Annex A: References

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Annex B: Literature Review

Annex B – Literature Review

To successfully measure the impact that TMEA has had on Trade and Growth, the team has used three different economic models: a transport model, an econometrics model, and a computable general equilibrium (CGE) model.

With the aim to ensure that the team is up-to-date with regard to the latest trends and novelties in these areas, we carried out an extensive literature review on the application of the three different models. Such a literature review is presented in this Annex.

1. Models of trade costs and literature results

The analysis of trade costs, trade time and trade risks are not novel in academic literature. As tariffs have come down, trade analysts have focused their attention on transport costs and NTBs. Based on back-of-the-envelope for Canada-US trade, Anderson, and van Wincoop (2004) claim these costs may be as high as 170% of the cost of the product in rich countries. Transport costs are estimated to be typically higher than tariffs. Moreover, in much the same way as tariffs, transport costs penalise goods produced in multiple stages across different countries, since producers need to pay for moving goods at each stage of the production process. These penalties from increased costs reduce the participation of countries in supply chain trade. A decline in transport costs will therefore be particularly beneficial for trade in vertically specialised goods, defined as the import content of exports. As highlighted by Milberg et al (2016): 'Vertical specialization is generally high when production is organized in GVCs that span multiple countries, which means that intra-industry trade in intermediate goods becomes far more significant.'[1]

Firstly, the issue of definition has to be explored. Anderson and van Wincoop (2004) define trade costs to include all costs incurred in getting a good to a final user excluding the cost of production. This covers transportation costs (both freight costs and time costs), policy barriers (tariffs and NTBs), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs (wholesale and retail). Bergstrand and Egger (2011)[2] define natural trade costs as, 'those costs incurred largely – though not exclusively – by geography'.[3] In bilateral trade, the measurable geographical distance would be classified as a natural trade cost. In contrast, unnatural trade costs or 'artificial' trade costs refer to impeding costs that occur in the absence of, or beyond, natural costs.[4] These man-made impediments to international trade are mainly attributable to the trade policy environment established by governments. These trade frictions can lead to a high number of barriers to trade that can render exports uncompetitive by affecting the comparative advantages of countries.

[1] Milberg, W., Jang, X. & Gereffi, G. (2016) Industrial Policy in the Era of Vertically Specialized Industrialization, in Salazar-Xirinachs, J. M., Nubler, I. & Kozul-Wright, R. (eds.) Transforming Economies: Making Industrial Policy Work for Growth, Jobs and Development, United Nations Conference on Trade and Development and International Labor Organization.

[2] Bergstrand, J. H. and Egger, P. (2011). Gravity Equations and Economic Frictions in the World Economy: A Survey, in Daniel Bernhofen, Rod Falvery, David Greenaway and Udo Kreickemeier (eds.), *Palgrave Handbook of International Trade*, New York, NY: Palgrave Macmillan, 2011.

[3] Gravity Equations and Economic Frictions in the World Economy by Jeffrey H. Bergstrand and Peter Egger.

[4] Ibid.

There are several sources of data for transport costs. Most direct is industry or shipping-firm information, from firms like Maersk. Alternatively, national customs offices collect free on board (FOB) and cost-insurance-freight (CIF) data on a bilateral basis. From this it is possible to calculate transport costs that can be expressed as an average ad valorem transport cost. Radelet and Sachs (1998) use the ratio of these two values minus unity to provide an *ad valorem* rate for the cost add-on associated with international transport:[5]

$\boldsymbol{C^S = \frac{CIF}{FOB} - 1}$, where CIF/FOB is the import price inclusive and exclusive respectively of insurance and freight and C^S refers to shipping costs. However, such measures have been criticised as regards their level of precision.[6] While International Monetary Fund (IMF) CIF/FOB ratios have been used by several authors to assess the effect of transportation costs on trade, mostly because of the ease of availability and coverage, a number of inconsistencies are found in the IMF CIF/FOB ratios, making the reliability of the ratio for indicating transport costs questionable in time series data. Radelet and Sachs (1998) conclude that countries will differ in their average CIF/FOB ratios, not only because of true differences in shipping costs for a given composition of goods, but also because of differences in the commodity mix. In addition to charges for shipping a standardised type of freight, transportation costs for a particular product depend on the distance covered by the shipment, the quality of the transport service offered and the weight/value ratio of the good. These factors vary considerably and hence significantly affect trade patterns. From their analysis of CIF/FOB ratios the authors have established that geographical isolation and higher shipping costs make it much more difficult for relatively isolated developing countries to succeed in promoting manufactured exports.

Gaulier *et al* (2008), indicate that these errors may arise under two conditions,[7] namely: 1) when the FOB at the point of export and the CIF at the point of import, or mirror quantities (in physical units) do not match across trading partners. This difference could arise as a result of differences in tracking systems, or differences in the level of scrutiny in tracking; and 2) when CIF unit values are smaller than or too high compared to FOB unit values, to be solely explained by transport and insurance costs. They estimate the trade cost using the following gravity equation:[8]

$$\frac{CIF_u}{FOB_u} = \boldsymbol{\beta_0 + \beta_1 log(dist_{ij}) + \beta_2 log(dist_{ij}^2) + \beta_3 contig_{ij} + \beta_4 comlang + \beta_5 colony + \delta log(UV)_k + \theta_1 GDP_i + \theta_2 \log(GDP_j) + \theta_3 \log(GDP_{pci}) + \theta_4 (GDP_{pcj}) + \emptyset_1 \log(infra_i) + \emptyset_2 \log(infra_{ij}) + \emptyset_3 landlock_i + \emptyset_4 landlock_j + \lambda_t + \varepsilon_{i,j,k,t}}$$

The authors introduce a ratio of unit weight variables (UV) to differentiate product varieties, and infrastructure variables (infra), as well as common borders (contig), common language

[5] Radelet, S. and Sachs, J. D. (1998) *Shipping costs, manufactured exports, and economic growth*, Earth Institute, Columbia University and Presented at the American Economics Association annual meeting, January.

[6] Hummels, D., and Lugovsky, V. (2003). *Usable Data? Matched Partner Trade Statistics as a Measure of International Transportation Costs*. Purdue University, Department of Economics, West Lafayette, Ind.

[7] Gaulier, G., D. Mirza, and Turban Zignago, S. (2008) *International transportation costs around the world: a new CIF/FOB rates Datase*t, CEPII, March.

[8] Based on Limao, N. and Venables, A. J. (2000): Infrastructure, Geographical Disadvantage and Transport Costs, Columbia University, London School of Economics working paper.

(comlang), colony and landlock considerations. A time and error term completes the indicators. This is the basis for the GTAP transport costs data, as described in Gelhar & McDougall (2016).

Hummels (2001a) points out that the data are poor and of dubious quality, but Sourdin and Pomfret (2012) claim that the CIF/FOB method is conceptually and operationally the best approach. CIF/FOB ratios have been used as an indication of transport (and insurance) costs. Bilateral trade flows can be measured by 'cost-insurance-freight' (CIF), which refers to the value of a shipment at the point of entry, by air or sea, inclusive of charges related to insurance and freight. The 'free on board' (FOB) measurement of trade flows refers to the value of a shipment that is delivered to and put 'on board' a vessel for potential shipment at the exporting port. Comparing the valuation of the same flow reported by both the importer and exporter, should, theoretically, yield a difference equal to the transport and insurance costs.

Another approach is based on the 'law of one price', which considers price differentials across countries for the same product. Hummels (2007) reveals that since transportation costs drive a wedge between the price at the place of origin and the price at the destination, the average change in prices, induced by transportation costs, can be calculated using the following equation:[9]

$\frac{P_d}{P_o} = 1 + \frac{F}{P_O}$ where: P_d = Price of good at destination; P_o = Price at origin; F = Per unit shipping cost.

As for indirect costs, Hummels (2001b) imputes a willingness-to-pay for time saved. Each day in travel is worth 0.8% of the value of manufactured goods, equivalent to a 16% AVE for the average ocean shipment. It is obvious that the value of time saved depends on the cargo, and he estimates this value by observing the tendency of shippers to switch from ocean to air when the full (shipping plus time) cost of ocean exceeds that for air. A limitation here is that some products (coal) are never air freighted and hence apparently have no value in terms of time saved.

There are two aspects of time that represent a cost for trade. One is the lead time, which is the length of time between placing an order and receiving goods. This depends on several variables including the distance, the speed of the mode of transport chosen, the type of product, the management of the supply chain and the logistics. There are also administrative delays of various sorts. A long lead time represents a cost because it raises the costs of uncertainty and variation in demand. If, for example, future demand for a fashion product has been underestimated, the seller may run out of stock. This has costs in terms of foregone sales and the possibility of losing customers.

Variability of delivery time imposes a cost because of the need to hold buffer stocks to cover demand. The more variable the delivery time, the greater the buffer stocks needed. High variability of delivery time would make it very hard to organise 'just-in-time' delivery, where

[9] Hummels, D. (2007). Transportation Costs and International Trade in the Second Era of Globalisation, *Journal of Economic Perspectives*, Vol. 21.

inventories are kept to a bare minimum and inputs arrive at the factory only when they enter the production process (Nordas, 2007: 35).

Poor infrastructure has been documented to be especially detrimental to low-income and landlocked countries, such as Rwanda and Burundi, which rely on third transit countries to carry goods to their final consumer. For instance, Freund and Rocha (2010) find that transit delays, due to poor road quality and insecurity, are a far greater barrier to Africa's exports than customs handling delays. They estimate that a one-day increase in inland transit, reduces the value of African exports by 7%. Portugal-Perez & Wilson (2012) suggest that improvements in physical infrastructure bring the greatest benefits in terms of export performance.

Sorescu and Flaig (2017) note that losses and costs associated with direct and indirect costs can be modelled with the widely used iceberg cost approach. The idea is that the costs of transporting goods are being paid for by a portion of the transported goods, rather than any other resources (Samuelson, 1954). Like an iceberg, the value of the product 'melts' away, as it is 'towed' to more distant destinations. This is modelled as negative technological change. In other words, trade facilitation is a productivity improvement.

Transport models

To address the reduction in costs and prices for the user, the team built a micro simulation model introducing a number of variables for the users of transportation services, such as paid to truckers, fee procedures, bribes, facilitation payments, etc. This micro-modelling methodology is used in a World Bank (WB) study[10] in an assessment on the Northern corridor in East Africa in an *ex-ante* project appraisal. The study finds that reductions in trade times are less significant than the impact of reducing uncertainty and improving predictability. The model used by the WB aims to estimate most savings generated by a Trade Facilitation Project, based on a limited number of parameters such as:

- Expected travel/dwell time and uncertainty decrease along the corridor;
- Value of time consignees bear for storage and inventory; and,
- Value of time for transportation equipment such as the fixed costs per day for a truck.

The WB modelled the supply chain as a succession of links, with each link along the corridor being characterised by the distance covered, the average time spent, the uncertainty (modelled as a standard deviation 0) and the fixed costs borne.

Link in the supply chain	Distance	Time/Delay	Uncertainty	Fixed Cost
: i	: x_i	: t_i	: σ_i	: c_i

[10] World Bank (2005). East Africa Trade and Transportation Facilitation Project. Project Appraisal Document.

In this model, the operating parameters per truck for transportation companies are:

- Variable costs α (calculated per km);
- Fixed costs β associated with trucking along corridor; and,
- Load factor λ, to consider the fact that the truck may not be full on return.

Where x_i is distance and fixed costs are expressed asC_i. Then, total transportation costs per trip, are defined as C_{trans}:

$$\text{Ctrans} = \sum_i \left(\alpha x_i/\lambda + \beta\, t_i + C_i\right)$$

Carrying inventory costs C_{inv} are defined as the sum costs of carrying inventory during transit plus a slack time to calculate the impact of uncertainty in the transit time:

$$C_{inv} = V * s * (\sum_i t_i + k * \sigma)$$

Where V equals the value of the cargo, s is the cost of inventory and storage per cargo, k is a safety coefficient and σ is the total standard deviation for the chain given by:

$$\sigma = \sqrt{\sum_i \sigma_i^2}$$

Total transportation costs C_{total} are then defined as:

$C_{total} \equiv C_{trans} + C_{inv}$

Benefit assessments compares the cost per shipment before and after trade facilitation measures. Variable costs and distance do not change, unlike delay, uncertainty, and fixed costs.

	Before			After		
Link	**Delay**	**Uncertainty**	**Fixed Cost**	**Delay**	**Uncertainty**	**Fixed Cost**
i	t_i	σ_i	c_i	t'_i	σ'_i	c'_i

Benefits of improved trade facilitation for each link can be written as:

$savings_i = -(\Delta C_{total})_i = (\beta + V * s) * (t_i - t'_i) + V * s * k * (\Delta\sigma)_i$ for a link which includes trucking, and $savings_i = -(\Delta C_{total})_i = (V * s) * (t_i - t'_i) + V * s * k * (\Delta\sigma)_i$ ~ for a link without trucking (e.g. clearance in the port). Where

$$(\Delta\sigma)_i = -(\sigma' + \sigma) \times \frac{\sigma_i'^2 - \sigma_i^2}{\sum_i \sigma_i'^2 - \sum_i \sigma_i^2} = -\frac{\sigma_i'^2 - \sigma_i^2}{\sigma' + \sigma}$$

is the contribution of link *i* to the reduction of uncertainty.

A similar approach is adopted by Arvis *et al* (2010), who developed a quantitative supply chain model identifying the impacts of cost, lead time, and uncertainty in lead time. The total transit cost borne by the shipper can be summarised with the following formula:

$$Total\ transit\ cost = A + O + \alpha \times T_{trans}(efficient)\ \ or$$
$$\frac{\alpha}{N\lambda}(cartel\_or\_syndicate)$$
$$+\frac{\beta}{\lambda} \times D + w \times T(\gamma) \times V + w \times \frac{S}{2} \times V$$

Where:

O = Transit overheads

A = Administrative costs of organising transit operations: internal costs or costs paid to logistics providers (for example, to arrange small shipments)

T_{mean} = Average lead time (days) of transit operation, for instance: Ex. Ship to consignee (imports) Shippers to FOB (exports)

S = Average time (days) between identical shipments required by the level of demand for such shipment (replenishment cycle)

α = Fixed costs of transportation

β = Variable cost of transportation (for example, fuel, maintenance)

Dis = Average distance covered in the period

λ = Load factor of truck

m = Moving inventory cost

w = Warehouse inventory cost

V = Value per shipment

T_i = Mean time taken by step

D_i = Distance covered during step

T_{trans} = Usage of transportation vehicle (including waiting time and return)

P(t) = Probability distribution of lead time (for one or several steps in the chain)

T = Total lead time (random variable)

D = Distance covered in transit (one-way)

N = Number of trips of transit vehicles (per month)

While $T(\gamma) = \left(\frac{\int_{T_k}^{\infty} tP(t)dt}{\int_{T_k}^{\infty} P(t)dt} \right)$ is the value associated with the uncertainty of lead time.

Parametrizing the model, leads the authors to provide a rough savings estimate of US$130 for each one-day reduction in truck transit times.

Eberhard-Ruiz & Calabrese (2017) used a similar approach. They presented a modelling framework to capture the operating conditions of the trucking industry in the EAC.[11] They assume total costs C_{ij} to exhibit a decreasing average cost, assuming that C has a variable cost component linked to the number of cargo loads X_{ij}; and a fixed component comprised of the truck driver salary, W_i the annual depreciation of the truck, and the opportunity cost of capital in the region:

$$C(X_{ij}) = \omega_j X_{ij} + \rho_j Xij + W_i + (\delta + r) K_i$$

Where ω is the direct pecuniary costs involved when a cargo load is transported on route j, covering en-route expenses, accommodation of drivers and other incidental costs; ρ_j is the total cost of fuel required for a return trip on route j; and W_i is the annual cost of labour to operate a truck. $(\delta + r)K_i$ represents the user cost of initially invested capital K_i, with δK_i standing for the annual depreciation of a truck and rK_i the risk-adjusted opportunity cost of owning a truck. rK_i is defined as a term including both the opportunity cost of capital as well as the truck owner's opportunity cost of time.

