the ICT4T team in that they create a platform designed to engender greater participation of women in e-commerce. But it is early days for iSOKO and further research on its poverty reduction effects is required.

Based on these conclusions, we offer three further recommendations.

Recommendation Four – The TMA ICT4T team should be more intentional in conducting gender and social inclusion analysis when designing and formulating projects in Strategy 3.

One stakeholder consulted during the evaluation commented that ICT4T systems are *'gender agnostic'* and we largely agree with this assessment. That said, if TMA wishes to achieve and measure more inclusive outcomes from its work then it should be more intentional on the way it incorporates them into its portfolio level ToC and project design documents in Strategy 3. Reference to the various iterations of the ICT4T portfolio ToCs contained in ANNEX C show no consideration of gender and inclusivity outcomes in the levels of change or logic pathways. At project design level, undertaking gender and social inclusion analysis to better understand how projects should be framed to achieve better outcomes for the traditionally underserved will ensure that opportunities for inclusion are maximised. Or at the very least, potential for exclusion is minimised.

With regards to practically implementing this recommendation, the evaluation team suggests that all project appraisal reports (PAR) for ICT4T projects should include a gender and social inclusion analysis as part of the design process. This will consider ways in which the project can be deliberate in achieving positive outcomes for women and other potential 'socially excluded' groups and ensure the project is designed in a way which maximises the probability of achieving these results. It is understood that not all projects will merit a gender and social inclusion analysis. Where this is the case, explanation as to why such an analysis does not apply

should be included in the PAR. This will show that inclusion has been properly considered and the reasons provided on why it was considered not applicable.

At the ICT4T portfolio ToC level, the ways in which inclusion will be achieved (for women and other targeted groups) need to be mapped out and made explicit in the results statements from the very start. Positive outcomes for traditionally marginalised groups are unlikely to materialise as a fortuitous by-product unless they have been deliberately 'baked in' to the overall design of the portfolio at the beginning of implementation. As the ICT4T team embarks on Strategy 3, this evaluation believes that now is the time to think deeply about how this cross-cutting theme can be embedded in the portfolio level TOC.

Recommendation Five – The TMA ICT4T team should be more intentional in considering pathways to poverty reduction when designing and formulating projects in Strategy 3.

As with recommendation four on inclusivity, TMA's ICT4T team should deliberately consider the ways in which interventions can contribute to poverty reduction. This should be mapped into ICT4T's portfolio ToC. While it is accepted that establishing the link between an ICT4T system and the reduction in poverty of some of the poorest in society is difficult, greater emphasis should be placed on this if it is an area of increased interest for TMA's donors. At the project level, it may be easier to do this for systems similar to iSOKO, which were designed with a clear social impact purpose. For the more traditional ITMS systems this may be more difficult. But assuming that Strategy 3 will see the introduction of more systems like iSOKO then such thinking and analysis needs to become a more regular feature of TMA's work.

The practical steps suggested to action this recommendation are the same as Recommendation Four above – the pathways to poverty reduction need to be mapped at the ICT4T portfolio level ToC and then carried through into project design. The TOR for this evaluation requested that the study consider the impact of the ICT4T portfolio on poverty reduction. However, given that poverty reduction has not explicitly featured as a result statement in the ICT4T portfolio-level ToC, the ICT4T results chains or PARs that the evaluation has reviewed, it has not been possible to capture strong evidence on this outcome. If TMA wishes to demonstrate evidence of the contribution of its ICT4T portfolio to poverty reduction then it must *'begin with the end in mind'*, explicitly spelling out the poverty reduction results it wishes to achieve at project design stage nd then mapping the ways in which it will achieve those through the ToC and project results chains. The more explicit that the ICT4T portfolio can be in explaining how it intends to achieve poverty reduction results, the easier it will be for TMA to capture and report against these. This is likely to involve doing different types of projects than were the norm in Strategy 2, with more projects similar to iSOKO and less like the traditional ITMS-type projects in the portfolio. This is tension which TMA will need to resolve with its donors depending on where they collectively see the results priorities.

Recommendation Six – The TMA ICT4T team should be more intentional in considering the potential climate change and environmental impacts (positive and negative) when designing and formulating projects in Strategy 3.

This recommendation is in the same vein as Recommendations four and five above. ICT4T systems have enormous potential to mitigate against the effects of climate change, yet this is not being systematically

included, defined and measured at either the portfolio level TOC or in project design documents. As with inclusivity and poverty reduction, beginning the design process by defining the climate related outcomes which are possible, and then regularly monitoring progress towards them, will ensure that TMA can tell a better story on its contribution to the defining issue of our time.

As with the cross-cutting Recommendations above (Four on gender and social inclusion, and Five on poverty reduction) the practical steps on implementation relate to being more deliberate on designing climate change outcomes into the portfolio level TOC and PARs. Committing to the climate change results which the portfolio wishes to see at portfolio and project design stage is more likely to lead to achievement of results in this area. Clear targets and indicators related to climate change adaptation and/or mitigation will ensure that TMA mobilises resources towards achieving and measuring them.

The final recommendation relates to sustainability and the differing capacities of TMA partner organisations to adopt, maintain, and improve the ICT4T systems they operate once TMA support ends.

Recommendation Seven – To improve the prospects for sustainability upon exit, TMA should develop ICT4T system sustainability plans tailored to the differing capacities of the organisations it works with.

This evaluation has found that TMA works with a wide range of partners in the ICT4T space, each with varying amounts of human and financial resources at its disposal. These span from revenue authorities which have the mandate and resources to seamlessly carry on projects once TMA support ends, to national Chambers of Commerce which have less means to run and maintain ICT4T systems without TMA support. In recognition of this, a 'one size fits all' approach to sustainability cannot be adopted by TMA. Greater resources and focus should be placed on readying its weaker partners to take on and run ICT4T systems independent of TMA once its support ends. We understand that TMA is already adopting this approach and we encourage the organisation to continue and deepen this individualised approach to sustainability.

ANNEX A. PROJECT SUMMARY

Table 30 List of Projects included in the Evaluation

Code	Project	Country	System Type	Evaluability Status (pre-inception)	Evaluability Status (for this inception report)
2703	Single Customs Territory (SCT)	Regional	Integrative – Customs	✓	✓
2706	Food and Drug Authority (FDA) Regional Information Sharing Platform (ISP)	Regional	Integrative - SQI	✗	✓Monitoring plans adapted to cover coordination and transparency outcomes.
3531	Northern Corridor Transport Observatory (NCTO)	Kenya	Agency - Transport	✓	✓
3535	Kenya Plant Health Inspectorate Service (KEPHIS) Seed Certification / Plant Variety Protection Services (PVP)	Kenya	Agency - SPS	✓	✓
3536	Agriculture and Food Authority (AFA)	Kenya	Agency - SPS	✓	✓
3537	Integrated Tea Trading System (ITTS)	Kenya	Agency – Market Access	✓	✓
3539	Rail Freight Logistics Services (RFLS)	Kenya	Integrative - General	✓	✓
3541	Regional Electronic Cargo Tracking System (RECTS)	Regional	Agency - SPS	✗	✓Project was evaluated as part of the STEF programme.
3548	Kenya Revenue Authority Integrated Customs Management Systems (KRA iCMS)	Kenya	Agency - Customs	✓	✓
3549	Kenya National Chamber of Commerce and Industry (KNCCI) Management Information System	Kenya	Agency – Market Access	✓	✓
3623	Authorised Economic Operator (AEO) Enterprise Risk Management System	Uganda	Agency - Customs	✓	✗ Project has not progressed sufficiently to be evaluated.
3723	Central Corridor Transport Observatory (CCTO)	Tanzania	Agency - Transport	✓	✓
3726	Tanzania Medicine and Medical Devices Authority (TMDA)	Tanzania	Agency - SQI	✓	✓
3728	Tanzania Ministry of Agriculture (MOA)	Tanzania	Agency - SPS	✓	✓
3729	Tanzania Ministry of Livestock and Fisheries (MLF)	Tanzania	Agency - SPS	✓	✓
3730	Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA) and Zanzibar National Chamber of Commerce, Industry and Agriculture (ZNCCIA) System	Tanzania	Agency – Market Access	✓	✓
3823	Rwanda Utilities Regulatory Authority (RURA)	Rwanda	Agency - SQI	✓	✓
3825	Rwanda Electronic Single Window (RESW)	Rwanda	Integrative - General	✓	✓
3827	Rwanda National Agricultural Export Development Board (NAEB)	Rwanda	Agency – Market Access	✓	✓
3828	Rwanda Standards Board (RSB)	Rwanda	Agency - SQI	✓	✓

Code	Project	Country	System Type	Evaluability Status (pre-inception)	Evaluability Status (for this inception report)
5423	Ethiopia Chamber of Commerce and Sectoral Association (ECSA)	Ethiopia	Agency – Market Access	✓	✓
5503	Safe Trade Reg-Tech Interventions	Regional	Agency – Market Access	✓	✓
4213	Democratic Republic of the Congo (DRC) Customs Management System (CMS) ASYCUDA World	DRC	Agency – Customs	✓	✗ Project has not progressed sufficiently to be evaluated.
3727	Tanzania Mercantile Exchange (TMX)	Tanzania	Agency – Market Access	✓	✗ Project has not progressed sufficiently to be evaluated.

ANNEX B. PROJECT DOCUMENTS REVIEWED

Code	Project	Project Appraisal Report	Monitoring Plan	Project Workplan	Results Chain	Risk Plan	21/22 Annual Progress Report	Evaluation Report
2703	Single Customs Territory	✓	✓	✓	✓	✓	✓	
3536	AFA	✓	✓	✓	✓	✓	✓	
3537	ITTS	✓	✓	✓	✓	✓	✓	✓
3539	Rail Freight Logistics Services		✓	✓	✓	✓	✓	✓
3548	KRA iCMS	✓			✓	✓	✓	
3549	KNCCI Management Information System		✓	✓	✓	✓	✓	
3726	Tanzania Medicine and Medical Devices Authority	✓	✓	✓	✓	✓	✓	✓
3728	MOA	✓	✓	✓	✓	✓	✓	✓
3729	MLF	✓	✓	✓	✓	✓	✓	
3823	Rwanda Utilities Regulatory Authority				✓		✓	✓
3825	Rwanda Electronic Single Window	✓	✓	✓		✓	✓	
3828	Rwanda Standards Board		✓	✓	✓	✓	✓	✓
3531	NCTO	✓	✓	✓	✓	✓	✓	✓

Code	Project	Project Appraisal Report	Monitoring Plan	Project Workplan	Results Chain	Risk Plan	21/22 Annual Progress Report	Evaluation Report
3623	AEO Enterprise risk mgt sys		✓	✓		✓	✓	
3723	CCTO	✓	✓	✓	✓	✓	✓	✓
3730	TCCIA and ZNCCIA System	✓	✓	✓	✓	✓	✓	✓
5423	Ethiopia Chamber of Commerce and Sectoral Associations		✓	✓		✓	✓	
5503	Safe Trade Reg-Tech Interventions		✓	✓		✓	✓	
2706	Food and Drug Authority ISP	✓	✓	✓				
3525	KEPHIS Integrated Export Import Cert Sys	✓	✓	✓				
3541	RECTS		✓	✓				✓

ANNEX C. DEVELOPING AN EVALUABLE THEORY OF CHANGE

OVERVIEW

This annex outlines the steps taken by EDI Global to develop and revise the ToC for IO 1.3. Revising the TOC during the inception phase was necessary to ensure the TOC accurately mapped and linked evaluable projects to portfolio outputs, and included the critical assumptions required for the causal pathways to occur. The version of the TOC used for this evaluation is the third iteration, referred to as TOC3. The first version of the TOC (TOC1) was developed in mid-2020, and TOC2 was developed in March 2023 as part of the Evaluability Assessment. In the sections below, we explain the TOC journey in more detail, highlighting the key issues and changes made across each iteration.

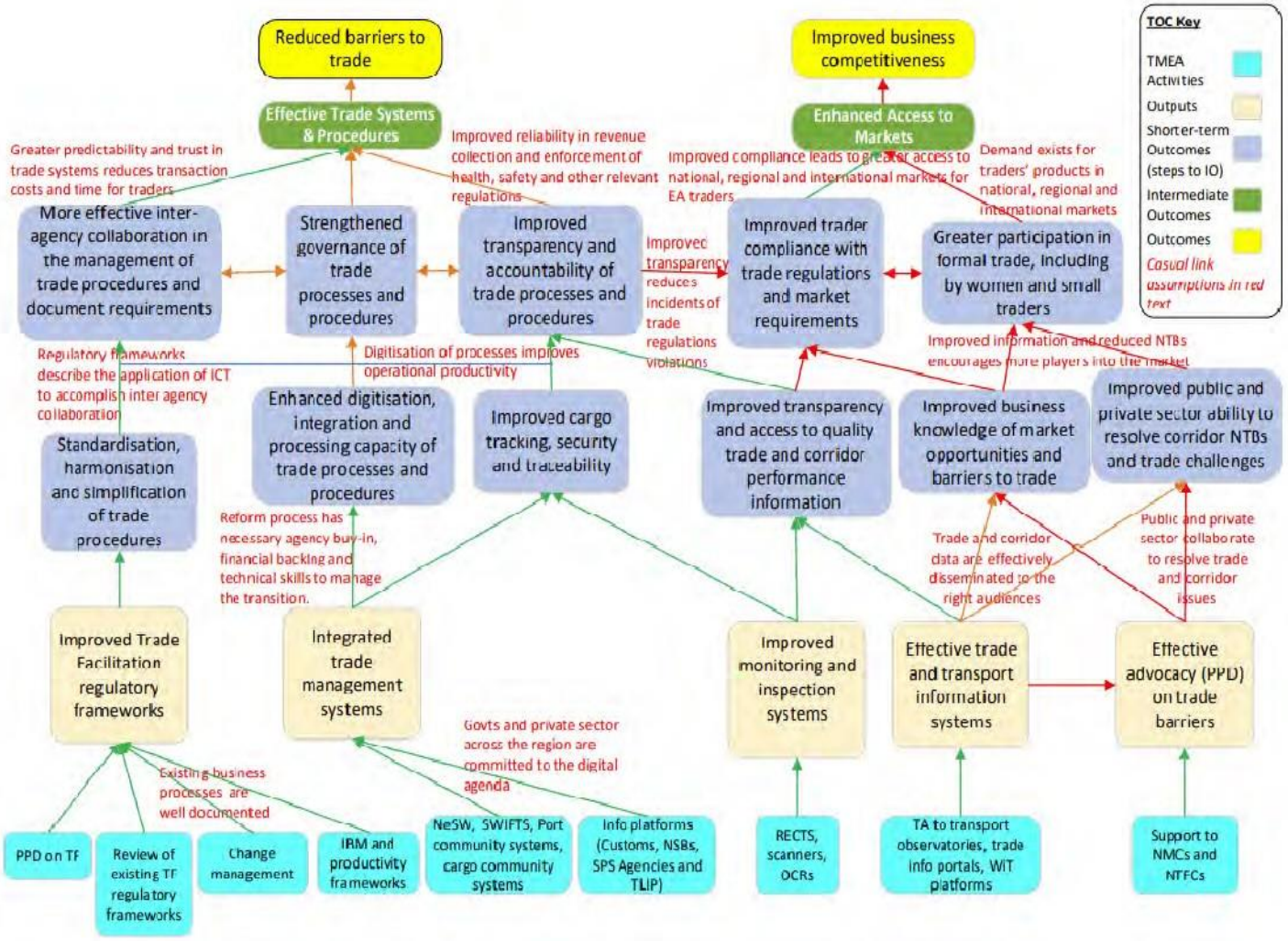
CRITIQUE OF TOC 1

ICT4T TOC1 was developed internally by TMA in 2020. The critique of TOC1 was presented in the Evaluability Assessment of the ICT4T Portfolio (March 2023) commissioned by TMA.[70] The main critique of TOC1 is summarised below:

- ✓ ICT4T projects only address three portfolio outputs (1) Integrated Trade Management Systems, (2) Improved Monitoring and Inspection Systems and (3) Effective Trade and Transport Information Systems. Improved Trade Facilitation Regulatory Frameworks and Effective Advocacy on Trade Barriers were removed as portfolio level outputs as no ICT4T projects contributed to those outputs.
- ✓ A vast majority of projects contribute to Integrated Trade Management Systems.