2. Modelling trade costs through CGE

From the CGE perspective, there are three elements to modelling trade costs where trade costs are of the 'iceberg' variety, which amounts to a loss in value, or loss in transit. Direct costs can be modelled as an *ad valorem* tax, imposed on either the importer (represented by the variable "tms" in the GTAP model), or the exporter ("txs"). Indirect costs are captured with the technology (productivity) variable ("ams"). The third element is a productivity increase where most of the gains accrue to the importer. This leads to a situation where welfare impacts are much greater because incomes are generated rather than merely transferred.[12]

Another approach developed by Walmsley and Minor (2016) builds on a willingness to pay approach for trade facilitation based on the data and concepts developed by Hummels. This alternative approach postulates that goods delivered quicker are preferred to those that are delayed. That is because consumers derive more utility from goods delivered earlier than later and are thus willing to pay more for them. The authors focus on the Armington nest that determines foreign demand by source country (XF i, j), as originally conceived by Armington (1969). The constant elasticity of substitution (CES) utility function at this level is:[13]

$$U_i^F = \left[\sum_{j=1}^{n} B_{i,j}^F . \left(X_{i,j}^F\right)^{-\rho_i^F}\right]^{-\frac{1}{\rho_i^F}}$$

[11] See Eberhard-Ruiz, A. & Calabrese, L. (2017), *ibid*.

[12] This is akin to comparing the welfare effects from a reduction in trade taxes which involve a transfer of rents either between the government and the private sector or between governments when countries influence the prices at which they import and export and technical progress when the value of output is increased while maintaining the supply of factors constant.

[13] Walmsley, T. & Minor, P. (2016). Willingness to Pay in CGE Models: Estimating the benefits of improved customs efficiencies within the WTO Trade Facilitation Agreement. ImpactEcon, Working Paper—002 Rev-2.

Where:

Commodity i (where there are m commodities, i $\in$ 1...m)

Country j (where there are n countries, j $\in$ 1…n)

U^F_i is utility derived from foreign consumption of good i

$B^F_{i,j}$ are the distribution parameters of foreign good i from country j $(\sum_{j=1}^{n} B_{i,j} = 1)$

$X^F_{i,j}$ is the quantity of foreign good i from country j

ρ^F_i is a substitution parameter. It is related to the elasticity of substitution between commodity i from different foreign sources σ_i^F, $(\sigma_i^F = \frac{1}{1+\rho_i^F})$.

Moïsé, Sorescu and Flaig (2017), using an OECD model and the GTAP database, attempt to combine both supply and demand side approaches to assess the impacts of trade facilitation. They estimate that implementation of the WTO's TFA has the potential to increase world trade by 0.6% compared to the baseline where the TFA is not implemented. They estimate that income increases are in the order of 0.3% in the medium term.[14]

3. Econometric Models

For identifying impacts econometrically, two major approaches have been used in the literature. One approach, as utilised by the WB (2018), applies quasi-experimental methods to compare the trade performance between two groups of otherwise similar countries, in one of which trade facilitation interventions have taken place and vis-à-vis the other without any such interventions. While the results obtained from the exercise provides an indication of the impact of such interventions to improve the LPI and Doing Business indicators, there are also severe challenges to applying this method, including the identification of an appropriate 'control group' since most developing countries receive some form of A4T or other assistance for undertaking trade facilitation related activities.

A more widely applied technique in the empirical literature, particularly in estimating the impact of A4T-type interventions is the use of the gravity model. The model is particularly favoured because it enables the estimation of trade impacts of various trade-related policies. The gravity model has been widely applied for analysing impacts of changes in tariff and non-tariff barriers, regulatory policies, as well as in political and institutional characteristics of countries. The impact of development assistance as trade facilitator has also been widely studied where the general finding is that trade facilitation measures increase bilateral trade flows (Basnett et al., 2012). Enhanced customs efficiency, reduced transport times and costs, etc. greatly reduce trade costs for exporters and importers alike (WTO, 2013). Applying the gravity framework, Helble *et al.* (2012) estimated that A4T policy reform projects produce a high-rate of return: for each US$1 of A4T for trade policy and regulatory reform yielded a US$1.3 additional trade is yielded. Positive

[14] Moïsé, E., Flaig, D. & Sorescu, S. (2017). Economy-Wide Impacts of Trade Facilitation: A METRO Model Simulation. OECD Trade and Agriculture Directorate, Trade Committee, TAD/TC/WP(2016)15/FINAL.

results have been estimated by Cali and te Velde (2010), Hummels (2001), Djankov, and Freund and Phan (2010), amongst others.

The gravity model has also been widely used in assessing the impact of transport, infrastructure, and logistics costs on trade flows. Logistics inefficiencies harm the competitiveness of firms by increasing trade costs both directly and indirectly since it requires additional costs like inventory holding, loss in reputation, etc. (Hausman, 2004). Limao and Venables (2001) produced one of the earlier studies in using it to consider the effect of the quality of infrastructure on bilateral trade. The authors utilised an infrastructure index (i.e. a composite of transport and communications networks) constructed from information on the road, rail, phone infrastructure and shipping costs obtained from freight forwarders in determining its implications for bilateral trade flows. Their estimation shows that an increase in trade costs (arising from weak infrastructure) by 10% reduces trade volume by more than 20%.

Nordas and Piermartini (2004) consider similar indicators such as airports, roads, telephone lines, port efficiency and the median port clearance time in measuring their impact on trade. They observe a significant relationship between trade and these explanatory components, amongst which, the port efficiency is found to have the highest impact. A similar conclusion is reached by Clarke, Dollar and Micco (2004) as they confirm port facilities as a major determinant of trade facilitation. Their estimation shows that a fall in the quality of port facilities and general infrastructures from the 25th to 75th percentile increases ocean freight costs by around 12%. Chang, Kaltani and Loayza (2009) proxied infrastructure quality by the number of land telephone lines per capita and showed it to be a significant determinant on the impact of trade reforms on economic growth. Portugal-Perez and Wilson (2012) analyse the impact of 'hard' and 'soft' infrastructure on the export performance of developing countries. Their estimates show that trade facilitation reforms do improve export performance with investment in physical infrastructure and regulatory reforms particularly improving the business environment. They also uncover a complementarity between hard and soft infrastructure. Deen-Swarray, Adekunle, and Odularu (2011) conducted an empirical analysis using the gravity model to estimate the impact of infrastructure on trade within Economic Community of West African States (ECOWAS) and a positive relationship was shown between infrastructure development and bilateral trade.

Hummels and Schaur (2013) examine the importance of time as a trade barrier, estimating the magnitude of time costs, and relating these to patterns of trade. Their estimation indicates that each day in transit is worth 0.6 to 2.1% of the value of the good, and that long transit delays significantly lower the probability that a country will successfully export a good. The authors also highlight that end use categories of motor vehicles and parts, and capital goods are especially time sensitive.[15] Similarly, Hummels (2001) also suggests that the advent of fast transport (air shipping and faster ocean vessels) is equivalent to reducing tariffs on manufactured goods from 32% to 9% between 1950-1998. These results are further supported by Djankov, Freund and Phan (2010) who report a transit delay of one additional day being associated with a 1% fall in bilateral trade.

[15] Hummels, D. L. & Schaur, G. (2013), Time as a Trade Barrier, American Economic Review, 103(7):2935-59.

Several studies report that the differences in logistics performance are influenced only in part by poor ‘hard’ infrastructures such as road, rail, waterways, port services, etc. (Subramanian and Arnold, 2001). In contrast, others lay the blame on poor ‘soft’ infrastructure caused by institutional constraints, such as procedural red tape, inadequate enforcement of contracts, delays in customs, delays at ports and border crossings, etc., as observed by Hausman, Lee and Subramanian (2005). The latter authors examined the effects of logistics costs (such as average time for all trade-related procedures, the average time for document processing, total number of documents required, etc.) and time on bilateral trade patterns. They find that a 1% reduction in the total trade-related logistics costs increases bilateral trade by more than 0.25%.

Korinek and Sourdin (2011) investigated the role of trade logistics over the volume and value of international trade. They found that holding all other factors constant, a 10% increase in the overall LPI of an exporter raises the exports from exporting country to the importing country by 69%. Applying more disaggregated data, Saslavsky and Shephard (2012) analysed the impact of overall LPI on trade in parts and components. They found that the networked trade in parts and components is more sensitive to the importing country’s logistics performance than trade in final goods

Annex C: The Transport Model

Annex C The Transport Model

The Transport Model Methodology

Trademark East Africa (TMEA) has focused on many areas surrounding transport infrastructure, such as investments in the port, the corridor, and OSBPs. To measure the efficiencies of TMEA's work along with these areas we decided to build our own transport model inspired by existing work in this area.[1]

The transport model developed by the evaluation team measures the savings both in terms of time, costs and risks along with the port and the corridor (including the OSBP's), which are the major influencers on costs. The period of comparison is 2010 and 2017. Given that the flow of traffic in these two periods are not the same, we calculated the savings aligned to the 2017 traffic but using cost reductions from the 2010 charges to the 2017 charges. Some assumptions have been made (Box 1)

Box 1 Assumptions of the transport model

Containers

Average ship is 190m in length and carries 58 000 tons of Cargo.

1 TEU = 20 Ft Containers; 20Ft Container = 24 000 Kg/24 Tons

The container size type used for the estimations is a 40' Container.

1 full 40' container = 2 x 20 Ft Containers = 48 000 Kg/48 Tons

Number of 40' Containers in a 190m Ship = 1208

The value of a loaded container is assumed to be $40,000.

1 GRT = 2.83 cubic meters. 1 Ship carries 91808 cubic meters

1 Ship is equivalent to 32441 GRTs

91% of shipments at the port of Mombasa are imports (based on KPA 2017 figures).

In our methodology, we calculated the cost savings for a container. Then, we extrapolate to the entire year savings using the traffic flow for the year.

Our traffic flow savings

We used the following calculations for traffic flow savings:

$$T_{s2017} = T_{t2017} * (T_{c2017} - T_{c2010})$$

[1] [1] Arvis, J-F, Duval, Y., Shepherd, B, Utoktham, C.& Raj, A. (2016). Trade Costs in the Developing World: 1996 –2010. World Trade Review 15 (3); Eberhard-Ruiz, A. & Calabrese, L. (2017). Would more trade facilitation lead to lower transport costs in the East African Community? ODI Policy Briefing, ODI, May.; Eravaninthorn, S., & G. Raballand. (2008). Transport Prices and Costs in Africa. Washington, DC: World Bank; Arvis, J-F., Raballand, G. & J-F, Marteau (2010). The cost of being landlocked: logistics costs and supply chain reliability. World Bank; Nathan Associates Inc (2009). Corridor diagnostic study of the Northern and Central Corridors of East Africa. Dec 16; CPCS (2013). East Africa Freight Logistics Markets Study. Ref 11368.

Where:
T_{s2017}: Total Savings in 2017
T_{c2010}: Total Costs(USD) per Container in 2010
T_{t2017}: Total Costs(USD) per Container in 2017
T_{t2017}: Total number of 40Ft' Containers in 2017

Port and Corridor Savings

The total costs per container can be broken down into total costs at the port and the total costs along the corridor. The savings around the port are mainly around storage and shipping charges, whereas the savings along the corridor are mainly around the transit time and cost savings. We consider uncertainty to be a major hidden cost and have included savings calculation for the risks where the data was available.

Port Costs and Savings

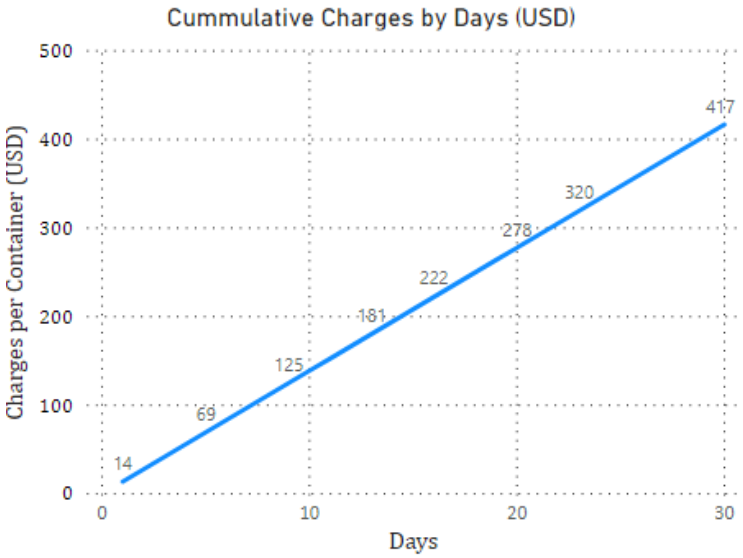
In our analysis of port costs, we looked mainly at the time-variant variables.
Port Costs (P_c) = Cost at Storage (C_s) + Cost at quay, buoying, anchorage (C_q) + Business Uncertainty (B_c) + Extra Inventory Uncertainty (E_c)

Cost at quay, buoying, anchorage (C_q)
Cost at quay, buoying, anchorage(C_q) follows a linear relationship with a time variable.

Given
T_s: Time ship spends at port
T_q: Total Charges per container at port (excluding storage)

$C_q = T_s * T_q$

Figure 1 Quay, buoying, anchorage, charges

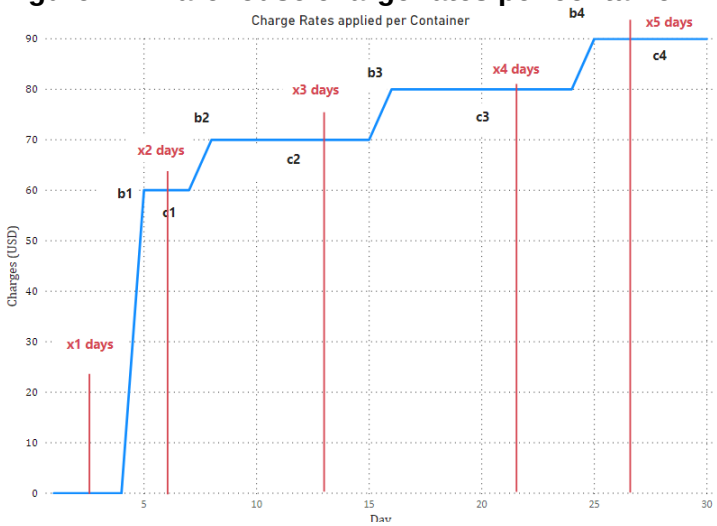


Source: KPA

Cost as Storage (C_S)

The storage costs, however, follow a non-linear charging mechanism, step-by-step increase of charges based on the number of days spent at the warehouse. Hence, the total charges per container were calculated as a function of the number of days the container stores and the charges applied at the different levels.

Figure 2 Warehouse charge rates per container.