[70] Evaluability Assessment: Effective Trade Systems and Procedures Portfolio (March 2023)

Figure 30 Theory of Change 1 for IO 1.3 - Effective Trade Systems and Procedures

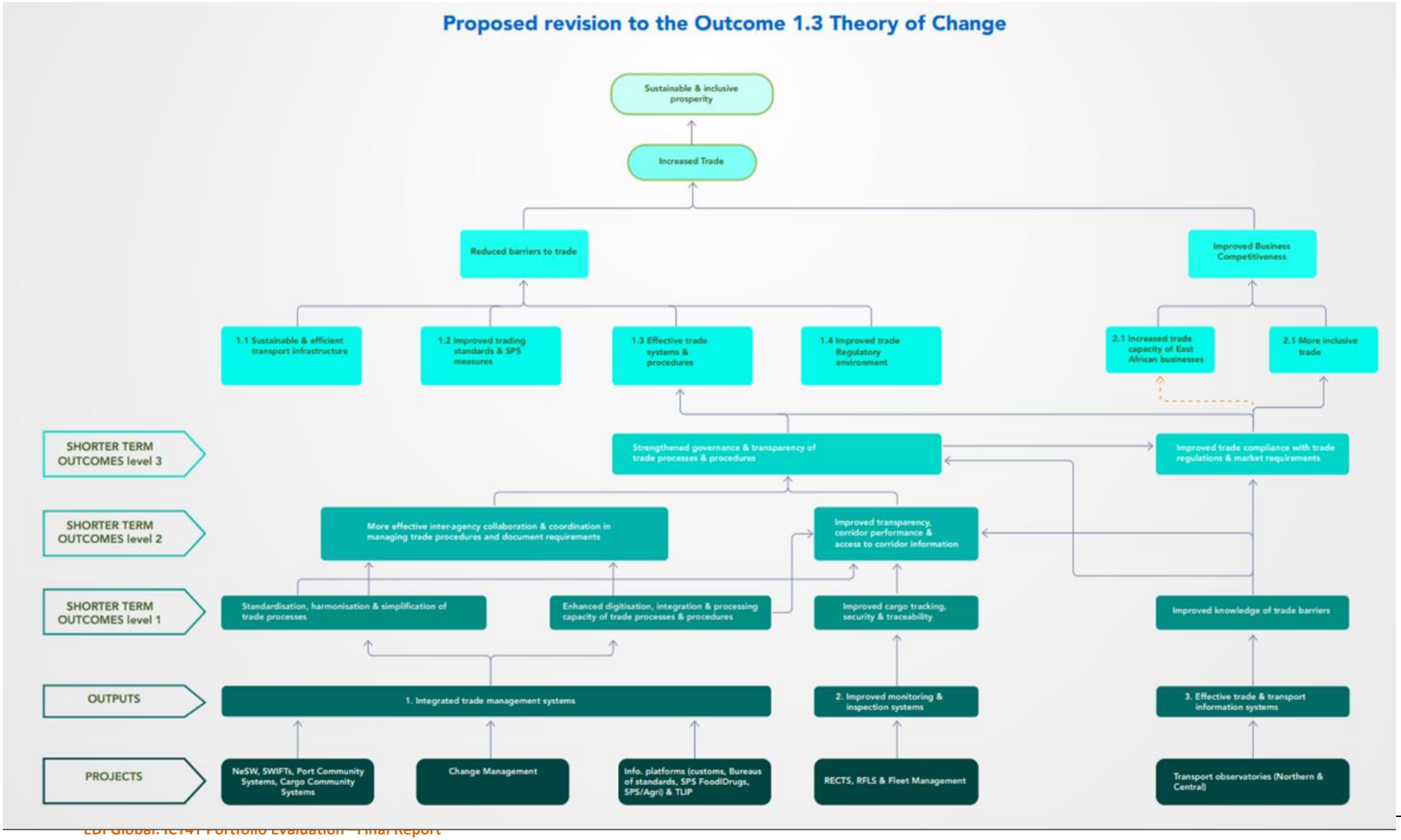


CRITIQUE OF TOC 2

TOC2 (see Figure 30) was developed as part of the Evaluability Assessment by external consultants. It was revised following an output-level review of all 42 projects in the ICT4T portfolio and it found that in reality, the ICT4T portfolio had narrower focus than presented in TOC1. Following EDI Global's review of the Evaluability Assessment, we felt TOC2 while effective in narrowing the portfolio outputs down from five to three, did not effectively present the link between specific projects and portfolio level outputs. The key critique of TOC2 is summarised below:

- ✓ The three portfolio outputs (1) Integrated Trade Management Systems, (2) Improved Monitoring and Inspection Systems and (3) Effective Trade and Transport Information Systems are very broad and are possible outcomes.
- ✓ There appears to be a missing link between individual projects and how they fit into the ICT4T portfolio.
- ✓ No assumptions were mapped onto TOC2.
- ✓ The **Projects** level of the TOC2 is more of a summary of IT trade systems implemented by TMA, rather than a mapping of specific projects and activities.

Figure 31 Theory of Change 2 for IO 1.3 - Effective Trade Systems and Procedures

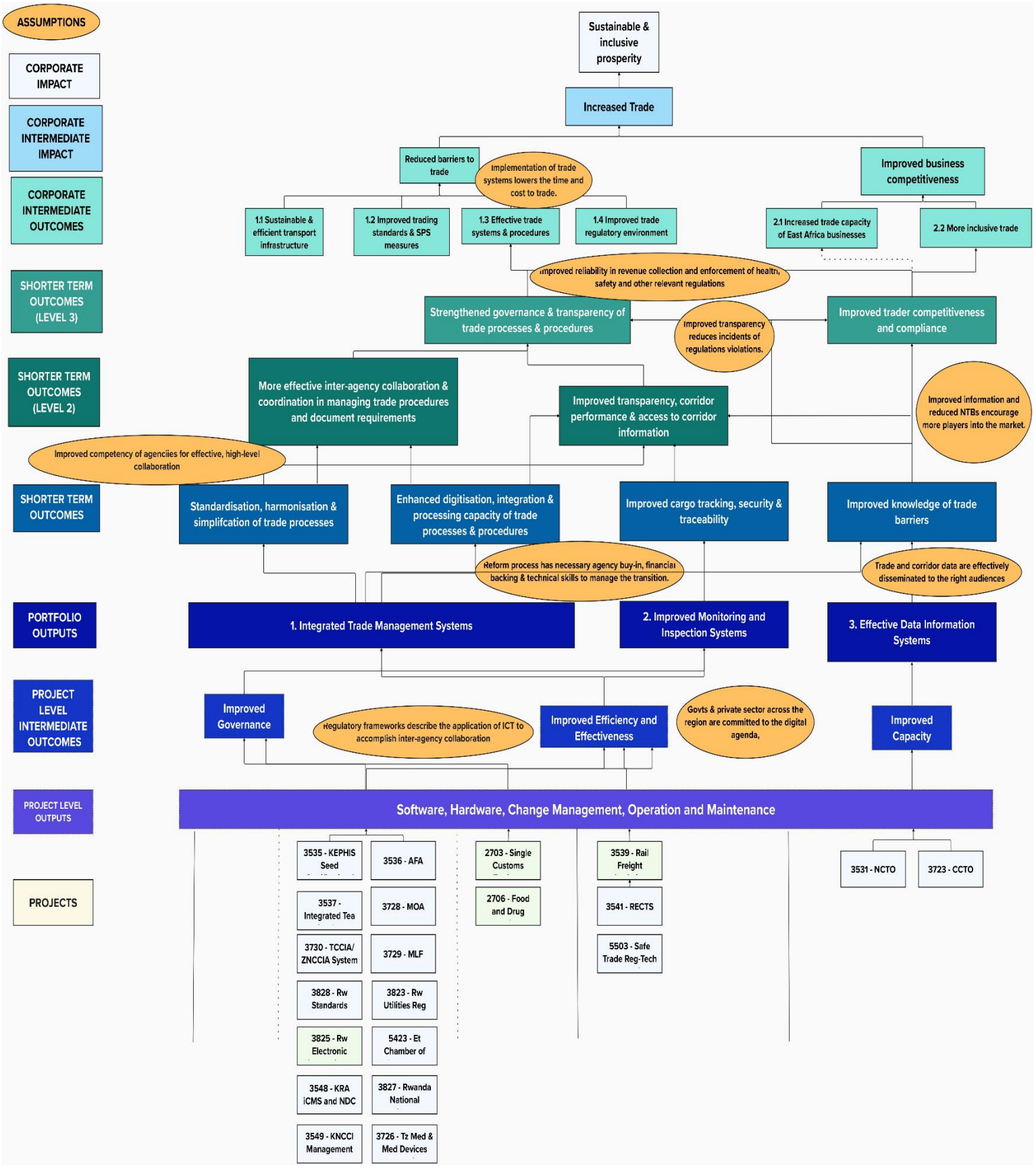


TOC3 DEVELOPMENT

TOC3 was developed during a workshop with TMA on 30th August, using the critique of TOC2 as a starting point. The main objective of the session was to establish the link between projects and portfolio outputs using project-level IOs and to plot the critical assumptions appropriately within the TOC. Doing this would enable us to better understand how evidence derived for a specific project, contributes towards the assumptions, outputs, outcomes and impact of the ICT4T portfolio. Figure 32 presents the final version of TOC3 that was agreed between stakeholders and will be used for this evaluation. For more specifics on the TOC3 development process, such as mapping projects onto portfolio outputs, see **Error! Reference source not found.**. The EQ Matrix presented in **Error! Reference source not found.**, presents how we plan to interrogate the TOC with our EQs, indicators and evidence sources.