Given

The grace period is the number of days before container is charged, p at USD 0 per day
Threshold number of days before charge USD c_1 is applied, b_1
Threshold number of days before charge USD c_2 is applied, b_2
Threshold number of days before charge USD c_3 is applied, b_3
Threshold number of days before charge USD c_4 is applied, b_4

From the charts above (Figure 2) the charges at:

x1 days = 0
x2 days = $(x2 - b_1)\ c_1$
x3 days = $(b_2 - b_1 + 1)\ c_1 + (x3 - b_2)\ c_2$
x4 days = $(b_2 - b_1 + 1)\ c1 + (b_3 - b_2 + 1)\ c_2 + (x4 - b_3)\ c_3$
x5 days = $(b_2 - b_1 + 1)\ c1 + (b_3 - b_2 + 1)\ c_2 + (b_4 - b_3 + 1)\ c_3 + (x5 - b_4)\ c_4$

Table 1 provides the charges for Kenya Imports. For example, a 10-day delay resulting in warehousing for that period leads to the following calculations:

10 days at the warehouse for a container is equivalent to:
4 days at USD 0 + 3 days at USD 60 + 3 days at USD 70
Total Charges = 180 + 210 = USD 390

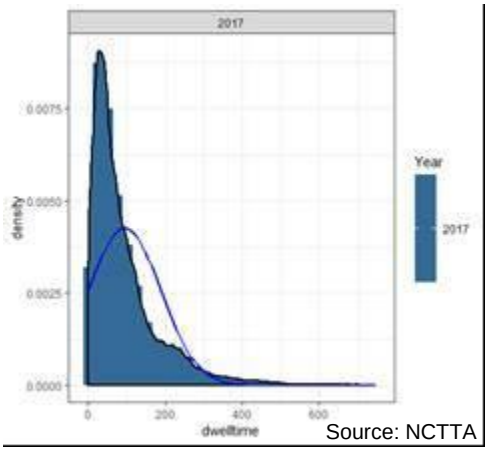
Table 1 Charge rates for Kenya imports

Imports into Kenya through Mombasa Port		
Day Range	**Number of Days**	**Charges US$**
1-4 days	4	**0**
5-7 days	3	**60**
8-15 days	8	**70**
16-24 days	9	**80**
24+ days	-	**90**

Business Uncertainty Savings (B_c)

We also calculated savings on uncertainty. The standard deviations provided by the corridor team were crucial for us to calculate the improvement in risks savings.

Figure 3 Normal and log-normal distributions at the Port of Mombasa



Source: NCTTA

The variance of port times at the Port of Mombasa around the mean was, however, quite high in some cases. It should be noted that the data obtained for standard deviations were normalized, but not log-normalised. The distribution of the values of times for different ships/containers does not follow the standard (symmetrical) normal distribution but instead has a long right-sided tail, as the frequency of occurrences falls but the extreme waiting times are severe. The distribution of the port dwell times in 2017 for Mombasa is a perfect illustration of this phenomenon. The truncated normal distribution is plotted in light blue as a line graph, while the log-normal distribution is plotted as a histogram in dark blue. The log-normal distribution has a longer tail, wider standard deviations (in terms of time) and a much higher mean. The only values the team could get from the Northern Corridor Observatory were the normalized values of the density function.[2] This has the effect of:

1) understating the time delays for each standard deviation by around half, and

2) overstates the median values. The mean values are the same under both functional forms.

As a result, the values of average are based on a mean calculation, and the standard deviation used in this study are based on a normal distribution, with the effect of underestimating the true variance of the sample, and thus underestimating the business and transporting companies' risks.

[2] No data was available for the Port of Dar Es Salaam.

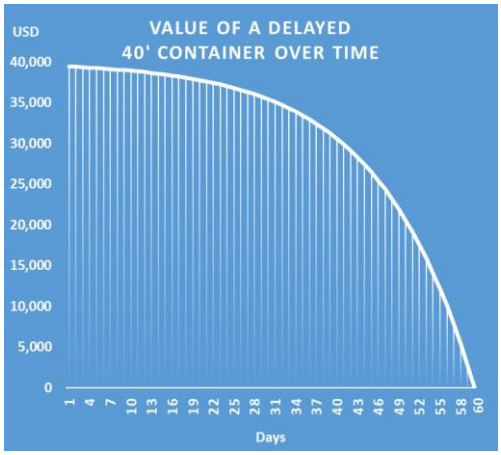
In terms of the value of uncertainty decrease for businesses, we assume that the value of a container decreases over time. Every day of unexpected delay creates a decreasing marginal return on the goods themselves, which after a period of 60 days is assumed to reach zero.[3] We also assume that to mitigate the risks of having depleted stock due to variances in stock arrivals the business caters for an extra inventory.

Uncertainty for Business

The value of uncertainty to businesses (*UB*) for 40' containers is a product of an exponentiation expression, the value of a container, and the share of the population affected by the uncertainty (n_s/N). The subscript *i* refers to the standard deviations (1 to 3); *V* refers to the value of a container; d to the delays in days; σ to the variance; t is days delayed up to T (60). The function of business risks is as follows:

$$UB = \prod_{i=1}^{3}\left(\frac{\delta^{(t_{s,c}-t_{j,c})}}{\delta^{T}} \cdot V_i \cdot d_i \cdot \sqrt{\sigma_i}\frac{n_i/2}{N}\right)$$

Figure 4 Value of container



The value of a container is assumed to decrease over time in value (Figure) for a business owing to a number of reasons. The first is that there are contractual penalties for being late, such that every day late after a certain grace period is expected to incur a cost. As the delay is a deviation from the average time it takes, there is a good reason to assume that fines will be imposed by buyers for contractual delays, until the contract gets canceled altogether once the delay is excessive. Another reason for the decreasing value of the container is that some of these goods are perishable (in the case of agri-produce) or time-sensitive (high-end fashion for example), or instrumental as inputs into an industry (intermediary inputs for example). Every day of unexpected delay creates a decreasing marginal return on the goods themselves, which after a period of 60 days is assumed to reach zero.

The value of the container has been estimated on the basis of past studies and re-insurance estimations of containers. While Arvis *et al* (2007) estimate the average value of a 40' container to be US$50,000, as does Arnold (2006), the values provided by re-insurance firms vary greatly, from US$10,840 to US$301,929.[4] We have used a conservative estimate of US$40,000, owing to the expectation that the container comes from Asia (for imports) and the value of exported products from East Africa-4 tends to be on the lower end of the value scale.

In our calculations, we include the population up to three Standard Deviations that is 99.7 %

The variation/standard deviation is looking at the indicators for the dwell time only.

[3] In most Marine Insurances, the insurance only covers a period of 60 days at the time that a good arrives to the warehouse. After that, the insurance expires. See: https://www.tradefinanceglobal.com/freight-forwarding/marine-insurance/

[4] Cowie, A. (2007). Cargo Accumulation. Presentation: Swiss Re: NY, Sept

Uncertainty - Extra Inventory (E_c)

Uncertainties cause businesses to be precautious. The risk of being out of stock and suffer loss pushes the latter towards maintaining an extra inventory. A study made CPCS “Analytical Comparative Transport Cost Study along the Northern Corridor” in 2010 claims from survey results the valuation of extra inventory to be 200K over one month and the capital opportunity cost to be valued at 25%.

We have reviewed this model and adapted it to one we consider more reliable.

- We agree to assume the valuation for the extra inventory to be 200K per month.
- Our valuation of inventory stock is 400K (60 days)
- We consider 10% to be a realistic capital opportunity cost figure.
- We have revised to two Standard Deviations of inventory to be kept instead of one month

Cost Savings per 40’Ft Container during trip, $C_{st} = C_{sd} * T_m$

Given,
Valuation of two months’ inventory value, V_i
Standard Deviation in container storage (2 SDs), Sd_2

Extra Inventory valuation, $E_i = Sd_2/60 * V_i$
Capital Opportunity cost is at 10%, $C_o = E_i / 10 * 100$
Extra Stock Opportunity cost per day, $S_o = C_o / 365$

If Cost Savings per 40’ Ft Container per day in 2010, S_{o2010}
and cost Savings per 40’ Ft Container per day in 2017, S_{o2017}

Cost Savings per 40’Ft Container per day, $C_{sd} = S_{o2017} - S_{o2010}$
Mean transit time, T_m

Corridor Cost and Savings

The corridor savings as mentioned was analyzed by looking at the time-variant reductions in costs along the transit corridors, OSBPs as well as importantly the reduction in uncertainties. (business, transporters and extra inventory).

Corridor Savings: = Time variable transport costs + Uncertainties for Impact to the business + Uncertainty Impact to Transporters + Uncertainty Extra Inventory Cost.

Table 1 Time variable transport costs per trip at the Northern and Central Corridors

Wages	Time Variable	Daily Rate (US$)
Drivers Wages	Yes	24
Truck Costs	**Time Variable attributable to TMEA**	**Daily Rate (US$)**
Allowance	-	-
Breakdown/ truck repair	No	0
Parking Fees	No	0
Offloading of container	No	0
Accommodation	Yes	5
Meals	Yes	3
Bribes/ Fines for traffic offences	No	0
Road user fees	No	0
Truck washing	No	0
Others		
Fuel	No	0
Truck Capital	Yes	128
Time preference value (for inventory)	Yes	50
TOTAL		**US$ 210**

Source: ODI (2017), Nathan (2011), Arvis (2007), and authors' calculations

There are some assumptions in our calculations: -

- Variable charges do not change over time.
- Fuel costs do vary due to diesel price and exchange rate fluctuations.
- One truck carries one container

Using the transport cost in Table 2 above:
Given Total Variable costs, T_v
Cost for accommodation, C_a
Meals, C_m
Truck Capital, T_c
Time preference value, T_p
Transit Time, T_s
Fuel Charges, F_C

Total truck time and cost savings, T_s per container in 2017 = Total variable costs in 2017 (Tv2017) - Total variable costs in 2010 (Tv2017)
$T_s = T_{v2017} - T_{v2010}$

Uncertainties for Impact to the Business

Using the same methodology as above (business uncertainty as ports) we calculate the uncertainty for the business. A recap is that the value of goods is assumed to decay over a period of 60 days, given by the function: -

The function of business risks is as follows:

$$UB = \prod_{i=1}^{3}\left(\frac{\delta^{(t_{s,c}-t_{j,c})}}{\delta^{T}} \cdot V_i \cdot d_i \cdot \sqrt{\sigma_i}\frac{n_i/2}{N}\right)$$

The value of uncertainty to businesses (*UB*) for 40' containers is a product of an exponentiation expression, the value of a container, and the share of the population affected by the uncertainty (n_s/N). The subscript *i* refers to the standard deviations (1 to 3); *V* refers to the value of a container; d to the delays in days; σ to the variance; t is days delayed up to T (60). The function of business risks is as follows:

The total business uncertainty savings per container in 2017 = Total business uncertainty savings in 2017 - Total business uncertainty savings in 2010

Uncertainty for transporters

The uncertainty for transporters is calculated by considering the standard deviations from the mean transit times along the corridor associated by the daily truck charges. The function is as follows: -

The function of transport risks is as follows:

$$UT = \prod_{i=1}^{3}\left(Ti \cdot d_i \cdot \sqrt{\sigma_i}\frac{n_i/2}{N}\right)$$

The value of uncertainty to transporters (*UT*) for 40' Ft containers is a product of an exponentiation expression, the time-variant value of daily truck charges, T_i and the share of the population affected by the uncertainty (n_s/N). The subscript *i* refers to the standard deviations (1 to 3); *T* refers to the daily truck charges; d to the delays in days; σ to the variance.

Extra Inventory Uncertainty

Uncertainty causing the need for Extra Inventory is also due to delays along the corridor. Using the same calculations as per Warehouse storage but replacing storage days by transit days along the corridor: -

Given
Valuation of 2 months' inventory value, V_i
Standard Deviation in transit times (2 SDs), Sd_2

Extra Inventory valuation, $E_i = Sd_2/60 * V_i$
Capital Opportunity cost is at 10%, $C_o = E_i / 10 * 100$
Extra Stock Opportunity cost per day, $S_o = C_o / 365$

If Cost Savings per 40' Ft Container per day in 2010, S_{o2010}
and cost Savings per 40' Ft Container per day in 2017, S_{o2017}

Cost Savings per 40'Ft Container per day, $C_{sd} = S_{o2017} - S_{o2010}$
Mean transit time, T_m

Cost Savings per 40'Ft Container during trip, $C_{st} = C_{sd} * T_m$

Annex D: CGE modelling

Annex D CGE modelling

CGE models are normally used for policy analysis, to show for example how a reduction in tariffs or other trade costs might be expected to affect trade, production and consumption, assuming other variables remain the same. The approach is forward looking, rather than trying to explain what has happened in the past. In this instance, we have observed transport costs reductions and we are using the model to explain what trade impacts could be expected from the cost reductions.

The mechanism is straight forward. A reduction in trade costs lowers the cost of imports, and consumers and producers needing intermediate inputs switch towards imports. Domestic producers may lose out as consumers switch to imported goods. In the other direction, domestic producers may be able to export more if the transport costs of exports are reduced. The magnitude of the effects is captured in the elasticities in the model.

The question remains as to the expected trade and growth effects and the distribution of the benefits. It is tempting to conclude that transporters and freight companies benefit the most, but in fact most of the benefits are passed on to consumers through lower prices. Some of the benefits are lost to foreign suppliers.

Generally, a reduction in trade costs should lead to increased trade and growth, but these effects can be negative if competitors enjoy a greater reduction in costs. Standing still is not good enough. The model estimates the expected effects from the observed reduction in costs.

The GTAP Computable General Equilibrium model

The standard GTAP model used in this evaluation to measure the impact of trade cost reductions in trade is a static, multiregional, multisector, computable general equilibrium (CGE) model that assumes perfect competition and constant returns to scale.[1] Bilateral trade is handled via the so-called Armington assumption that differentiates imports by source. Input-output tables reflect the links between sectors.

The underlying Armington assumption is an important feature of the model. It drives the change in imports. The underlying notion is that domestic and imported goods in the same sector, such as rice or wheat, are not perfect substitutes. Furthermore, imports from different countries are not perfect substitutes. A fall in transport costs will induce some consumers to switch from domestic to foreign goods, and subsequently between foreign goods from different sources. This is governed by two sets of (Armington) elasticities. The elasticities between domestic and foreign goods are generally rather low, whereas the elasticity between foreign sources is double the first. This implies, for example, that Kenyan consumers prefer Kenyan rice, but once they decide to switch to a foreign source, they are not so particular in choosing between Indian and ASEAN imports. The Armington elasticities in the GTAP model are sector specific but common across all regions. Their value makes an important difference to output and terms of trade effects.

The GTAP 2014 model version is used. The GTAP database has 141 countries representing 98% of world GDP and 92% of world population, and 65 sectors. The full model cannot be

[1] The GTAP model is documented in Hertel (1997). See Chapter 2 in particular for a description of the structure of the model.

solved with this number of countries, so both countries and sectors must be aggregated. Countries are aggregated into 28 regions and 30 sectors as shown in Table 1. The regional aggregation separates out EAC members Kenya, Tanzania, Rwanda and Uganda. Unfortunately, Burundi and South Sudan cannot be identified separately, and they are included as members of the remaining East African group.

Table 1 Regions used for the model in GTAP

EU_27	European Union 27
USA	USA
JPN	Japan
KOR	Korea
ODV	Other developed
CHINA	China & HK
IND	India
ASEAN	ASEAN
XAS	Other South Asia
LAM	Latin America
MENA	Middle East and North Africa
WA	West Africa
CA	Central Africa
ETH	Ethiopia
KEN	Kenya
TZA	Tanzania
RWA	Rwanda
UGA	Uganda
MDG	Madagascar
MOZ	Mozambique
MUS	Mauritius
MWI	Malawi
ZMB	Zambia
ZWE	Zimbabwe
EA	East Africa nec
SA	Southern Africa
CBP	Caribbean & Pacific
RoW	Rest of World

The sectoral aggregation separates out the goods to a large extent. Services tend to be bundled into three groups, although transport services are treated individually.