In Sections 0 to 0 below, we present the narrative for TOC3, starting with the problems that ICT4T is trying to address, impact, outcomes, outputs and assumptions.

Figure 32 Theory of Change 3 for IO 1.3 - Effective Trade Systems and Procedures



Problems ICT4T is Trying to Address

In understanding the problems that the ICT4T portfolio is trying to address, we use the write-up provided in the MEL Strategy document, evaluation reports and insights from the TOC workshop with TMA programme team facilitated by EDI Global on 30th August. The main themes that were identified as problems that the ICT4T portfolio is trying to address include:

Table 31 Problems ICT4T is Trying to Address

Theme	Issue
Governance	✓ Lack of transparency and corruption
Procedural	✓ Inefficiency in trade systems (e.g. bottlenecks, bureaucracy) ✓ Lack of reliability and predictability
User	✓ High transaction costs ✓ Trade service access issues ✓ Inclusivity ✓ Access challenges

As shown in Table 31, we have also clustered these issues into three main themes: Governance, Procedural and User. TMA stakeholders cited that governance-related issues are pervasive across trade systems in East Africa, whether that be corrupt practices in obtaining permits or a lack of traceability of trade products. In terms of procedural issues, the TMA team referred to inefficient and unpredictable trade services, manual processes and a lack of harmonisation as key issues in the sector. Finally at the user-level, challenges to access trade services, and high transaction and time costs when engaging in trade services, were identified as key problems.

An example of the procedural inefficiency issues is cited in the endline evaluation of the 3539 – Rail Freight Logistics Services project in Kenya. In this report, the project evaluators cite that the project is trying to address inefficiencies and bottlenecks in the handling, movement and clearance of cargo caused by a lack of coordination of the Kenya Ports Authority, Kenya Revenue Authority and Kenya Railways.

Impact

TMA is ultimately trying to achieve 'Sustainable and Inclusive Prosperity' (Corporate Impact) in Africa. The key mechanism for achieving this is through 'Increased Trade' (Corporate Intermediate Impact).

Outcomes

Achieving 'Increased Trade', rests on two main Corporate Intermediate Outcomes, (1) Reduced Barriers to Trade and (2) Increased Business Competitiveness. The ICT4T portfolio primarily contributes to 'Reduced Barriers to Trade' by delivering 'Effective Trade Systems and Procedures' (Corporate IO 1.3). This relies on the critical assumption that the implementation of IT trade systems reduces the time and cost of trade. The ICT4T portfolio also contributes to 'Improved Business Competitiveness' by delivering 'Increased Trade Capacity of East Africa Business' (Corporate IO 2.1) and 'More Inclusive Trade' (Corporate IO 2.2).

Achieving 'Effective Trade Systems and Procedures' rests on the shorter-term outcome (Level 3) of 'Strengthened governance and transparency of trade processes and procedures', and this rests on the assumption that there is an improved reliability in revenue collection and enforcement of health, safety and other regulations. Achieving 'Increased Trade Capacity of East African business' and 'More Inclusive Trade' depends upon 'Improved trader competitiveness and compliance' (STO Level 3).

Delivering 'Strengthened governance and transparency of trade processes and procedures' (STO Level 3) is dependent on 'More effective inter-agency collaboration and coordination in managing trade procedures and document requirements' (STO Level 2) and 'Improved transparency, corridor performance and access to corridor information' (STO Level 2). A critical assumption here is that improved transparency reduces incidents of regulation violations.

Delivering 'Improved trade competitiveness and compliance' (STO Level 3) requires 'Improved knowledge of trade barriers' (STO Level 1), assuming that improved information and reduced NTBs encourage more players into the market.

Achieving 'More effective inter-agency collaboration and coordination in managing trade procedures and document requirements' (STO Level 2), requires 'Standardisation, harmonisation and simplification of trade processes' (STO Level 1) and 'Enhanced digitisation, integration and processing capacity of trade processes and procedures' (STO Level 1). This also rests on the assumption that there is improved competency of agencies to collaborate effectively at a high level.

'Improved transparency, corridor performance and access to corridor also requires 'Enhanced digitisation integration and processing capacity of trade processes and procedures' (STO Level 1) and 'Improved cargo tracking, security and traceability' (STO Level 1).

Outputs

There are three portfolio outputs that are key to achieving the shorter-term outcomes: (1) Integrated Trade Management Systems, (2) Improved Monitoring and Inspection Systems and (3) Effective Data Information Systems. (1) Integrated Trade Management Systems is the most far-reaching output as it is a requirement to achieve 'Standardisation, harmonisation and simplification of trade processes', 'Enhanced digitisation, integration and processing capacity of trade processes and procedures', and 'Improved knowledge of trade barriers', assuming that the reform process has necessary agency buy-in, financial backing and technical skills to manage the transition.

(2) 'Improved Monitoring and Inspection Systems' are required for 'Improved cargo tracking, security and traceability' (STO Level 1), while (3) Effective Data Information Systems are necessary to achieve 'Improved knowledge of trade barriers' (STO Level 1), assuming that trade and corridor data are effectively disseminated to the right audiences.

Project Level Intermediate Outcomes

The addition of Project Level Intermediate Outcomes was one of the main additions in TOC3 and is the missing link between the projects and portfolio. To achieve the portfolio outputs of (1) Integrated Trade Management Systems and (2) Improved Monitoring and Inspection Systems, 'Improved Governance' within agencies and 'Improved Efficiency and Effectiveness' of trade systems is required, assuming that regulatory frameworks describe the application of ICT to accomplish inter-agency collaboration. It is also assumed here that governments and the private sector across the region are committed to the digital agenda. To achieve the portfolio output of (3) Effective Data Information Systems, 'Improved Capacity' to troubleshoot is required.

Project Level Outputs

TMA's activities within this portfolio are wide and range from support to review existing trade facilitation regulation, integrated border management and productivity frameworks, to technical support to develop trade information portals and improve the ICT infrastructure of East Africa's transport observatories. A large proportion of TMA's work in this area involves development of systems designed to improve the integration of trade. These include national electronic single windows (NeSWs), SWIFTs, port and cargo community systems and information platforms for customs

agencies, NSBs and SPS agencies. These platforms also include TMA's flagship ICT4T project in Strategy 2, the Trade Logistics Information Pipeline (TLIP). As the name suggests, this is a project cluster designed to create a seamless pipeline of trade and logistics information regionally and internationally.

For simplification, it was agreed that the outputs generated by the 21 evaluable projects could be grouped into four main project-level outputs, summarised below:

- ✓ **Software –** TMA designs IT software with agencies to transform a previously manual trade system online.
- ✓ **Hardware –** TMA provides agencies with the relevant hardware to support the implementation of the IT trade system.
- ✓ **Change Management –** TMA works with agencies to encourage uptake and ownership of the system once the project funding finishes.
- ✓ **Operation and Maintenance –** TMA provides operational and technical assistance to participating agencies to ensure smooth implementation.

PROJECTS

The 21 evaluable projects are clustered at the bottom of the TOC based on how they link to project level IOs and portfolio outputs. This clustering was completed during the TOC3 workshop.

The greatest clustering of projects by project IO and portfolio output is 15 projects which work towards (i) Improved Governance and (ii) Improved Efficiency and Effectiveness, which then contribute to the portfolio output (1) Integrated Trade Management Systems. Projects clustered in this category include projects implementing integrative systems such as 3825 – Rwanda Electronic Single Window and 3625 – AEO Uganda, and agency system projects such as 3537 – Integrated Tea Trading System and 3535 – KEPHIS Seed Certification/PVP.

Two projects: 2703 – Single Customs Territory and 2706 – Food and Drug Authority ISP were identified to only produce the project IO of (ii) Improved Efficiency and Effectiveness, while also feeding into (1) Integrated Trade Management Systems.

Projects 3549 – Rail Freight Logistics Services, 3541 – RECTS and 5503 – Safe Trade Reg Tech Interventions also work towards (i) Improved Governance and (ii) Improved Efficiency and Effectiveness, but they contribute to the portfolio output of (2) Improved Monitoring and Inspection Systems. These 21 projects cover five countries: Kenya, Tanzania, Uganda, Rwanda and Ethiopia and also include integrative system projects and agency system projects.