Table 2 Sector aggregates used for the model in GTAP

rce	Rice
wht	Wheat
vfn	Vegetables, fruit, nuts
sug	Sugar
pfb	Plant fibres
crps	Other crops
ff	Forestry & fishing
res	Resources
bv	Beef and veal
pp	Pork and poultry
dry	Dairy products
ofd	Food products nec
b_t	Beverages & tobacco
txt	Textiles
wap	Wearing apparel
lea	Leather
ele	Electronics
p_c	Petroleum, coal products
mvt	Motor vehicle & trans equip
wpp	Wood & paper products
crp	Chemical, rubber & plastics
ome	Machinery and equipment nec
nmm	Mineral products nec
man	Manufactures
otp	Transport nec
wtp	Sea transport
atp	Air transport
cmn	Transport and comm.
bsv	Business services
svc	Other services

The imperfect substitution feature of GTAP makes it well-suited for examining changes in tariff and non-tariff barriers. It is also possible to make a reasonable estimate as to their likely effects on industry prices and production, consumption and trade.

Additionally, GTAP is ideally suited for analysis of trade facilitation, involving reductions in bilateral trade costs that are likely to have international and inter-sectoral effects. This is because input-output tables capture the indirect inter-sectoral effects, while the bilateral trade flows capture the linkages between countries. A shock or policy change in any sector has effects throughout the whole economy. Transport cost reductions in one sector, such as agriculture, tends to have positive effects on downstream sectors (food) by reducing input costs. Similarly, changes in policies in sectors, such as maize, tend to have relatively important economy-wide effects because many workers provide inputs into production and many

consumers purchase the product. However, cost reductions in one market may have a negative effect on others because each sector competes with the others for factor inputs, capital, labour and land. CGE models attempt to capture these effects.

Box 1 Key Assumptions and Restrictions of the GTAP Model:

Trade is sourcing at the border. For each product, all domestic agents in an economy use the same mix of imports from different countries, though each agent chooses its own combination of imports with the domestic product. This greatly reduces the size of the database and simulation run time, but rules out more elaborate supply-chain analyses such as that of Koopman et al. (2014).

Absence of domestic margins, the transport, sales and other services incurred between point of production or importation and point of use.

There is no international trade in primary factors, this might be a concern in, for instance, modelling mode 4 of the General Agreement on Trade in Services (GATS) which relates to the movement of people across national borders.

There is no distinction between cross-border trade in goods and consumption abroad (travellers' expenditures), though import duties are liable to affect the two flows differently.

There are no re-exports; only domestic products are exported. Recognizing re-exports would, in principle, allow us better to represent re-export services, however difficult it might prove in practice to operationalize such improvements.

There is no inventory investment, a limitation requiring deviation from input-output statistics, but in accord with the natural limitations of our model theory. And correspondingly, working capital is not recognized as a factor of production. The external accounts cover only trade in products and net capital inflow.

There is no transfer payments or property income receipts in the government accounts. Accordingly, the database does not reflect any concept of a government budget deficit. The gaps in the government accounts situate the model within the trade-oriented (as opposed to the tax-oriented) stream of general equilibrium modelling. The theoretical structure cannot accommodate negative capital earnings or intermediate usage, though these are liable to occur in official input-output tables, though, for instance, loss-making activities or sales by final buyers.

Source: Corong et al (2017). The Standard GTAP Model, Version 7. Journal of Global Economic Analysis, Volume 2 (2017), No. 1, pp. 1-119.

Transport costs affect output prices, and are modelled as a lowering of the costs of production. A reduction in transport costs also affects the mix of domestic and imported inputs, with producers switching somewhat to imported inputs and consumers switch to imported final goods. Cheaper inputs make producers more competitive and they may be able to export more. Producers make zero profits, in the model at least, so cost changes are passed on to consumers.

In this application, we assume labour market adjustment occurs in employment, not wages. Real wages are fixed. This applies only to unskilled labour in developing countries. Skilled labour remains fixed with flexible wages. This is based on the intuition that the informal sector in developing countries is characterized by significant unemployment and underemployment. Because the demand for labour is indirectly derived from the demand for labour-intensive goods, trade facilitation tends to increase employment in developing countries and reduce it in developed countries. This is an important assumption. Changes in the amount of labour

employed have a far greater effect on output and welfare than merely reallocating labour in response to changes in relative prices.

We use a long run closure, which implies capital is mobile between countries as well as sectors.

Transport modes

The GTAP database contains three modes of transport, namely air, sea and land (road and rail). In this application, the authors are interested in examining improvement in transport across land borders, such as between Uganda and Rwanda at Mirama Hills and Kagatumba, and improvements at the ports at Mombasa and Dar es Salaam. Therefore, it is useful to separate out the different transport types and reduce them directly (see Box 32).[2]

Box 32 Transport margins

GTAP has transport margins on bilateral trade by sector. These transport margins are decomposed into air (atp), water (wtp) and other transport (otp). These margins can be shocked to simulate a reduction in transport costs. This reduces demand for transport services for any given level of bilateral exports. It also dampens the cost of shipping, thereby lowering the CIF price (covers insurance and freight) implied by a given FOB value (free on board). It is useful to be able to differentiate transport costs by mode, because countries use different shares of the different modes, depending on their proximity to the shipping routes.

Modelling transport costs reductions

There are several components contributing to transport costs. One is the actual transit times. The second comes from increased reliability which means businesses and consumers can reduce the costs of hold stocks. Transit times can be observed, and a value attached to the time saved. For example, Eberhard-Ruiz and Calabrese (2017) calculate that a day saved on the trip from Mombasa to Kampala is worth $128 per container. This is because the capital costs of vehicles can be spread over a greater number of trips. There is no saving in fuel, a major cost, and little savings in wages for drivers.

The second component involves making an allowance for inventory costs and storage. TMEA, in their Results Meter, have previously used a value of $490 a day, which includes an allowance for inventory costs and storage. When applied to time saved at ports, which may amount to days or weeks, the calculated costs savings can swamp the actual costs.

The first component, transit times, affects the cost of transport. The second affects the cost of doing business for the importer. Therefore, it is desirable to model these two components differently, the first as a cost reduction, and the second as a productivity enhancement.

Time saved is modelled as a reduction in bilateral land transport costs on trade between any two countries.

The reduction in risk leads to reductions in inventory costs. This is the gain from avoiding the uncertainty associated with variable delivery. These gains may exceed the actual transport costs. Therefore, they are modelled as a productivity shift that increases the value of the imports that arrive from a particular source. Normally, the value of exports is diminished by the freight costs. A productivity shift reduces these freight losses.[3]

[2] The relevant variable in GTAP is “atall”, which has four dimensions (transport mode, sector, exporter and importer).
[3] The GTAP variable “ams” is used to capture these benefits.

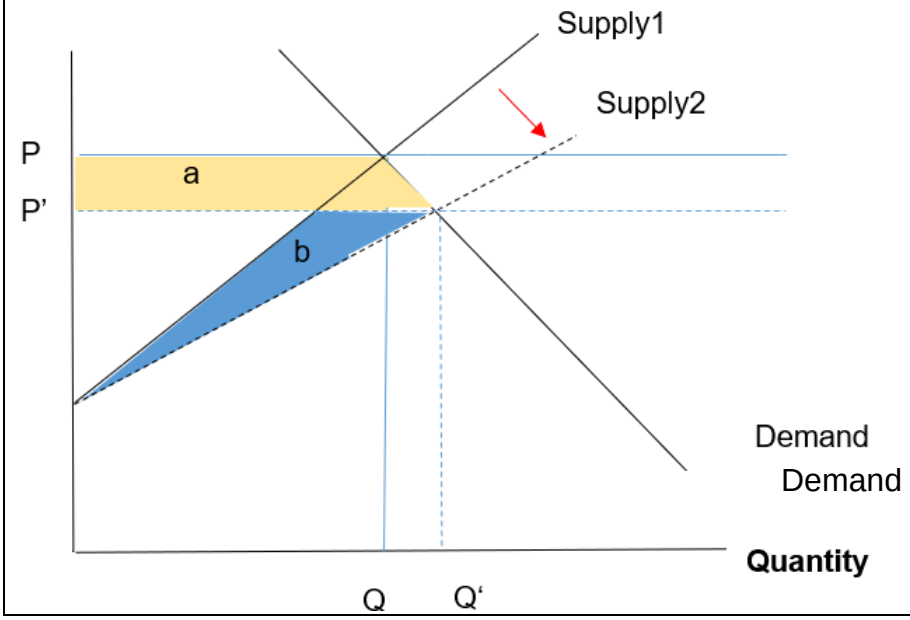
The reduction in transport costs depends on the observed transit times. A day saved is valued at $210 per container, and this reduction in applied to land transport costs. These reductions may be as high as 30 per cent. With transport costs as high as ten per cent of landed costs, even a large cut in transport costs is not going to make a large difference to landed cost. However, there may be a more sizeable switch in the source of imports. This depends on the trade elasticities in the model.

The reduction in uncertainty benefits producers and consumers in turn. These estimates are quite large compared with the time benefits. These cost savings are modelled as a productivity shift that is applied to the bilateral trade flow. This effectively increases the trade flow.[4]

Box 1 Effects of a reduction in transport costs

The effects of a reduction in transport costs on the distribution of benefits can be illustrated in a simple diagram. We expect that an exogenous reduction in costs shock would benefit producers and consumers, although the gains would not be equally shared. This is illustrated in figure 2, which shows the impact of a pivotal shift of the supply curve due to reduced costs. Prices fall from P to P', and the quantity consumed rises from Q to Q'. Consumers benefit by the area 'a'. Producers gain area 'b' but lose 'a'. The distribution of benefits depends on the slope of the demand curve. If it is almost flat, there is no change in prices and most of the benefits go to producers, who sell more at the same price but lower cost. If the demand curve is steep, consumers gain at the expense of producers. In fact, it is possible that a productivity shift may make produces worse off, if area 'a' is greater than area 'b'.

Where producers and consumers are in different countries, the effect of a reduction in transport costs on the benefits going to exporters and importers is an empirical question, depending on trade flows and relative elasticities.



[4] We use the GTAP variable "ams".

The scenarios

We report two scenarios to demonstrate the impact of each countries' trade costs on itself and the target country. The purpose of these simulations is to estimate the expected impact of observed reductions in trade costs trade (DEQ3.2) and growth (DEQ3.4). We estimate the trade and growth impacts and attribute a portion of these to TMEA activities.

Table 3 Scenarios

No	*Label*	*Description*
1	Ports	Reduction in port costs
2	Intraregional	Reduction in land transport costs.

Scenario 1 involves a reduction in transport cost in each direction along internal EAC routes, based on the observed reductions in transit cost between 2010 and 2017. These costs are broken down into time saved and reduction in risk to businesses and shippers.

The shocks for scenarios 1 and 2 are listed in the tables below. These are based on the estimated cost savings shown in **Error! Reference source not found.** and **Error! Reference source not found.**. Transport cost savings are expressed as an *ad valorem* equivalent (AVE) of the relative transport costs. For example, cost reductions through the port of Mombasa reduce transport costs by 2.73%. Most notable is Uganda, where internal land transport costs have reduced considerably (table 10). This reduction is much greater than Kenya, implying that the cost reductions have occurred between Nairobi and Kampala. Transport cost reduction also apply to exports.

The risk variable reflects the reduced uncertainty, most notable into Uganda (5 per cent). These are expressed as a percentage of the bilateral trade flows. The value of these reductions depends on the trade flows. On internal trade, there are no observed benefits on the export side, as exporters have a nine-day grace period in which to deliver their cargo to the ship.

Cost savings at the ports are of greater importance, because of greater trade flows and greater variation in delays. Kenya and Tanzania benefit greatly from cost reductions, whereas Uganda and to a lesser extent Rwanda benefit from more reliable deliveries. The gains are minimal on the export side.

Table 9 Port cost savings expressed as ad valorem equivalent

	Transport cost	Risk reduction	Transport cost	Risk reduction
	Imports	Imports	Exports	Exports
Kenya	2.73	0.73	0	0.03
Tanzania	8.47	1.33	4.44	0.22
Rwanda	0	0.09	0	0
Uganda	0	1.09	0.01	0.02

Source: Authors calculations. Note: “NAF” denotes Non-African countries.

Table 10 Intra-regional cost savings expressed as ad valorem equivalent

	Transport cost	Risk reduction	Transport cost	Risk reduction
	Imports	Imports	Exports	Exports
Kenya	1.09	0	0.30	0
Tanzania	0	0	0	0
Rwanda	6.57	0.27	1.39	0
Uganda	40.21	5.11	45.30	0

Source: Authors calculations, NAF denotes Non-African countries. These AVEs apply to land transport only, not sea transport.

The simulations show the estimated impact on trade, growth in national income and sectoral output assuming the transport cost changes have had time to work through, generally assumed to be three to five years. The estimates are in real 2014 dollars, the mid-year of the period 2011 to 2017 over which changes were observed.

It is important to stress that the although the cost reductions have accumulated over a number of years, 2010 to 2017, the resulting trade and welfare effects estimated by the model occur every year. They are annual. The size of these effects in each country depend on the size of each economy in the base period.

It would be possible to add up these benefits over a time horizon in which the economy grew each year. The annual benefits would increase over time in line with the growth in output and trade. This is not done here, but a similar analysis is undertaken in the breakeven analysis presented in the Value for Money Evaluation Report.

Finally, the underlying assumption in the CGE analysis is that only the transport costs have changed. In reality, many variables have changed over the implementation period, from external tariffs to demand shocks and political factors, such as elections, which may have had an impact on trade and growth. The CGE analysis does not attempt to account for these factors, but we try to capture their effects in the gravity modelling, which attempts to isolate the effects of some of these exogenous shocks.

Annex E: Gravity Model

Annex E Gravity Model

Introduction

A more widely applied technique in the empirical literature, particularly in estimating the impact of Aid for Trade (A4T) type interventions is the use of the gravity model. The model is particularly favoured because it enables an estimation of trade impacts of various trade-related policies. The gravity model has been widely applied for analysing impacts of changes in tariff and non-tariff barriers, regulatory policies, as well as in political and institutional characteristics of countries. The impact of development assistance as a trade facilitator has also been widely studied, where the general finding is that trade facilitation measures increase bilateral trade flows (Basnett et al., 2012). Enhanced customs efficiency, reduced transport times and costs, etc. greatly reduce trade costs for exporters and importers alike (WTO, 2013). Applying the gravity framework, Helble *et al.* (2012) estimated that A4T policy reform projects produce a high rate of return: for each US$1 of A4T for trade policy and regulatory reform yielded a US$1.3 additional trade. Positive results have been estimated by Cali and te Velde (2010), Hummels (2001), Djankov, and Freund and Phan (2010), amongst others

The gravity model has also been widely used in assessing the impact of transport, infrastructure, and logistics costs on trade flows. Logistics inefficiencies harm the competitiveness of firms by increasing trade costs both directly and indirectly since it requires additional costs like inventory holding, loss in reputation, etc. (Hausman, 2004). Limao and Venables (2001) was one of the earlier studies to use it for considering the effect of the quality of infrastructure on bilateral trade. The authors utilised an infrastructure index (i.e. a composite of transport and communications networks) constructed from the information on the road, rail, phone infrastructure and shipping costs obtained from freight forwarders in determining its implications for bilateral trade flows. Their estimation shows that an increase in trade costs (arising from weak infrastructure) by 10% reduces trade volume by more than 20%.