ANNEX D. EVALUATION QUESTION MATRIX

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
1. Relevance (Is the intervention doing the right things?)	1. To what extent did the programme address the needs (sector / trade system) identified at the formulation and design stages? At country level and regional EAC level. 2. To what extent is the ICT4T portfolio inclusive and diverse? How to ensure that women, and marginalised groups are well-targeted and responded to the intervention design with measurable outcomes. 3. ~~Did the interventions do the right things in the right way - quality of the portfolio design, content, implementation, management and reporting?~~	1. Has the private sector responded to the interventions that were implemented, leading to an ease in doing business? 2. Did the intervention cover the highest priorities (in terms of needs) at the time of design and implementation?	Qual: KIIs - TMA Senior Leadership, KIIs: Ministry of Trade (Kenya), Ministry of Trade / Ministry of Investment (Tanzania), East Africa Business Council, EAC Secretariat. IDIs - Beneficiaries.	Review of National Gov and EAC trade policies. Evaluation Reports: 3535 - Endline Study of KEPHIS SC-PVP System, 3536 - Endline Study of AFA iMIS, 3537 - Endline Study of EATTA iTTS, 3539 - Final Evaluation Report - Endline Evaluation of Cargo Tracking by Rail, 3726 and 3728 - Endline Evaluation of SWIFTs Project, 3823 3828, 3723 and 3531 - Final Evaluation Report, 3541 - Final Report STEF Evaluation	Portfolio Level Outputs 1, 2 and 3 Corporate Intermediate Impact 2.2	EQ 3 highlighted in red combines the Relevance and Efficiency criteria. We propose to remove this question as it has already been captured in other questions in Relevance and in Efficiency criteria. Moreover, such normative questions would be difficult to address e.g. 'doing the right thing 'for whom'?
2. Coherence (Is the portfolio aligned with country / regional priorities?)	4. How does ICT4T trade contribute towards the Sustainable Development Goals and policy priorities in the East African Community? (macro level question) 5. To what extent were the projects included in the	1. How does the ICT4T portfolio complement other TMA and other donor initiatives along the Northern and Central Corridors?	KIIs: Ministry of Trade (Kenya), Ministry of Trade / Ministry of Investment (Tanzania), East Africa Business Council, EAC Secretariat	TMA Strategy 2, SDGs, National Gov and EAC Trade Policies	Project level outputs to Project Level IOs (I, II)	

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
	ICT4T portfolio designed in collaboration with Government partners and achieve necessary buy-in (testing TOC assumption)? 6. Are ICT platforms and systems aligned with legal mandate and regulatory framework at national and regional levels (testing TOC assumption)? 7. To what extent do regulatory frameworks describe the application of ICT to accomplish inter-agency collaboration? (TOC Assumption EQ - Project Level Outputs to Project Level IOs)		UN trade facilitation analysis data			
3. Effectiveness (Is the intervention achieving its objectives?)	8. To what extent do portfolio activities under 1.3 lead to reducing trade barriers? To what extent are changes attributable to the programme? 9. How did the portfolio strengthen governance, enhance transparency, efficiency and service delivery for trade, and improve trader competitiveness, and compliance in the countries and the region? (short-term outcomes level 3) 10. Is trade and corridor data effectively disseminated to right audiences? (TOC	1. To what extent did agency governance improve? 2. To what extent did users experience more efficient and effective trade? 3. To what extent were Integrated Trade Management systems developed? 4. To what extent were monitoring and inspection systems improved? 5. To what extent were effective data information systems developed? 6. To what extent were the assumptions in the results chain and TOC validated? 7. What positive and negative external factors have affected the portfolio, in what ways, and why? National/EAC/Regional – e.g.,	All stakeholders, Quant: IT System Data (e.g. time stamps, frequency of use etc), Phone Survey (beneficiaries) KIIs - Shippers Council of Kenya , Kenya Transporters Association, Kenya Ports Authority, Kenya Railways Corporation, Fresh Producer Exporters Association of Kenya, Kentrade KRA; Customs Management, Tanzania Private Sector Foundation, Tanzania Ports Authority, Tanzania	Project Monitoring Plans, Evaluation Reports: 3535 - Endline Study of KEPHIS SC-PVP System, 3536 - Endline Study of AFA iMIS, 3537 - Endline Study of EATTA iTTS, 3539 - Final Evaluation Report - Endline Evaluation of Cargo Tracking by Rail, 3726 and 3728 - Endline Evaluation of SWIFTs Project, 3823 3828, 3723 and 3531 - Final Evaluation Report, 3541 - Final Report STEF Evaluation, Project Annual Reports, IT system data	Project Level IOs (i, ii, iii) to Portfolio Outputs (1, 2, 3).	

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
	Assumption EQ - Portfolio Output to STO 1) 11. To what extent are governments and the private sector in East Africa committed to the digital agenda? (TOC Assumption EQ - Project Level IO to Portfolio Output) 12. Does the reform process have necessary agency buy-in, financial backing and technical skills to manage transition to digitisation and integration of trade system? (TOC Assumption EQ - Portfolio Output to STO1) 13. To what extent does improved agency competency enable effective high-level collaboration? (TOC Assumption EQ - STO1 to STO2) 14. To what extent has agency revenue collection and regulation enforcement (e.g. health and safety) improved? (TOC Assumption EQ - STO3 to Corporate IO)	policies and regulations that worked for or against the portfolio?	Revenue Authority- AEO Risk, TMDA Management, Private Sector Federation- Rwanda, Rwanda Utilities Regulatory Authority Management, Rwanda Revenue Authority Management (RRA), Rwanda Standards Board Management, Private Sector Foundation of Uganda, Uganda Revenue Authority, Uganda Customs Management			

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
4. Efficiency (How well are resources being used?)	15. How economically resources/inputs (funds, expertise, time, equipment, etc.) were converted into results? 16. How valuable were the results to service providers, clients, the community and/or organizations involved? 17. Has the portfolio results been achieved with good Value for Money (regarding costs and benefits) (TOC Assumption EQ - Corporate IO to Corporate II)?	1. To what extent was the ICT4T portfolio implemented on time and on budget? 2. How well did the portfolio achieve the following-? i) Adaptive management: - how well did the portfolio apply and improve its decision-making and practices based on lessons learned? ii) Relationship management: - How well did the portfolio manage its projects including partners, donors, and other stakeholders? iii) TMA's portfolio management processes – how well did they enhance or impend project planning and implementation? iv) Staffing: - How adequate and aligned were key staff to efficiently deliver the project? How well were staffing challenges addressed? v) Delivery model: - Determining if another implementation methodology would have been more cost-effective vi) Determining if the selected implementation partners were able to adequately implement the project and if not, how were gaps handled?	KIIs: - TMA (ICT4T and Results Team Leadership), Shippers Council of Kenya , Kenya Transporters Association, Kenya Ports Authority, Kenya Railways Corporation, Fresh Producer Exporters Association of Kenya, Kentrade KRA; Customs Management, Tanzania Private Sector Foundation, Tanzania Ports Authority, Tanzania Revenue Authority- AEO Risk, TMDA Management, Private Sector Federation- Rwanda, Rwanda Utilities Regulatory Authority Management, Rwanda Revenue Authority Management (RRA), Rwanda Standards Board Management, Private Sector Foundation of Uganda, Uganda Revenue Authority, Uganda Customs Management	Evaluation Reports: 3535 – Endline Study of KEPHIS SC-PVP System, 3536 – Endline Study of AFA iMIS, 3537 – Endline Study of EATTA iTTS, 3539 – Final Evaluation Report – Endline Evaluation of Cargo Tracking by Rail, 3726 and 3728 – Endline Evaluation of SWIFTs Project, 3823 3828, 3723 and 3531 – Final Evaluation Report, 3541 – Final Report STEF Evaluation, PARs, TMA Business and Financial Data	TOC Assumption (Corporate IO to Corporate II), Project Outputs	Sub-EQ 3 highlighted in red relates to the Value-For-Money assessment. As EDI Global will be doing a separate VfM assessment with its own criteria and questions, we suggest this sub-EQ be removed from the EQ matrix.

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
5. Impact (What difference does the intervention make?)	18. What was the impact of the ICT 4 Trade Portfolio since the beginning of Strategy 2 in reference to the TOC logic that was established? 19. What have been the benefits established and how do the established results contribute towards effective trade systems and procedures? 20. What deliberate and unintended results – positive and negative – did the intervention produce? How did these occur? 21. Does improved information and reduced non-tariff trade barriers (NTBs) encourage more market players? (TOC Assumption EQ – STO 1 to STO 3)	1. What are the key portfolio elements that can be considered successful, new, and innovative? 2. To what extent has the portfolio generated unintended positive and/or negative impacts? 3. What are the developmental and social impacts of the portfolio? Who is experiencing the portfolios intended and unintended results, short, medium and long-term results, positive and negative results and to what extent? (service providers, clients, farmers, the community and/or organizations). To what scale and what is the depth of change? 4. To what extent did COVID and the budgetary cuts affect the portfolio and undermine results that would otherwise have been achieved? 5. What conditions (including the delivery model) are needed to make this type of project succeed?	Phone Survey (beneficiaries) IDIs: Beneficiaries from projects 3536 - AFA, 3537 - ITTS, 3539 - RFLS, 3535 - KEPHIS PVP, 3541 - RECTS, 3728 - MLF, 3729 - MOA KIIs: Senior Staff from Shippers Council of Kenya , Kenya Transporters Association, Kenya Ports Authority, Kenya Railways Corporation, Fresh Producer Exporters Association of Kenya, Kentrade KRA; Customs Management, Tanzania Private Sector Foundation, Tanzania Ports Authority, Tanzania Revenue Authority- AEO Risk, TMDA Management, Private Sector Federation- Rwanda,	TOC, Evaluation Reports: 3535 - Endline Study of KEPHIS SC-PVP System, 3536 - Endline Study of AFA iMIS, 3537 - Endline Study of EATTA iTTS, 3539 - Final Evaluation Report - Endline Evaluation of Cargo Tracking by Rail, 3726 and 3728 - Endline Evaluation of SWIFTs Project, 3823 3828, 3723 and 3531 - Final Evaluation Report, 3541 - Final Report STEF Evaluation, Annual Review Reports, IT system data	Shorter Term Outcomes Level 1 to Level 3	Sub-EQs 6-12 highlighted in red are more macro-level and as such, it will be difficult to establish a clear causal link between TMA's programme and these macro-level changes. This conclusion is drawn given the vast institutional knowledge of our evaluation team who have interacted with agencies and other key stakeholders. While we will set out to find relevant evidence sources, it will not be sufficient to state for certain the extent to which TMA's ICT4T contribute to observed changes (if any).

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
	22. To what extent does improved agency transparency reduce incidents of regulations violations? (TOC Assumption EQ – STO 2 to STO 3)	6~~. What are the income and livelihood characteristics of the portfolio beneficiaries specifically the tea farmers and exporters? Have their incomes increased? What impact has the portfolio had in terms of increased sustainable incomes and livelihoods?~~ ~~7. To what extent did the interventions contribute to increased trade within EAC?~~ ~~8. Did improved ICT4T systems lead to increases in government revenue collection~~ ~~9. To what extent have jobs being created through this portfolio's work?~~ ~~10. Did improved transparency reduce the incidence of trade regulation violations?~~ ~~11. Has the portfolio enhanced digitization, integration, and processing capacity of trade processes?~~ ~~12. Did improved ICT4T systems lead to better enforcement of relevant regulations?~~	Rwanda Utilities Regulatory Authority Management, Rwanda Revenue Authority Management (RRA), Rwanda Standards Board Management, Private Sector Foundation of Uganda, Uganda Revenue Authority, Uganda Customs Management			

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
6. Sustainability (Will the benefits last?)	23. How will the completed projects remain viable and operational post TMA support? 24. To what degree is the ICT4T portfolio promoting green growth? 25. To what extent does the positive impact justify continued investments? (suggested additional question)	1. Under what conditions and in what context is the project replicable or transferable? 2. Has capacity of the partners been built to ensure future delivery of the programmes? Was knowledge transferred (Including best practices) to the Government, key implementing partners, JMC, and other stakeholders to improve the project results and its long-term sustainability 3. Does the programme have a potential for replication, to inform S3 programming , based on the design and implementation?	IDIs: Beneficiaries from projects 3536 - AFA, 3537 - ITTS, 3539 - RFLS, 3535 - KEPHIS PVP, 3541 - RECTS, 3728 - MLF, 3729 - MOA KIIs: Senior Leadership (TMA), Senior Staff from Shippers Council of Kenya , Kenya Transporters Association, Kenya Ports Authority, Kenya Railways Corporation, Fresh Producer Exporters Association of Kenya, Kentrade KRA; Customs Management, Tanzania Private Sector Foundation, Tanzania Ports Authority, Tanzania Revenue Authority- AEO Risk, TMDA Management, Private Sector Federation- Rwanda, Rwanda Utilities Regulatory Authority Management, Rwanda Revenue Authority Management (RRA), Rwanda Standards Board Management, Private Sector Foundation of Uganda, Uganda Revenue Authority, Uganda Customs Management	Evaluation Reports: 3535 - Endline Study of KEPHIS SC-PVP System, 3536 - Endline Study of AFA iMIS, 3537 - Endline Study of EATTA iTTS, 3539 - Final Evaluation Report - Endline Evaluation of Cargo Tracking by Rail, 3726 and 3728 - Endline Evaluation of SWIFTs Project, 3823 3828, 3723 and 3531 - Final Evaluation Report, 3541 - Final Report STEF Evaluation	Corporate Intermediate Outcome 1.3	

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
7. Learning (What learning can be taken from the ICT4T portfolio implementation?)	26. What are the key achievements, challenges, and lessons learned from the programme? What has worked well/not worked well, and why? 27. How was the portfolio adaptive to changes and uncertainty internal and external to the programme? 28. What good practices did the programme introduce to achieve better results?"	1. To what extent could the portfolio have been implemented better for more impact at the TMA corporate level? 2. What barriers and enablers affected the interventions either positively or negatively with impact on results?"	KIIs - TMA (ICT4T and Results Team Leadership), Senior Staff from Shippers Council of Kenya , Kenya Transporters Association, Kenya Ports Authority, Kenya Railways Corporation, Fresh Producer Exporters Association of Kenya, Kentrade	Evaluation Reports: 3535 - Endline Study of KEPHIS SC-PVP System, 3536 - Endline Study of AFA iMIS, 3537 - Endline Study of EATTA iTTS, 3539 - Final Evaluation Report - Endline Evaluation of Cargo Tracking by Rail, 3726 and 3728 - Endline Evaluation of SWIFTs Project, 3823 3828, 3723 and 3531 - Final Evaluation Report, 3541 - Final Report STEF Evaluation	Corporate Intermediate Outcome 1.3 and 2.2	

Evaluation criteria	Evaluation questions	Areas to Explore (Included in survey tools)	Primary Data Sources	Secondary Data Sources	TOC Areas Covered by EQ	Comments
8. **Value-for-Money** (To what extent is ICT4T value-for-money?)	29. To what extent does TMA manage ICT4T portfolio resources economically, buying the inputs at the appropriate price and manage fiduciary risk? (economy) 30. To what extent does TMA enhance ICT4T portfolio performance through sound adaptive management and produces the intended quantity of deliverables at the required quality, on time and within budget. (efficiency) 31. To what extent does the ICT4T portfolio contribute towards (i) reduced trade barriers and (ii) improved business competitiveness. (effectiveness) 32. To what extent does the portfolio promote fair access to trade-related benefits marginalized groups and regions? (equity)	Economy: Resource allocation Cost-effectiveness Efficiency: Operational efficiency Good management of key efficiency drivers Technological efficiency Adaptive management Effectiveness: Outcome achievement Impact on trade and sustainability Equity: Promoting fair access	Economy: KII (ICT4T Management) Efficiency: KII (ICT4T and Results Management) Effectiveness: Quantitative survey, IDIs (beneficiaries), KII (ICT4T and Results Management) Equity: Quantitative survey, IDIs (beneficiaries)	Economy: ICT4T Financial data, Project Annual Reports, ICT4T Audit Report, FCDO Cost proforma template Efficiency: Project workplans, Project Monitoring Plan, Project Annual Reports, Risk Plans Effectiveness: TOC, Evaluation Reports: 3535 - Endline Study of KEPHIS SC-PVP System, 3536 - Endline Study of AFA iMIS, 3537 - Endline Study of EATTA iTTS, 3539 - Final Evaluation Report - Endline Evaluation of Cargo Tracking by Rail, 3726 and 3728 - Endline Evaluation of SWIFTs Project, 3823 3828, 3723 and 3531 - Final Evaluation Report, 3541 - Final Report STEF Evaluation Equity: Project Annual Reports, Evaluation Reports	Corporate Intermediate Outcome 1.3 and 2.2	

ANNEX E. VALUE FOR MONEY APPROACH

TMA's ICT4T Portfolio VfM assessment builds on *FCDO's Approach to VfM.* It examines the "Four Es" of economy, efficiency, effectiveness, and equity as set out in FCDO's approach. We have embedded FCDO's 4Es into the OECD DAC criteria. Economy and efficiency are addressed under section 5 of the report, effectiveness under section 4 and equity under section 6. We have complemented the Four Es with an indicative analysis of project costs and benefits and a Break-Even Analysis as part of section 4. The extent to which these analyses are done is dependent on data availability against key indicators.