Nordas and Piermartini (2004) considered similar indicators such as airports, roads, telephone lines, port efficiency and the median port clearance time in measuring their impact on trade. They observed a significant relationship between trade and these explanatory components, amongst which, the port efficiency is found to have the highest impact. A similar conclusion was drawn by Clarke, Dollar and Micco (2004) as they confirmed port facility as a major determinant of trade facilitation. Their estimation shows that a fall in the quality of port facilities and general infrastructures from the 25th to 75th percentile increases ocean freight costs by around 12%. Chang, Kaltani and Loayza (2009) proxied infrastructure quality by the number of land telephone lines per capita and showed it to be a significant determinant on the impact of trade reforms on economic growth. Portugal-Perez and Wilson (2012) analysed the impact of “hard” and “soft” infrastructure on the export performance of developing countries. Their estimates showed that trade facilitation reforms do improve export performance with investment in physical infrastructure and regulatory reforms particularly improving the business environment. They also uncovered a complementarity between hard infrastructure and soft infrastructure. Deen-Swarray, Adekunle, and Odularu (2011) conducted an empirical analysis using the gravity model to estimate the impact of infrastructure on trade within Economic Community of West

African States (ECOWAS) and a positive relationship between infrastructure development and bilateral trade.

Some studies reported that the differences in logistics performance are influenced only in part by poor 'hard' infrastructures such as road, rail, waterways, port services, etc. (Subramanian and Arnold, 2001). In contrast, others lay the blame on poor 'soft' infrastructure caused by institutional constraints such as procedural red tape, inadequate enforcement of contracts, delays in customs, delays at ports and border crossing, etc., as observed by Hausman, Lee and Subramanian (2005). The latter authors examined the effects of logistics costs (such as average time for all trade-related procedures, the average time for document processing, total numbers of documents required, etc.) and time on bilateral trade patterns. They found that a 1% reduction in the total trade-related logistics costs increases the bilateral trade by more than 0.25%.

Korinek and Sourdin (2011) investigated the role of trade logistics over the volume and value of international trade. They found that holding all other factors constant, a 10% increase in the overall LPI of an exporter raises the exports from exporting country to the importing country by 69%. Applying more disaggregated data, Saslavsky and Shephard (2012) analysed the impact of overall LPI on trade in parts and components. They find that the networked trade in parts and component is more sensitive to the importing country's logistics performance than trade in final goods.

Model Adopted

Currently, the gravity model is considered the most successful model to explain bilateral trade at the aggregate level because it captures two important regularities in trade data: (i) the elasticity of imports and exports to GDP is close to unity; (ii) bilateral trade in inversely related to distance between the partners. Anderson and van Wincoop (2003) provided a gravity equation that mainstream trade theories. Dropping time subscripts for now, bilateral trade between i X_{ij} , is given by:

$$X_{ij} = \frac{Y_i Y_j}{Y}\left(\frac{t_{ij}}{\pi_i P_j}\right)^{1-\sigma} \quad (1)$$

Where (country 'i' is exporter and 'j' is importer)

$$X_{ij} = export\ from\ country\ i\ to\ j$$

$$Y_i = GDP\ of\ country\ i$$

$$Y_j = Country\ j's\ GDP$$

$P_j =$ inward multilateral resistance (MRT) indicating the importer's ease of market access

$\pi_i =$ the outward multilateral resistance showing the exporter's ease of market access.

$$t_{ij} = all\ sources\ of\ bilateral\ total\ trade\ cost\ between\ i\ and\ j$$

Given the multiplicative nature of the structural gravity equation, and assuming that it holds in each period of time t, log-linearization of (1) gives rise to the "structural" gravity equation below (2) with an additive error term:

$$\ln X_{ij,t} = \ln Y_{j,t} + \ln Y_{i,t} - \ln Y_t + (1 - \sigma) \ln t_{ij,t} + (1 - \sigma) \ln P_{j,t} + (1 - \sigma) \ln \pi_{i,t} + \mu_{ij,t} \quad (2)$$

A major challenge for empirically estimating this theoretically consistent gravity model is to take account of the existence of multilateral trade resistances (MRT) which is not observed. The MRT represents the barriers each country faces with all its trading partners, going beyond any particular trade partner. That is, country j has additional trading partners beyond country i (and vice versa). If country j is located near other large economies, fewer of its imports will be sourced by i.

Under an ideal scenario, one should use importing and exporting country-year fixed effects for tackling this problem in conjunction with time-invariant fixed effects (Yotov et al., 2016). However, this approach, which is fully consistent with the existing trade theory, does not allow estimating the impacts of time-varying country-specific explanatory variables (Shephard, 2013). These are of interest in many cases, including here. This is because the country-year fixed effects preclude the direct estimation of the partial effects of country-specific, time varying explanatory variables such as the quality of trade-related infrastructures, logistics performance, any indicator of the policy and regulation regime, etc. Likewise, including time-invariant fixed effects precludes including distance, an often-used proxy for transport costs.

So, a compromise is to not control as fully for omitted variable bias. This is the approach used here. Then, proxying the MRT by a remoteness index (Shephard, 2013) is a possible solution. This remoteness index can be constructed following Head (2003) and Head and Mayer (2000). Considering 'i' as exporter, and 'j' as importer, the remoteness index constructed for this study is:

$$Rem_i = \sum_i \frac{dist_{ij}}{GDP_j / GDP_w}$$

$$Rem_j = \sum_i \frac{dist_{ij}}{GDP_i / GDP_w}$$

That is, the index is measured as a country's weighted distance from its trading partners, where weights are the partner countries' shares of world GDP.[1]

Including the constructed remoteness index (Rem), therefore, the following modified gravity model is estimated:

$$\ln X_{ij,t} = \beta_0 + \gamma T + \beta_1 \ln GDP_{i,t} + \beta_2 \ln GDP_{j,t} + \beta_6 TF_{i,t} + \beta_7 TF_{j,t} + \beta_8 \ln Rem_{i,t} + \beta_9 \ln Rem_{j,t} + \mu_{ij,t}$$

[1] One could also follow Baier and Bergstand (2009) in constructing the MRT proxy variable. They suggested using a linear approximation (by applying a first order Taylor series expansion) of the MRT, where trade costs are proxied with distance and borders. For an application, see Carrère, C. Melo, J de,& Wilson, J. (2013) The Distance Puzzle And Low-Income Countries: An Update, Journal of Economic Surveys, Wiley Blackwell, vol. 27(4), pages 717-742. For a critique of the REM index, see Head, K. and Mayer, T. (2014), 'Gravity Equations: Workhorse, Toolkit, and Cookbook.', in Gopinath, G., Helpman, E., and Rogoff, K. (eds) , Handbook of International Economics, Vol. 4, Oxford: Elsevier B. V.

where, T represents a vector of time-invariant conventional trade cost variables. These include distance between countries, if the bilateral trade partners have a common language, if the trade partners share a common border, if the partners have common colonial linkages, etc.

And, $TF_{i,t} = Trade\ facilitation\ indicator\ of\ country\ i\ in\ year\ t$, such as the logistics performance index (LPI) and other cost of doing business indicators.

In an earlier paper, Hausman, Lee and Subramanian (2005) focused on logistics friction and used a data set compiled by the World Bank (WB) with specific quantitative metrics of logistics performance in terms of time, cost, and variability in time. Their results showed that the new variables that relate directly to logistics performance have a statistically significant relationship with the level of bilateral trade. They also found that a single logistics index can capture virtually all the explanatory power of multiple logistics indicators. The authors recommended that since the logistics metrics are directly related to operational performance, countries can use these metrics to target actions to improve logistics and monitor their progress.

Another much-discussed challenge in gravity model is the issue of handling zero trade flows each year between two given countries. The problems primarily arise from the fact that the conventional approach in gravity model estimation is to use a log-linear specification. The zero trade flows (alternatively, missing trade values) will be dropped out of the estimation since the log of zero is undefined.

For tackling this issue, several approaches have been sought in the empirical literature. One possibility is to employ a tobit estimator with censoring the data at zero. However, such a practice has been criticised as an inappropriate model to explain the phenomenon of “missing trade” (Linders and de Groot, 2006).

An alternative approach to deal with the zero trade flows is to apply the Pseudo-Poisson Maximum Likelihood (PPML) estimator. The PPML has a number of desirable properties such as, (i) even in the presence of heteroscedasticity in the data, it provides a robust estimate (Santos Silva and Tenreyro, 2006); (ii) it can estimate the model while using data on zero trade flows; and (iii) the PPML estimator comprises an additive property which secures the gravity fixed effects to be analogous to the corresponding structural terms (Arvis and Shepherd, 2013). The use of PPML has become widespread and it is arguably the most appropriate approach to estimate structural (in the sense of being compatible with several accepted trade theory models) gravity models (Head and Mayer (2015) and Yotov et. al, 2016).

In addition to the zero-trade problem, it is possible that the probability of having positive trade between two countries is correlated with unobserved characteristics of that country pair. Then the PPML estimation strategy, is not appropriate (Westerlund and Wilhemsson, 2011). Moreover, the PPML also has limitations in the presence of unobserved heterogeneity. Comparing different estimation strategies Gomez-Herrera (2013) conclude that the best method for estimating the gravity model of bilateral trade is the Heckman two-stage method.

The application of the Heckman model in the gravity literature is based on a theoretical model constructed by Helpman, Melitz, and Rubinstein (HMR hereafter, 2008). HMR suggested for modelling the gravity equation in two steps following the original Heckman (1976) procedure, which is a statistical technique to correct bias from non-randomly selected samples or otherwise

incidentally truncated dependent variables, a pervasive phenomenon in quantitative social sciences when using observational data. Conceptually, this is achieved by explicitly modelling the selection process (i.e., the probability that an observation is included in the selected sample) together with the outcome equation (i.e., the expected value of the dependent variable {\displaystyle y_{i}}conditional on having been included in the selected sample). Following this, HMR suggested estimating a probit equation in the first stage for estimating the probability of the country's entry into an export market. The inverse Mills ratio obtained in the first stage is used in the second stage to correct for sample selection bias resulting from zero trade flows. Despite its advantages from a theoretical standpoint, it is difficult to find variables that satisfy the exclusion restriction (i.e. variables that are correlated with the probability of positive bilateral exports but that are not correlated with the volume of bilateral exports). Also, the Heckman estimates can be biased and inconsistent in the presence of heteroscedasticity (Cipolina and Salvatici, 2012). Controlling for heteroscedasticity is however a standard practice in empirical estimation.

Having recognised the pros and cons of the available estimation strategies, for this exercise we considered applying three estimation techniques: (i) a pooled OLS model, which is still commonly employed in the empirical gravity literature to obtain some quick results, (ii) a Heckman two-step estimation procedure, and (iii) a PPML estimation technique. The remoteness index has been incorporated in all the specifications for controlling the MRT.

Data

Since the objective of the present exercise is to assess the impact of TMEA interventions during 2010-17, the gravity model employed here corresponds to a period of 2007-2018 covering 199 countries for which most of the required are available. The data come from a wide range of sources. For the present exercise, the data on bilateral trade (both exports and imports) was taken from the IMF's Direction of Trade Statistics (DOTS) database (for the period of 1995-2018). Data on the distance between bilateral country pairs, if the countries have a common border, if the bilateral partners have a common language, if the partners had a common coloniser, as well as if county is landlocked or not have been taken from one of the most popularly used sources, the CEPII database. The data on GDP (in current US$) are collected from the WB World Development Indicators database.

Since the estimation of the gravity model requires globally comparable measures of TMEA-type trade facilitation interventions, for assessing the overall impact of these measures some key variables from the Trading across Borders are used: the time-to-export (days), time-to-import (days), cost-to-export (US$, deflated), cost to import (US$, deflated). It does not include tariff data. The data on the cost-to-export/import and time-to-export/import are taken from the World Bank Doing Business database. Table 1 provides a brief summary of the major variables of interest, and Table 2 provides the actual data of those variables

Table 1 Brief summary of the variables of interest

Variable	Brief description
Time to export / import	The time to export/import is recorded in calendar days. The time calculation is observed for four stages, namely: (i) the document preparation, (ii) inland transportation, and handling, (iii) customs clearance and inspection, and (iv) port and terminal handling. The time calculation for each of these stages starts immediately after the stage is initiated and continues until it is completed. It also includes waiting time that occurs in practice such as during the shifting of the cargo at the seaport.
Cost to export / import	Cost to export/import is measured as the fees levied on a 20-foot container in US$. All fees, including those charged by government agencies, and the private sectors to a trader during the process of exporting and importing of the goods – are considered. It includes costs for documents, administrative fees for customs clearance and inspections, port-related charges, inland transport charges, etc.

Table 2 Brief summary of the variables of interest

Economy	Year	Cost to export (US$ per container)	Cost to import (US$ per container)	Time to export (days)	Time to import (days)
Kenya	2015	2255	2350	26	26
	2014	2377.3	2477.4	26	26
	2012	2675.8	2851.6	26	24
	2010	2981.1	3176.9	27	25
	2007	3655	3729.8	29	37
Rwanda	2015	3245	4990	26	27
	2014	2270.4	3491.3	26	30
	2012	2608.2	3974	29	31
	2010	2914.5	4440.7	38	35
	2007	4708.3	4904.4	60	95
Tanzania	2015	1090	1615	18	26
	2014	1211.2	1794.6	18	31
	2012	1697.3	1934	18	24
	2010	1959.8	2290.5	24	31
	2007	2377.6	2795.5	24	30
Uganda	2015	2800	3375	28	31
	2014	2954.3	3561	30	33
	2012	3930.7	4114.9	33	31
	2010	5464.3	5806.9	33	31
	2007	2102.5	5897.1	38	64

Source: World Bank Doing Business database.

In 2015, the WB changed the methodology used to compile the Trading Across Borders Indicators. Since the methodology changed, some of the variables (such as the cost of exports) could not be compared between pre-2015 and post-2015. Under the ideal scenario, a combined

score could have been prepared from these two variables applying appropriate scale factors. However, one practical challenge is to identify such an ‘appropriate’ adjustment scale.

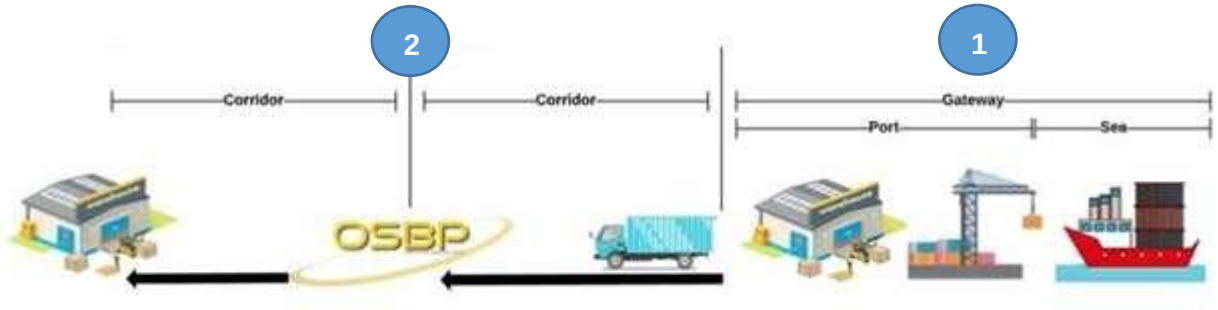
Noting the challenge, the team estimated the gravity model for the doing business variables for the years of 2007, 2010, 2012, 2014, and 2015. As a matter of fact, since the gravity dataset already contains large data points (until 2015), the addition of another round of the year (such as 2017) would not have made much difference in the final estimation result (even if there was a continued doing business dataset).

Annex F: Transport Model Results

Annex F The Results from the Transport Model

This annex analyses the impact of TMEA's interventions has had: (1) at the Ports – Mombasa & Dar ES Salaam, and, (2) across the Northern and Central Corridors.

Figure 1 Analysis Areas



Port Interventions

TMEA's investments at the Ports Mombasa and Dar ES Salaam have been significant, having invested over GBP 23 million in Mombasa and over GBP 3.5 million in Dar ES Salaam. Such investments have mainly been focused in infrastructural improvements, aiming to improve the capacity and efficiency of the port, improve handling capacity, asset utilisation and productivity of ship, truck and rail handling, etc. The Port of Dar ES Salaam is expected to receive addition GBP 43 million in infrastructural investment during TMEA's Strategy 2 (S2).

Port Traffic

Port traffic for both ports has been increasing from 2010 to 2017. Mombasa Port had a throughput of 695,600 TEUs in 2010 increasing by 71% to 1,189,957 in 2017, while Dar ES Salaam had a throughput of 359,010 increasing by 86% to 668,135 TEUs in 2017.

Port Savings Calculations

We had, as an objective, to measure the reduction in transport times, costs, and risks. Hence our approach was to calculate the total port savings as the sum of costs reductions for the activities and charges across the port, times savings in the transport of goods(inventory) and reductions in uncertainties for the business in terms of goods value and extra inventory.

> Total Port Savings = Reductions in Costs + Time Savings for inventory + Reductions in Business uncertainties.

Port Data Availability

Data availability was key for our calculations. Regarding the costs reduction calculations, The KPA and TPA tariff books provided with good guidelines. Since we were mostly looking at reductions our focus was mostly at time variant indicators.

Table 1 Port tariff variant variables identified: KPA tariff book

Clause No	Clause Description	Kenya Clause Details
6	Dockage and Buyoage	Anchorage, Dockage dues shall be charged on all vessels, including barges and bunkering vessels whether berthed or double banked per metre per hour
2	Tug Services	Tugs ordered and present at the time of service but not used by the vessel within 30 minutes through no fault of the Authority
3	Mooring and unmooring services	Mooring Gang ordered and present at the time of service, but not used by the vessel within 30 minutes through no fault of the Authority
7	Supply of fresh water to vessels	In stream supply ordered and present at the time of service, but not used by the vessel within 30 minutes, through no fault of the Authority, shall be charged US$100.00 per each 30 minutes detained thereafter
8	Laid up ships	Vessels laid up shall be charged per week of seven (7) calendar days
13	Storage charges	Containers remaining in the Authority's premises in excess or free periods shall accrue storage charges
18	Hire of staff and labour	Charges for hire of staff and equipment not covered elsewhere in this tariff shall be applied

Table 2 Port tariff variant variables identified: TPA tariff book

Clause No	Clause Description	Tanzania Clause Details
2	Port Dues	Port Dues shall be paid by all vessels entering port.
4	Dockage and Buoyage	Ships mooring alongside or double banked at quays, wharves and jetties or moored to buoys.
11	Hire of Staff and Labour	Charges for hire of staff and equipment not covered elsewhere in this
12	HIRE OF EQUIPMENT	Charges for hire of staff and equipment not covered elsewhere in this tariff shall be applied
20	Hire of row boats, boats, porterages and bumboatmen’s licences.	Hire of row boats, boats, porterages and bumboatmen’s licences.
35	Storage Charges	Containers remaining in the Authority's premises in excess or free periods shall accrue storage charges

One of the main challenges was to get the appropriate data for the period range we were monitoring; that is between 2010 and 2017. We relied mostly on the Northern and Central Transport Observatories for the as well as other reliable data sources. Important for us was also to have the standard deviations that would allow us to calculate for the risk and uncertainty part.

Table 3 Observatory data provided by NCTO: Mombasa Port

Ship Waiting to Berth		
Time ship is waiting in the sea before docking to the quay		
Year	Year-Month Mean	Standard Deviation
2010	12	
2017	22.85	

Ship Turn Around Time		
Time ship spends between entering and leaving the port.		
Year	Year-Month Mean	Standard Deviation
2010	96	
2017	83.72	

Cargo Dwell Time in Port		
Time container spends in the port. Exit time minus arrival time		
Year	Year-Month Mean	Standard Deviation
2010	117.58	125.61
2017	94.25	93.05

Table 4 Observatory data provided by CCTO: Dar Es Salaam Port

Ship Turn Around Time (DAYS)		
Time ship is waiting in the sea before docking to the quay		
Year	Year-Month Mean	Standard Deviation
2010	8	2.77
2017	2.73	0.3

TICTS AVERAGE LOCAL CONTAINER DWT (DAYS)		
Time container stays in freight station for local destination		
Year	Year-Month Mean	Standard Deviation
2010	12.25	1.46
2017	5.41	2.82

TICTS AVERAGE TRANSIT CONTAINER DWT (DAYS)		
Time container stays in freight station for transit destination		
Year	Year-Month Mean	Standard Deviation
2010	16.30	3.32
2017	13.86	1.64

Taking into account the data limitations we mapped the data available to the time variant clauses extracted from the tariff book.

Table 5 Port of Mombasa: Time Variable elements mapping to data sources

	Time variant variables			Data Source			
	Source	**Clause Header**	**Port**	**Warehouse**	**Quay**	**Sea**	**Metrics**
Dar ES Salaam Port	TPA Tariff Book	2. PORT DUES	Port Dues				CCTO: Ship turnaround time
	TPA Tariff Book	4. DOCKAGE AND BUOYAGE			Dockage		CCTO: Ship turnaround time
	TPA Tariff Book	35. STORAGE SERVICES		Storage Charges			CCTO: Container Dwell Time
Mombasa Port	KPA Tariff Book	6.DOCKAGE,BUOYAGE AND ANCHORAGE				Buoyage	NCTO: Ship waiting to Berth
	KPA Tariff Book	6. DOCKAGE,BUOYAGE AND ANCHORAGE			Dockage		NCTO: Ship turnaround time
	KPA Tariff Book	16. STORAGE CHARGES AND PENALTIES		Storage Charges			NCTO: Dwell Time

Assumptions

As mentioned, our calculations for port savings have been limited due to the data provided by the Northern and Central Corridor Observatories. Below are our main assumptions:

Containers

We used an average ship of 190m length for our calculations

1 Ship of 190m carries 58 000 tons.

1 TEU = 1 20 Ft Containers. 1 20Ft Container = 24 000 Kg/24 Tons

The container type used for the estimations is a 40' Container.

1 full 40' container = 2 20 Ft Containers = 48 000 Kg/48 Tons

Number of 40' Containers in a 190m Ship = 1208

The value of a loaded container is assumed to be US$40,000.

1 GRT = 2.83 cubic meters. 1 Ship carries 91808 cubic meters

1 Ship is equivalent to 32441 GRTs

91% of shipments at the port of Mombasa are imports (KPA).

Imports/Exports

There is no indication of trade flow directions from the data provided. Hence we have assumed time for imports and exports to be the same. We have proportioned the traffic volumes.

Port Data for Mombasa

The table below shows the time variable data available from the Northern corridor.

Table 6 Port of Mombasa: Time Variable elements

Concept	2010 Mean (Hours)	2017 Mean (Hours)	% Change	% Attributable to TMEA	2010 Std Dev (Hours)	2017 Std Dev (Hours)	% Change	% Change Attributable to TMEA
Ship waiting to berth	12	22.85	**+90%**	**+8.9%**	-	-	**-**	**-**
Ship turnaround time (Time between entering and leaving the port)	96	83.72	**-13%**	**-1.3%**	-	-	**-**	**-**
Cargo dwell time in port (Exit date/time from the port minus arrival date/time at the port)	117.58	94.25	**-20%**	**-2.0%**	4.90	3.93	**-20%**	**-2.0%**

Source: CCTO and African development bank (for the 2010 Ship turnaround time). TMEA % of total investment = 9.9%

Port Data for Dar ES Salaam

The table below shows the time variable data available from the Northern corridor.

Table 7 Port of Dar Es Salaam: Time Variable elements

Concept	2010 Mean (Hours)	2017 Mean (Hours)	% Change	% Attributable to TMEA	2010 Std Dev (Hours)	2017 Std Dev (Hours)	% Change	% Attributable to TMEA
Ship Turn Around Time (Time between entering and leaving the port)	192	58.3	**-66%**	**-1.2%**	66.4	7.2	**-89%**	**-1.6%**
Cargo Dwell Time in Port – Tanzania Imports (Exit date/time from the port minus arrival date/time at the port)	294	129.8	**-55%**	**-0.7%**	35.0	67.7	**+93%**	**+1.7%**
Cargo Dwell Time in Port – Transit (Exit date/time from the port minus arrival date/time at the port)	391.2	332.6	**-15%**	**-0.2%**	79.7	39.4	**-51%**	**-0.9%**

Source: CCTO. TMEA % of total investment = 1.8%

The Port Cost Savings

When looking at the transport costs, we compared the cost of the new flow of trade using 2010 times against those of 2017, and calculated the difference as the savings made through the improvements made at the port. Particularly, the container traffic increased quite significantly between 2010 and 2017 for both Mombasa and Dar ES Salaam ports.

In terms of the tariffs applied by the Kenyan Port Authority (KPA) and the Tanzania Ports Authority (TPA), we assume these remained unchanged over the analysed period. However, there are slight differences in the application of the tariffs for the two ports. These are explained below.

Table 8 Tariffs applied by Kenya's Port Authority

	KPA Tariff	Unit Cost - Per meter / Per hour	Average Ship Size / 1 day	Total Cost per Ship/ day
Stage 1 - At Sea				
Vessels at buoys, or RORO vessels berthed stern to quay RORO	Clause 6	USD 0.13	190m / 24h	**USD 592.8**
Stage 2 – Arrival				
Vessels at quays, wharves or jetties	Clause 6	USD 0.26	190m / 24h	**USD 1,185.6**

Source: Data from KPA. Note: It should be noted that Kenya's Port Authority applies significantly higher costs on containers destined for the domestic import market than on containers originating from the domestic markets but destined for export.

Table 9 Tariffs applied by Tanzania Port Authority

	TPA Tariff	Unit Cost - Per 100 GRT	Average Ship Size / day	Total Cost per Ship
Stage 1 – Port Dues				
Port Dues	Clause 2	USD 10	32441 GRT / First 5 days	**USD 3,244**
		USD 6	32441 GRT / Subsequent 5 days	**USD 5,191**
Stage 2 – Arrival				
Vessels at quays, wharves or jetties	Clause 4	USD 0.35/GRT for first 100 GRT / 018/GRT thereafter	32441 GRT / day	**USD 1,809**

Source: Data from TPA. Note: It should be noted that due to data unavailability on the ship waiting for berths Vessels at Buoy charges were not included in our cost saving calculations.

The reduction in waiting times have led to discernible improvements. The reduction in times provides an opportunity for a fall in the anchoring, wharfage, stevedoring, shore handling, and all associated warehousing charges. The costs move in incremental steps rather than continuous decreasing functions of time. The reason for this is that the tariff applied by the port authority provides for an initial grace period, followed by a fixed cost per container per day for a number of days, followed by a further higher cost for another number of days, and so on until the costs are quite high for anything above 30 days.

Also, it should be noted that transit containers destined to Uganda and Rwanda face much more generous grace periods (nine days in Mombasa and 15 days in Dar ES Salaam), and also face less arbitrary charges on the export side than on the import side. The time changes ended up not impacting transit trade in any significant way because the grace periods were, on average, not exceeded

The figures and tables below show the charges for warehousing applied by ports on a single 40” container, and the improvements in average storage times, from 2010 to 2017.

Table 10 & Figure 2 Costs of warehousing at the Ports : Mombasa (Kenya Imports)

Imports into Kenya through Mombasa Port		
Day Range	**Number of Days**	**Charges**
1-4 days	4	**USD 0**
5-7 days	3	**USD 60**
8-15 days	8	**USD 70**
16-24 days	9	**USD 80**
24+ days	-	**USD 90**

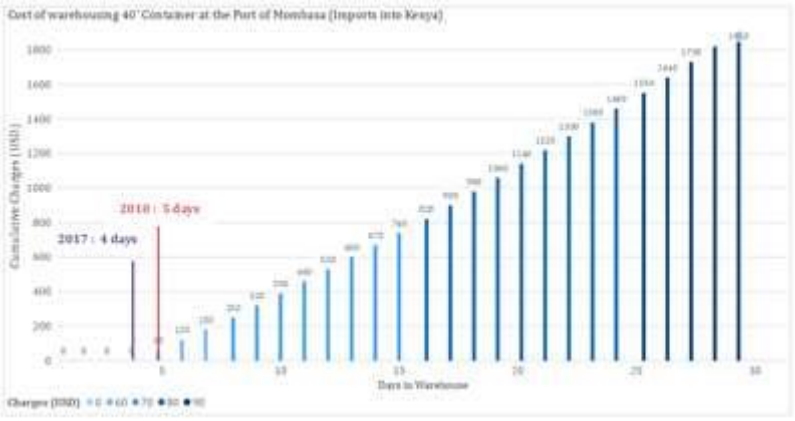


Table 11 & Figure 3 Costs of warehousing at the Ports : Mombasa(Kenya Exports)

Exports from Kenya through Mombasa Port		
Day Range	**Number of Days**	**Charges**
1-9 days	9	**USD 0**
9+ days	-	**USD 90**

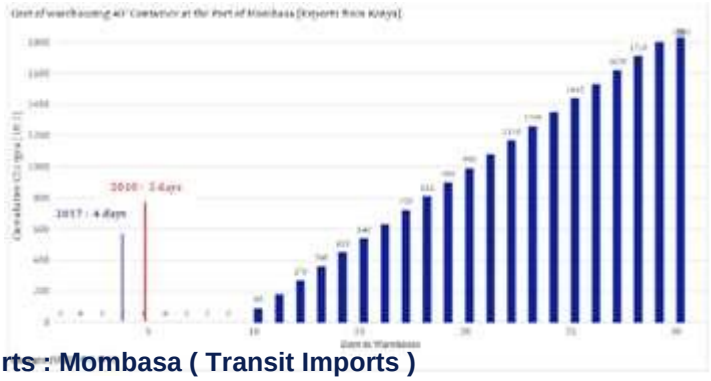


Table 12 & Figure 4 Costs of warehousing at the Ports : Mombasa (Transit Imports)

Imports into Rwanda/Uganda through Mombasa Port		
Day Range	**Number of Days**	**Charges**
1-9 days	9	**USD 0**
10-11 days	2	**USD 60**
12-18 days	7	**USD 70**
19-24 days	6	**USD 80**
25+ days	-	**USD 90**

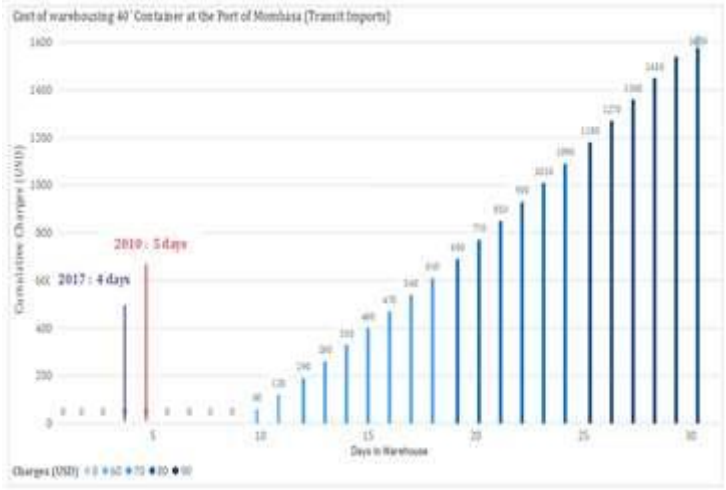


Table 13 & Figure 5 Costs of warehousing at the Ports : Mombasa (Transit Exports)