To a great extent, we have adopted an evaluative approach to the VfM assessment, where performance judgements are informed by definitions presented in the inception report (where applicable). The sub-criteria assessed under each E are based on the VfM framework presented in the inception report. We have made minimal use of the rubrics developed at the inception to allow for a coherent presentation of the report.

The assessment focuses on the VfM achieved by TMA's ICT4T portfolio under Strategy 2, in line with the evaluation scope. The assessment is undertaken from a donor perspective primarily: focusing on resources from TMA's principal donors channelled directly through TMA and the achievement of outputs and outcomes by TMA. The VfM assessment draws on the evaluation of TMA's ICT4T portfolio, to the extent that it addresses VfM issues. The assessment also draws on ICT4T's operational and management information, including but not limited to ICT4Ts financial data, M&E system, programme progress reports and previous programme evaluations. The following questions have broadly guided the assessment of TMA's ITC4T VfM.

Economy: How efficiently are financial and human resources allocated across the projects within the portfolio to ensure that there is no unnecessary duplication of efforts or wastage of resources?

Efficiency: Are projects achieving intended outputs, completed within budget and on schedule, allowing for deviations for adaptive programming and contextual factors.

Effectiveness: Is the portfolio achieving its ultimate outcomes and impacts, such as improved trade efficiency, reduced time and cost to trade, and enhanced trade transparency?

Equity: Does the portfolio promote fair access to trade-related benefits for marginalized groups and regions?

BEA: Have the portfolio results been achieved efficiently with regards to costs and benefits?

ANNEX F. FIELDWORK APPROACH

The timeline for the training and data collection for the quantitative phone survey is presented in Table 32 below.

Table 32 Fieldwork Timeline

Country	Activity	Dates
Kenya and Tanzania	Training	25th – 27th Oct
Kenya and Tanzania	Full Pilot (One day)	30th Oct
Kenya and Tanzania	Debrief	31st Oct – 1st Nov
Kenya	Data Collection	2nd Nov – 23rd Nov (14 working days)
Tanzania	Data Collection	2nd Nov – 17th Nov (12 working days)

QUANTITATIVE SURVEY TRAINING

EDI Global conducted a bespoke and comprehensive training programme for all quantitative interviewers in Kenya and Tanzania to ensure that they fully understood their individual roles in the project and to equip them with a strong foundation in general data collection techniques and understanding of the sensitive nature of the respondents' status and conditions. The training sessions were led by EDI Global's Project Coordinators and Data Quality Officer and were run simultaneously in Kenya and Tanzania to allow for good-quality discussions and clarifications between the survey teams. The training covered the following topics:

- ✓ Introduction to the project;
- ✓ Phone-based data collection techniques;
- ✓ Questionnaire training;
- ✓ Piloting the survey tool.

Figure 33 Kenya Phone Survey Team

Quantitative Survey Pilot

To ensure we were confident that our survey tool flowed well, was understood by respondents, and within 30 minutes, we agreed the first working day would be considered a full-day pilot, followed by a two-day debrief to make the final survey changes before proceeding with the main data collection on **2nd November**. EDI Global shared a brief **pilot report** summarising findings on **3rd November.** As Table 33 shows, the pilot provided an early indication of low survey completion rates across the sample, particularly for Kenya-based systems. The average survey length for completed interviews during the pilot was 33 minutes, which showed the survey to be adequate in length, with no need to amend the number of questions.

Table 33 Pilot Statistics

Item	No. Calls Made	No Interviews Completed (% total)
Total	**263**	**57 (22%)**
Kenya	156	16 (10%)
CMIS	76	7 (9%)
iSOKO	80	9 (11%)
Tanzania	107	41 (38%)
ATMIS	64	18 (28%)
MIMIS	43	23 (53%)

The pilot also brought up various scenarios that we had not originally considered during the survey, these included:

- ✓ **Scenario 1:** Businesses that only registered to a system but did not subsequently use it.
- ✓ **Scenario 2:** Businesses that outsource usage of the system.
- ✓ **Scenario 3:** Businesses that did not exist before the system was introduced.

Each of these three scenarios were subsequently included into the survey tool using routing logic. **Scenario 1** was routed to only answer questions related to time, cost and efficiency; **Scenario 2** businesses were routed to answer questions related to business outcomes only, while **Scenario 3** businesses were routed to answer questions 'after' the system was introduced (i.e. no baseline).

Quantitative Data Collection

Following the training, pilot and debrief, the main data collection commenced in Kenya and Tanzania on **2nd November.** EDI Global's Survey Management Team were in regular communicate with the phone survey team through WhatsApp to report any new scenarios, sample or survey tool configuration issues. Throughout the data collection, EDI Global's Project Manager was closely monitoring the survey completion rates, and available sample to ensure the phone survey teams were productive throughout the data collection period. The Project Manager was also in close contact with TMA to keep pushing for more lists from agencies.

Some challenges from the data collection included:

- ✓ **Kenya phone lines:** During the early stages of data collection, the phone operator in Kenya repeatedly blocked our phone survey team's phone lines. Our Project Coordinator visited Safaricom regularly to address the issue, which ultimately required letters from EDI Global and TMA to be shared with the phone operator to 'whitelist' the lines and prevent them from being blocked.
- ✓ **Survey completion rates:** Survey completion rates for some systems (CMIS and iSOKO) were very low which meant achieving the target of 10 interviews per person per day was a challenge in the early stages. Our first

mitigation was to send generic emails from EDI Global's Project Manager to all of the sample that had an email address. We also pushed TMA to provide lists from other systems such as TCCIA IMIS, AFA IMS and iCMS, which also helped improve overall survey completion rates.

The Tanzania team finished data collection on 17th November, while the Kenya team finished on 23rd November. Overall, we were satisfied with the phone survey team performance and communication with EDI Global's survey team, enabling us to almost reach 93% of our final survey sample target.

Quantitative Data Analysis

To generate useful insights from the quantitative phone survey dataset, we used a variety of econometric techniques to analyse the data. Before analysing the data, we ran a few data transformations to ensure the data was comparable and precise.

Firstly, we converted banded values to actual values for all outcome variables. During the survey, we enabled respondents who were unable to give a specific value on an outcome, such as time or cost, a banded value option. For all outcome variables where a banded value response was given, we have converted these into actual values by using the mid-point of the banding. For example, if the respondent indicated the time taken to complete a trade activity was 'Less than one hour', we applied the actual value of 0.5 hours. Likewise, if they indicated the business cost of a trade activity was between Ksh 5,000 and Ksh 10,000, we applied the actual value of Ksh 7,500. While this process carries some margin for error, we included these data points in the analysis to boost statistical power.

The second transformation was converting different units to the same unit of measurement. For the time variable, we converted any response that indicated 'days' to 'hours'. For example, a respondent who indicated a trade process took two days, their value transformed to 48 hours. For outcome variables where we present a currency, typically Kenyan Shillings (Ksh) or Tanzanian Shillings (Tsh), we convert these values into US Dollars (USD), using a historic baseline conversion rate of (USD$1 = Ksh 100; USD$1 = Tsh 2,300). We maintained these rates for baseline and endline to ensure comparability, but note that the value of the Kenya Shilling and Tanzania Shilling against the US Dollar has weakened significantly in the past two years.

Secondly, to ensure the statistics presented are not skewed, we use the Interquartile Range Rule to eliminate outliers in the dataset. This is a commonly used statistical approach improve the precision of estimates. Our rationale for implementing this process was due to the range of businesses included in the sample, which varied from small micro businesses to multi-million dollar international enterprises. This variance is then reflected in many of the outcome variables.

The Interquartile Range Rule process is outlined below:

- ✓ **Step One:** Find the 25th and 75th percentiles for a specific variable.
- ✓ **Step Two:** Subtract the 25th percentile value from the 75th percentile value to generate the interquartile range.
- ✓ **Step Three:** Multiply the interquartile range by 1.5.
- ✓ **Step Four:** Subtract this value from the 25th percentile and add it to the 75th percentile. This generates the range of values to be included in the analysis, eliminating values outside of the range.