Exports from Rwanda/Uganda through Mombasa Port		
Day Range	**Number of Days**	**Charges**
1-15 days	15	**USD 0**
15+ days	-	**USD 24**

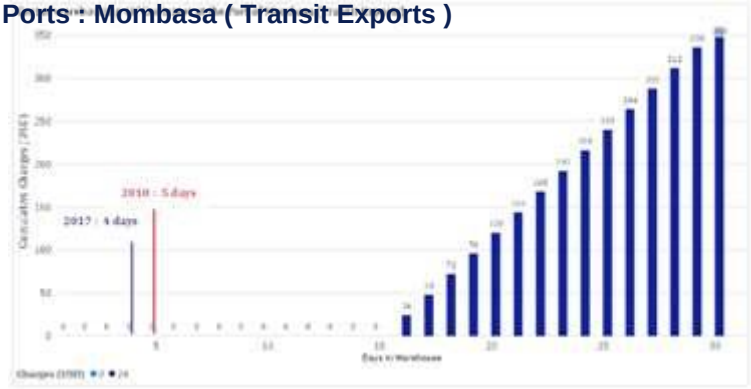


Table 14 & Figure 6 Costs of warehousing at the Ports : Dar ES Salaam (Tanzania Imports)

Imports into Tanzania through Dar ES Salaam Port		
Day Range	**Number of Days**	**Charges**
1-7 days	7	**USD 0**
8-21 days	14	**USD 40**
Above 21 days	-	**USD 80**

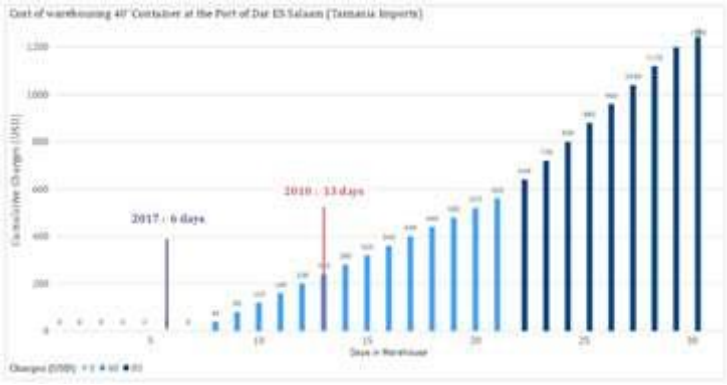


Table 15 & Figure 7 Costs of warehousing at the Ports : Dar ES Salaam (Tanzania Exports)

Exports from Tanzania through Dar ES Salaam Port		
Day Range	**Number of Days**	**Charges**
1-7 days	7	**USD 0**
Above 7 days	-	**USD 32**

Table 16 & Figure 8 Costs of warehousing at the Ports : Dar ES Salaam (Transit Imports)

Imports into Rwanda/Uganda through Dar ES Salaam Port		
Day Range	**Number of Days**	**Charges**
1-15 days	15	**USD 0**
16-21 days	6	**USD 40**
Above 21 days	-	**USD 80**

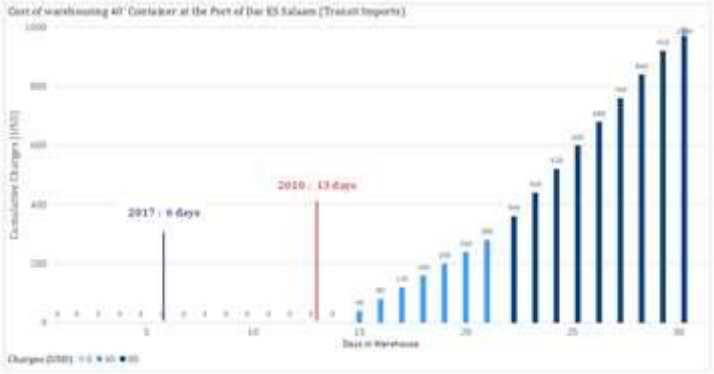
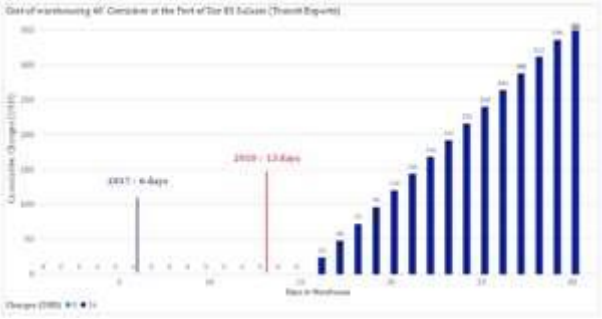


Table 17 & Figure 9 Costs of warehousing at the Ports : Dar ES Salaam (Transit Exports)

Exports from Rwanda/Uganda through Dar ES Salaam Port		
Day Range	**Number of Days**	**Charges**
1-21 days	21	**USD 0**
Above 21 days	-	**USD 32**



The Port Cost Savings Calculation per 40 Ft Container

Taking into consideration the above data, the team calculated the time variable costs linked to the port.

Mombasa Port: Kenya Imports

Particularly important to note is the elimination of “Charges for Shorehandling, Wharfage & Storage Services”, as these are no longer necessary thanks to the time reductions (below four days is free) achieved from TMEA, leading to a 96% reduction in the cost per ship and per container of which 9.5% is attributable to TMEA.

Table 18 Time variable import costs at the port, for Kenya

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for Marine Services	Vessels at buoys	**296**	**564**	**90%**	9.9%	**8.9%**	The mean days for ship waiting for berth * charges for vessels buoyed.
Charges for Marine Services	Vessels at quays, wharves or jetties	**2,371**	**2,068**	**-13%**	9.9%	**-1.3%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for Shorehandling, Wharfage & Storage Services	Domestic Import containers	**72,500**	**0**	**-100%**	9.9%	**-9.9%**	The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**75,168**	**2,632**	**-96%**	9.9%	**-9.5%**	
Total Cost per 40' Container (1,208 containers per ship)		**62**	**2**	**-96%**	9.9%	**-9.5%**	

Source: Author's calculations

Mombasa Port: Kenya Exports

Particularly important to note is no improvement on "Charges for Shorehandling, Wharfage & Storage Services", as these have been below the grace period of nine days. The cost savings on the export side is negligible.

Table 19 Time variable export costs at the port, for Kenya

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for Marine Services	Vessels at buoys	**-**	**-**	**-**	9.9%	-	Excluded for exports
Charges for Marine Services	Vessels at quays, wharves or jetties	**2,371**	**2,068**	**-13%**	9.9%	**-1.3%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for Shorehandling, Wharfage & Storage Services	Domestic Import containers	**0**	**0**	**0%**	9.9%		The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**2,371**	**2,068**	**-13%**	9.9%	**-1.3%**	
Total Cost per 40' Container (1,208 containers per ship)		**1.96**	**1.71**	**-13%**	9.9%	**-1.3%**	

Source: Author's calculations

Mombasa Port: Transit (Rwanda/Uganda) Imports

Rwanda and Uganda, in turn, experience a limited reduction, due to the fact that their imports were not previously facing Charges for Shorehandling, Wharfage & Storage Services, as their average time was 4.9 days, inferior to the nine days grace period foreseen in the KPA's Tariff book.

Table 20 Time variable import costs at the Port of Mombasa, for Rwanda & Uganda, individually

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for Marine Services	Vessels at buoys, or RORO vessels berthed stern to quay RORO	**296**	**564**	**90%**	9.9%	8.9%	The mean days for ship waiting for berth * charges for vessels buoyed.
Charges for Marine Services	Vessels at quays, wharves or jetties	**2,371**	**2,068**	**-13%**	9.9%	**-1.3%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for Shorehandling, Wharfage & Storage Services	Import containers, Transit	**0**	**0**	0%	9.9%	0	The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**2,668**	**2,632**	**-1.3%**	9.9%	**0.13%**	
Total Cost per 40' Container(1,208 containers per ship)		**2.2**	**2.18**	**-1.3%**	9.9%	**0.13%**	

Source: Author's calculations

Mombasa Port : Transit (Rwanda/Uganda) Exports

The improvements are negligible also on the export side.

Table 21 Time variable Exports costs at the Port of Mombasa, for Rwanda & Uganda, individually

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for Marine Services	Vessels at buoys	**-**	**-**	**-**	9.9%	-	Not included for exports.
Charges for Marine Services	Vessels at quays, wharves or jetties	**2,371**	**2,068**	**-13%**	9.9%	**-1.3%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for Shorehandling, Wharfage & Storage Services	Import containers, Transit	**0**	**0**	0%	9.9%	-	The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**2,371**	**2,068**	**-13%**	9.9%	**-1.3%**	
Total Cost per 40' Container(1,208 containers per ship)		**1.96**	**1.71**	**-13%**	9.9%	**-1.3%**	

Source: Author's calculations

Dar ES Salaam Port : Tanzania Imports

In the case of Tanzania, the impact of the reduction on the imports is more significant, as these were facing higher time delays, falling outside the grace period for storage charges, for which now they qualify.

Table 22 Time variable costs at the Port of Dar es Salaam, for Tanzania

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for port Services	Port dues per ship	5,194	3,237	**-38%**	1.8%	**-0.7%**	The mean ship turnaround time(days) * port dues.
Charges for dockage	Vessels at Quays, wharves or jetties	14,472	4,940	**-66%**	1.8%	**-1.2%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for storage	Storage charges	289,920	0	**-100%**	1.8%	**-1.8%**	The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**309,586**	**8,177**	**-97%**	**1.8%**	**-1.7%**	
Total Cost per 40' Container (1,208 containers per ship)		**256.3**	**6.8**	**-97%**	**1.8%**	**-1.7%**	

Source: Author's calculations.

Dar ES Salaam Port : Tanzania Exports

In the case of exports, the impact of the reduction on the imports is also significant, as these were facing higher time delays, failing outside the grace period for storage charges, for which now they qualify.

Table 23 Time variable costs at the Port of Dar es Salaam, for Tanzania

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for port Services	Port dues per ship	5,194	3,237	**-38%**	1.8%	**-0.7%**	The mean ship turnaround time(days) * port dues.
Charges for dockage	Vessels at Quays, wharves or jetties	14,472	4,940	**-66%**	1.8%	**-1.2%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for storage	Storage charges	231,936	0	**-100%**	1.8%	**-1.8%**	The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**251,602**	**8,177**	**-97%**	1.8%	**-1.7%**	
Total Cost per 40' Container (1,208 containers per ship)		**208.3**	**6.8**	**-97%**	1.8%	**-1.7%**	

Dar ES Salaam Port : Transit (Rwanda/Uganda) Imports

A similar conclusion can be drawn from the Rwanda and Uganda reductions. In 2017 similar to Tanzania imports they also qualify for the grace period of 15 days by dropping from an average of approximately 16 days to little less than 14 days.

Table 24 Time variable costs at the Port of Dar es Salaam, for Rwanda & Uganda, individually

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for port Services	Port dues per ship	5,182	3,237	**-38%**	**1.8%**	**-0.7%**	The mean ship turnaround time(days) * port dues.
Charges for dockage	Vessels at Quays, wharves or jetties	14,472	4,941	**-66%**	**1.8%**	**-1.2%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for storage	Storage charges	96,640	0	**-100%**	**1.8%**	**1.8%**	The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**116,294**	**8,178**	**-93%**	**1.8%**	**1.7%**	
Total Cost per 40' Container (1,208 containers per ship)		**96.3**	**6.8**	**-93%**	**1.8%**	**1,7%**	

Source: Author's calculations

Dar ES Salaam Port : Transit (Rwanda/Uganda) Exports

Rwanda and also qualify for the grace period of 15 days by dropping from an average of approximately 16 days to little less than 14 days.

Table 25 Time variable costs at the Port of Dar es Salaam, for Rwanda & Uganda, individually

Category	Concept	2010 USD	2017 USD	% Change	TMEA % of Total Investment	% Change attributable to TMEA	Explanations
Charges for port Services	Port dues per ship	5,182	3,237	**-38%**	**1.8%**	**-0.7%**	The mean ship turnaround time(days) * port dues.
Charges for dockage	Vessels at Quays, wharves or jetties	14,472	4,941	**-66%**	**1.8%**	**-1.2%**	The mean ship turnaround time(days) * charges for vessels at quay.
Charges for storage	Storage charges	0	0	**0%**	**1.8%**	0%	The mean days containers in storage * storage charges
Total Cost per Ship (190m)		**19,654**	**8,178**	**-58%**	**1.8%**	**1%**	
Total Cost per 40' Container (1,208 containers per ship)		**16.3**	**6.8**	**-58%**	**1.8%**	**1%**	

Time Savings on Inventory

A similar exercise to the cost savings has been done to calculate the value of time savings on inventory arising from the reduction of time at the port, taking into consideration that the inventory holding cost, according to Arvis (2007), is US$50 per each 40' container per day.

Since we lack data on the direction of trade flows we assume the time savings on the inventory to be the same in both directions.

Northern Corridor

Figure 10 :NCTO Data

Ship Waiting to Berth		
Time ship is waiting in the sea before docking to the quay		
Year	Year-Month Mean (Hrs)	Standard Deviation
2010	12	
2017	22.85	

Ship Turn Around Time		
Time ship spends between entering and leaving the port.		
Year	Year-Month Mean (Hrs)	Standard Deviation
2010	96	
2017	83.72	

Cargo Dwell Time in Port		
Time container spends in the port. Exit time minus arrival time		
Year	Year-Month Mean (Hrs)	Standard Deviation
2010	117.58	125.61
2017	94.25	93.05

The overall time savings for the Northern corridor is assumed to be the difference between the 2017 and 2010 values for the Ship Waiting Time to Berth in addition to the gains around ship turnaround time and the cargo dwell time. The dwell time for the domestic (Kenya) and in transit (Uganda and Rwanda) countries is not provided separately. We assume both to be the same.

Table 26 Time savings on inventory at the Port of Mombasa

Category	
Total Time Savings per container (2010-2017)	-24.76 h (-1.03 days)
Cost of inventory holding per container per day	USD 50
Kenya, Rwanda, Uganda	
Difference in cost, per 40' container	**- USD 51.5**
Difference in cost, per 40' container(attributable to TMEA due to 9.9% investment)	**-USD 5.1**

Source: Author's calculations

As shown above, the results arising from the Port of Mombasa are contained, particularly due to the limited reduction in time achieved, which results in an average US$51.5 reduction per container imported. It has not been possible to distinguish between those containers destined for Kenya and those transiting due to lack of data. Overall, Kenya is the country that benefits the most, followed by Uganda.

Central Corridor

Figure 11 :CCTO Data

Ship Turn Around Time (DAYS)		
Time ship is waiting in the sea before docking to the quay		
Year	Year-Month Mean (Hrs)	Standard Deviation
2010	8	2.77
2017	2.73	0.3

TICTS AVERAGE LOCAL CONTAINER DWT (DAYS)		
Time container stays in freight station for local destination		
Year	Year-Month Mean (Hrs)	Standard Deviation
2010	12.25	1.46
2017	5.41	2.82

TICTS AVERAGE TRANSIT CONTAINER DWT (DAYS)		
Time container stays in freight station for transit destination		
Year	Year-Month Mean (Hrs)	Standard Deviation
2010	16.30	3.32
2017	13.86	1.64

The overall time savings for the Central corridor is assumed to be the difference between the 2017 and 2010 values for the gains around ship turnaround time and the cargo dwell time at the warehouses. For the central corridor data, we do have separated data for the local containers and those who are in transit.