We implemented this process two different ways based on the variable type. For the time and cost variables, we worked out the IQR per activity (e.g. import permit, export permit etc) per system, due to the variance in time and cost between different activities within the same system. For business-related outcome variables, we ran a top-level IQR across the full sample. Table presents the total number of data points per outcome variable before and after

implementation of the Interquartile Range Rule. In total, 1797 (13%) data points were dropped from the analysis of outcome variables.

Table 34 IQR Rule Observations per Outcome Variable

Variable	Total Observations	Total Observations (after IQR Rule)	Number of Observations Dropped	Percentage of Observations Dropped per Variable
Time (All) (Hours)	2711	2432	279	10%
Cost (All) (USD)	2502	2204	298	12%
Trade Volume (All) (No. per Month)	2464	2193	247	10%
Trade Value (All (No. per Month)	2232	1855	371	17%
Turnover (All) (USD per Year)	1983	1672	255	13%
Employees (All)	2473	2126	347	14%
Total	**14,365**	**12482**	**1797**	**13%**

After transforming the data and identifying our sample of interest, we then ran a mixture of summary statistics, Welch T-test's and Wilcoxon RankSum Test's to compare the mean values from baseline to endline and assess statistical significance. The Welch T-test is applied because of the unequal sample sizes and unequal variance between the baseline and endline values per outcome variable. We decided to use all data points within the IQR Rule range for the T-test and RankSum tests to boost statistical power. This means some businesses are included in the estimates who could not provide a value for baseline or endline. We also use a non-parametric Wilcoxon RankSum Test to validate the Welch T-test results. We have also disaggregated results by country, system and business ownership gender.

Qualitative Fieldwork Summary

Qualitative data collection took place between 16th October and 1st December. Our strategy to secure interviews was to first send an email request to interview. If there was no response to the email within three working days, the Interviewer was responsible to either call or send a follow-up to the respondent to try to secure the interview. Interviews were conducted either in-person or remotely via video conference (i.e. MS Teams) depending on what was easier for the respondent. All qualitative interviews were recorded using a tablet, laptop or smartphone, and then transcribed using our summary transcript template.

Qualitative Data Analysis

In this evaluation, we use the qualitative data primarily to supplement the quantitative data. However, for some evaluation questions where quantitative data is not available, we use the qualitative data to form an answer to the evaluation question. The qualitative data analysis followed several levels of synthesis. First, we designed a summary transcript template which encouraged transcribers to summarize the key points of the interviews, and these responses sit under the overarching evaluation question. Next, we pulled out these summaries, and identified whether the response was 'positive', 'negative' or 'indecisive' in answering the evaluation question, and then placed this assessment in the relevant section of the analysis plan. As a final step, we combined primary quantitative and qualitative evidence with secondary evidence to answer each evaluation question, while also rating the quality of the evidence.

CHALLENGES AND LESSONS LEARNED

Attempting to gather primary data from such a large sample of ICT4T system beneficiaries was the first research of its kind for TMA. In previous evaluations, TMA has typically worked with smaller samples of ICT4T beneficiaries (n = <100) which has limited the insights the organisation is able to glean from the data. By opting for a larger sample size in the current evaluation, the intention is to provide TMA with a larger body of evidence on the performance of the ICT4T systems it funds, from the perspective of those who use it. This exercise led to several challenges which it will be useful for TMA to reflect on if it attempts similar data collection in future. The main challenges and learning

- ✓ **Access to beneficiary lists –** one of the ongoing challenges that we worked closely with TMA on was accessing lists of businesses who interact with the ICT4T systems supported by TMA so that we could sample them for the phone survey. Early on, we learnt that receiving contact information from businesses in Rwanda would not be possible due to strict national data sharing laws. Other agencies from Kenya or Tanzania either ignored requests or took repeated attempts from EDI Global and TMA to eventually share beneficiary lists. Given TMA's leverage with partner agencies through the ICT4T programme, we assume it would have been more straightforward to obtain this data. TMA should create data sharing agreements with agencies for any future programming to allow smoother access for independent evaluators.
- ✓ **Difference in beneficiary list quality –** there was a range in list quality across systems which meant that some lists had significant percentages of companies who had never interacted with the system or were wrong numbers. The impact of this was on the total number of calls that interviewers needed to make in order to reach the target of 10 completed interviews per person per day. The poor quality lists were especially felt in Kenya, the CMIS and iSOKO systems being particularly low-quality. The learning here is that agencies rarely sense-check their user databases and reported usage figures may inflate the number of genuine system users. Agencies should invest more time to understand their databases and if shared in the future, have the capacity to filter out duplicates and non-users.
- ✓ **Securing qualitative interviews –** we hoped to leverage TMA's good-standing with participating ICT4T agencies to secure interviews host agencies and affiliated authorities for the KIIs and with businesses for the IDIs. Unfortunately, we were only able to reach 48% of our final target for qualitative interviews, this is despite our best efforts of emailing target stakeholders, following up with calls and snowball sampling where possible. If there is a way for TMA to mandate senior stakeholder participation in these types of evaluations it could go some way to improving response rates. A possible learning here, which has been evident in this evaluation, is that TMA should be less reliant on stakeholder evidence in its evaluations and focus more on beneficiaries. Agencies.

ANNEX G. LIST OF STAKEHOLDERS CONSULTED

Country	Name	Role	Organisation
Kenya	John Kulova	Programme Manager	TradeMark Africa
	Catherine Nanzigu	Impact and Results Director	TradeMark Africa
	Erick Sirali	Digital Trade Director	TradeMark Africa
	Stephen Wanjala	IT Officer	Kenya Agriculture and Food Authority
	Nelson Wabwire	SCT Liason Officer	Kenya Revenue Authority
	Boniface Mwangi	IT Officer (RECTS)	Kenya Revenue Authority
	Nemaisa Kiereini	Former CEO	Kenya National Chamber of Commerce and Industry
	Martin Gichure and Cyrus Ngaria	IT Officers	Kenya Revenue Authority
	Ann Owino	IT Officer (CMIS)	Kenya National Chamber of Commerce and Industry
	Brian Omondi	IT Officer (iSOKO)	Kenya National Chamber of Commerce and Industry
	Carole Kariuki	Senior Management	Kenya Private Sector Alliance
	Hosea Machuki	CEO	Fresh Producer Exporters Association of Kenya
	Rachel Mwaniki	Sales and Marketing Consultant	Vegflo Seeds Africa Ltd Nairobi
	John Sudi	IT Officer	East African Tea Trade Association
	Gideon Chakamai	IT Officer	Northern Corridor Transity and Transport Coordination Authoirty
	Naveed Ariff	Director	Global Tea & Commodities (Kenya) Ltd
	Shadrack Gicheru Wairimu	IT Officer	Kericho Tea Suppliers
	Mary Njoroge	Compliance Officer	Beauty Line Limited
	Nicholas Musyoki	Assistant Planning Manager	Dawa Limited
	Faruk Mohamed	Head of Logistics	Blackstone Logistics
	George Kamica	Director of Business Development	Carjet
	Nicol Mercy	Procurement/Logistics Manager	Cemex Holdings Limited
	Pamela Indulachi	Business Owner	Micro Business
	Zahra ahmed	Business Owner	Micro Business
	Nashon ingwaga	Business Owner	Micro Business
	Vivian Nkirote	Business Owner	Micro Business
	Gibson Murithi	Business Owner	Micro Business
	Aisha Muhodhar	Business Owner	Micro Business
	Ann kundi	Business Owner	Micro Business
	Mary wanjugu	Business Owner	Micro Business
	Jacqueline Mbuva	Finance	TradeMark Africa
Tanzania	Kennedy Nelson	IT Officer	22. Tanzania Chamber of Commerce and Industry
	Faraji Kondo and Melchior Barantandikiye	IT Officer	25. Central Corridor Transport Facilitation Agency

	Sigfrid Kimario	SCT Liason Officer	Tanzania Revenue Authority
	Monica Hangi	Regional Director - East and Central Africa	TradeMark Africa
	Lilian Masalu	TMA Tanzania Country Programme Manager	TradeMark Africa
	Gabriel Kinu	IT Officer Single Customs Territory	EAC Secretariat
Rwanda	Alex Mugire	Senior Management (RECTS)	Rwanda Revenue Authority
	Joachim Cyaboshye	IT Officer (ReSW)	Rwanda Revenue Authority
	Gaston Uwayo	IT Officer (RSB)	Rwanda Standards Board
Ethiopia	Haria Woldegebriel	IT Officer	Ethiopia Chamber of Commerce