Table 271 Time savings on inventory at the Port of Dar Es Salaam

Category	
Cost of inventory holding per 40' container per day	USD 50
Tanzania	
Total Time Savings per container (2010-2017)	-290.6h (-12.11 days)
Difference in cost, per 40' container	**- USD 605.5**
Difference in cost, per 40' container(attributable to TMEA due to 1.8% investment)	**- USD 10.9**
Rwanda, Uganda	
Total Time Savings per container (2010-2017)	-185.04h (-7.71 days)
Number of 40' Containers in Dar Es Salaam 2017 for Rwandan imports	21,673
Difference in cost, per 40' container	**- USD 385.5**
Difference in cost, per 40' container(attributable to TMEA due to 1.8% investment)	**- USD 6.9**

Source: Author's calculations

The results show that the time reductions achieved at the Port of Dar ES Salaam are significant: 12 days and seven days for Tanzanian imports and for transit containers, respectively. Tanzania's savings in terms of inventory nearly reach US$606 dollars per container. Rwanda and Uganda also benefit significantly due to the noticeable time reduction, with US$386 dollars in savings.

Savings on Uncertainty

The value of the container has been estimated on the basis of past studies and re-insurance estimations of containers. While Arvis et al (2007) estimate the average value of a 40' container to be US$50,000, as does Arnold (2006), the values provided by re-insurance firms vary greatly, from US$10,840 to US$301,929.1 We have used a conservative estimate of US$40,000, owing to the expectation that the container comes from Asia (for imports) and the value of exported products from East Africa-4 tends to be on the lower end of the value scale.

In our calculations we include the population up to three Standard Deviations that is 99.7 %

The variation/standard deviation is looking at the indicators for the dwell time only.

Figure 14 – Cargo Dwell Time

Cargo Dwell Time in Port		
Time container spends in the port. Exit time minus arrival time		
Year	Year-Month Mean (Hrs)	Standard Deviation
2010	117.58	125.61
2017	94.25	93.05

Considering the standard deviations provided for the different periods and our aforementioned methodology of calculating the value loss for a container we have calcuted the savings on the risks between 2010 and 2017.

The decrease in variation is quite significant in port of Mombasa(upto 1.36 days improvement) on the first standard deviations. This results on a savings of US$298 per 40'Ft Container.

Table 28 Value of Uncertainty Decrease at the Port of Mombasa

Category	2010	2017
Value of 40' container	USD 40,000	
Standard Deviation (hours)	125.61	93.05
Variation	- 32.56 h / (- 1.36 days)	
Kenya, Rwanda, Uganda		
Value of Uncertainty Decrease for Businesses, per 40' container	**- USD 298**	
Value of Uncertainty Decrease for Businesses, per 40' container (attributable to TMEA due to 9.9% investment)	**- USD 29.5**	

Source: Author's calculations

For the Central Corridor we have separate mean and standard deviations for the local(Tanzania) and transit destinations(Rwanda/Uganda)

[1] Cowie, A. (2007). Cargo Accumulation. Presentation: Swiss Re: NY, Sept

Figure 15 – Cargo Dwell Time for local and transit

TICTS AVERAGE LOCAL CONTAINER DWT (DAYS)		
Time container stays in freight station for local destination		
Year	Year-Month Mean	Standard Deviation
2010	12.25	1.46
2017	5.41	2.82

TICTS AVERAGE TRANSIT CONTAINER DWT (DAYS)		
Time container stays in freight station for transit destination		
Year	Year-Month Mean	Standard Deviation
2010	16.30	3.32
2017	13.86	1.64

Table 29 Value of Uncertainty Decrease at the Port of Dar Es Salaam

Category	2010	2017
Tanzania		
Value of 40' container	USD 40,000	
Standard Deviation (hours)	1.46	2.82
Variation	- 1.36h / (- 0.06 days)	
Value of Uncertainty Decrease for Businesses, per 40' container	**-USD 259**	
Value of Uncertainty Decrease for Businesses, per 40' container(attributable to TMEA due to 1.8% investment)	**-USD 4.7**	
Rwanda/Uganda		
Standard Deviation (hours)	3.32	1.64
Variation	- 1.68h / (- 0.07 days)	
Value of Uncertainty Decrease for Businesses, per 40' container	**- USD 262**	
Value of Uncertainty Decrease for Businesses, per 40' container(attributable to TMEA due to 1.8% investment)	**-USD 4.7**	

Source: Author's calculations

Uncertainty - Extra Inventory

Uncertainties cause businesses to be precautious. The risk of being out of stock and suffer loss pushes the latter towards maintaining an extra inventory.

A study made CPCS "Analytical Comparative Transport Cost Study along the Northern Corridor" in 2010 claims from survey results the valuation of extra inventory to be 200K over one months and the capital opportunity cost to be valued at 25%.

We have reviewed this model and adapted it to one we consider more reliable.

- We agree to assume the valuation for the extra inventory to be 200K per month.
- Our valuation of inventory stock is 400K (60 days)
- We consider 10% to be a realistic capital opportunity cost figure.
- We have revised to two Standard Deviations of inventory to be kept instead of one month

Using the standard deviations for the Dwell Time in Mombasa we calculated as show in table 30 below the cost savings on Extra Inventory to approximately US$5 per day for a 40'ft Container.

Table 2 Value of Exta Inventory Uncertainty at the Port of Mombasa (Kenya, Rwanda, Uganda)

Category	2010	2017
Two months inventory value	USD 400,000	
Standard Deviation (2 SDs)	10.47	7.75
Extra Stock to kept (2 SDs/ 2 months * inventory value)	69783 USD	51694 USD
Capital Opportunity Cost (10%)	6987 USD	5169 USD
Extra Stock Opportunity cost per day (divided by 365)	19.12 USD	14.16 USD
Cost Savings per 40' Ft Container per day		-4.97 USD
Cost Savings per 40' Ft Container during trip (mean * per day)		-18.55 USD
Cost Savings per 40' Ft Container during trip (attributable to TMEA due to 9.9% investment)		-1.8 USD

For Tanzania the standard deviations have actual increased. So instead of savings there is a loss of US$5 per day for a 40'ft Container

Table 31 Value of Exta Inventory Uncertainty at the Port of Dar ES Salaam (Tanzania)

Category	2010	2017
Two months inventory value	USD 400,000	
Standard Deviation (2 SDs)	2.92	5.64
Extra Stock to kept (2 SDs/ 2 months * inventory value)	19467 USD	37600 USD
Capital Opportunity Cost (10%)	1947 USD	3760 USD
Extra Stock Opportunity cost per day (divided 365)	5.33 USD	10.30 USD
Cost Savings per 40' Ft Container per day		**4.97 USD**
Cost Savings per 40' Ft Container during trip (mean * per day)		**26,88 USD**
Cost Savings per 40' Ft Container during trip (attributable to TMEA due to 1.8% investment)		**0.48 USD**

Unlike Tanzania, there have been improvements on the deviations for Rwanda/Uganda of over three days. The savings per days have been over six US dollars per day for a 40'ft Container

Table 32 Value of Exta Inventory Uncertainty at the Port of Dar ES Salaam (Rwanda/Uganda)

Category	2010	2017
Two months inventory value	USD 400,000	
Standard Deviation (2 SDs)	6.64	3.28
Extra Stock to kept (2 SDs/ 2 months * inventory value)	44267 USD	21867 USD
Capital Opportunity Cost (10%)	4427 USD	2187 USD
Extra Stock Opportunity cost per day (divided by 365)	12.13 USD	5.99 USD
Cost Savings per 40' Ft Container per day		-6.14 USD
Cost Savings per 40' Ft Container during trip (mean * per day)		-85 USD
Cost Savings per 40' Ft Container during trip (attributable to TMEA due to 1.8% investment)		-1.53 USD

Please note that we have not done any risk calculations on the export side since the data for exports have not provided and also we lack clarity on how risky the delays are on the export side since there is a rotation of ships. Ships mostly wait for days at the port waiting to load cargo and leave the port.

The total Container Traffic

To measure the total savings arising from these time and costs reductions, it is necessary to determine the total container traffic in Mombasa and Dar ES Salaam. Note the very low exports from Uganda through Dar and on the other side low exports from Rwanda through Mombasa Port.

Table 33 Container Traffic at the Ports of Mombasa and Dar Es Salaam

Category	2010	2017
Container Traffic in Mombasa (TEU/Year)	695,600	1,189,957
Container Traffic in Dar ES Salaam (TEU/Year)	379,753	668,135
Kenya		
Container Traffic in Mombasa for Kenya (TEU/Year)	479,964	821,070
Container Traffic in Mombasa for Kenya Imports (est) TEU/Year	436,767	747,174
Container Traffic in Mombasa for Kenya exports (est) TEU/Year	43,197	73,896
Rwanda – Through Mombasa		
Container Traffic in Mombasa for Rwanda (TEU/Year)	5,252	8,984
Container Traffic in Mombasa for Rwandan Imports (est) TEU/Year	4,779	8,176
Container Traffic in Mombasa for Rwandan Exports (est) TEU/Year	473	808
Uganda – Through Mombasa		
Container Traffic in Mombasa for Uganda (TEU/Year)	172,048	294,322
Container Traffic in Mombasa for Ugandan Imports (est) TEU/Year	156,564	267,833
Container Traffic in Mombasa for Ugandan Exports (est) TEU/Year	15,484	26,489
Rwanda – Through Dar es Salaam		
Container Traffic in Dar es Salaam for Rwandan TEU/Year	14,542	62,423
Container Traffic in Dar es Salaam for Rwandan Imports TEU/Year	13,871	61,195
Container Traffic in Dar es Salaam for Rwandan Exports TEU/Year	671	1,228
Uganda– Through Dar es Salaam		
Container Traffic in Dar es Salaam for Ugandan TEU/Year	2,164	15,998
Container Traffic in Dar es Salaam for Ugandan Imports TEU/Year	2,159	15,905
Container Traffic in Dar es Salaam for Ugandan Exports TEU/Year	5	93
Tanzania		
Container Traffic in Dar es Salaam for Tanzanian TEU/Year	305,513	459,254
Container Traffic in Dar es Salaam for Tanzanian Imports TEU/Year	251,365	394,345
Container Traffic in Dar es Salaam for Tanzanian Exports TEU/Year	54,148	64,909

Source: [https://www.logisticsglossary.com/term/teu/]

TEU refers to Twenty-foot equivalent unit. 1 40 Ft Container is equivalent to two TEUs.

Note: no data has been obtained indicating the total amount imports for the different countries coming through Mombasa. According to Shippers Council, 91% of the transit at the Mombasa Port are imports, and this figure has been used to calculate the imports and transit for Mombasa. For Dar ES Salaam, actual figures were obtained.

Below are out calculations for the cost savings per container for the costs, time savings and uncertainties as well as the volume of traffic at the different ports for domestic and inland countries.

Summary: Port Savings

Table 3 Savings at port for Kenya (Mombasa)

The savings for Kenya have been considerable. Driven by the reduction around uncertainties around the transit times in the port and the large increase in traffic volumes. (over 300 thousand TEUs/Year increase as compared to 2010)

Category	2010	2017	Savings(2017 – 2010)
Kenya Imports(Mombasa)			
Container Traffic in Mombasa for Kenya (TEU/Year)	436,767	747,174	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 23,239,976	USD 813,836	**USD -22,426,140**
Time Savings on Inventory			**USD -19,270,863**
Uncertainty savings for Business			**USD -111,238,425**
Uncertainty savings for Extra-Inventory			**USD -7,270,778**
		Import Savings	**USD -160,206,206**
Kenya Exports(Mombasa)			
Container Traffic in Mombasa for Kenya (TEU/Year)	43,197	73,896	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 72,506	USD 63,231	**USD -9,275**
Time Savings on Inventory			**USD -1,905,910**
Uncertainty savings for Business			**-**
Uncertainty savings for Extra-Inventory			**-**
		Export Savings	**USD -1,915,185**
		TOTAL Savings	**USD -162,121,391**
TOTAL Savings (attributable to TMEA due to 9.9% investment)			**USD -16,050,018**

Table 35 Savings at port for Tanzania (Dar ES Salaam)

Category	2010	2017	Savings(2017 – 2010)
Tanzania Imports(Dar ES Salaam)			
Container Traffic in Dar (TEU/Year)	251,365	394,345	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 1,335,649	USD 50,531,123	**USD -49,195,474**
Time Savings on Inventory			**USD -119,387,949**
Uncertainty savings for Business			**USD -51,019,265**
Uncertainty savings for Extra-Inventory			**USD -5,299,421**
		Import Savings	**USD -224,902,109**
Tanzania Exports(Dar ES Salaam)			
Container Traffic in Dar (TEU/Year)	54,148	64,909	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 6,759,583	USD 219,847	**USD -6,539,736**
Time Savings on Inventory			**USD -19,651,200**
Uncertainty savings for Business			**-**
Uncertainty savings for Extra-Inventory			**-**
		Export Savings	**USD -26,190,936**
		TOTAL Savings	**USD -251,093,045**
TOTAL Savings (attributable to TMEA due to 1.8% investment)			**USD -4,519,675**

For Tanzania the driving factor for the savings has been the average time savings within the port of over 12 days as compared to 2010. The impact is quite impressive given the fact that volume of traffic in Dar is only 52% of that of Mombasa, the savings are approximately US$62 Million higher.

Table 36 Savings at port for Rwanda (Mombasa)

Category	2010	2017	Savings(2017 – 2010)
Rwanda Imports(Mombasa)			
Container Traffic for Rwanda (TEU/Year)	4,779	8,176	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 9,025	USD 8,905	**USD -119**
Time Savings on Inventory			**USD -210,862**
Uncertainty savings for Business			**USD -1,217,174**
Uncertainty savings for Extra-Inventory			**USD -80,510**
		Import Savings	**USD -1,508,665**
Rwanda Exports(Mombasa)			
Container Traffic for Rwanda (TEU/Year)	473	809	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 1,466	USD 1,367	**USD -99**
Time Savings on Inventory			**USD -20,855**
Uncertainty savings for Business			**-**
Uncertainty savings for Extra-Inventory			**-**
		Export Savings	**USD -20,954**
		TOTAL Savings	**USD -1,529,619**
TOTAL Savings (attributable to TMEA due to 9.9% investment)			**USD -151,432**

Rwanda uses mostly the Dar Port as compared to Mombasa Port. The volume of traffic in Dar is 10 times than through Mombasa and as well as over US$21 Million more savings in Dar than Mombasa. Again Mombasa drive is the reduction in uncertainties while for Dar is the reduction in the mean transit times.

Table 37 Savings at port for Rwanda (Dar ES Salaam)

Category	2010	2017	Savings(2017 – 2010)
Rwanda Imports(Dar ES Salaam)			
Container Traffic for Rwanda (TEU/Year)	13,871	61,195	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 2,945,717	USD 207,122	**USD -2,738,595**
Time Savings on Inventory			**USD -11,795,336**
Uncertainty savings for Business			**USD -8,016,387**
Uncertainty savings for Extra-Inventory			**USD -589,919**
		Import Savings	**USD -23,140,237**
Rwanda Exports(Dar ES Salaam)			
Container Traffic for Rwanda (TEU/Year)	671	1,228	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 9,992	USD 4,156	**USD -1,301**
Time Savings on Inventory			**USD -236,697**
Uncertainty savings for Business			**-**
Uncertainty savings for Extra-Inventory			**-**
		Export Savings	**USD -237,998**
		TOTAL Savings	**USD -23,378,235**
TOTAL Savings (attributable to TMEA due to 1.8% investment)			**USD -420,808**

Table 38 Savings at port for Uganda (Mombasa)

Category	2010	2017	Savings(2017 – 2010)
Uganda Imports(Mombasa)			
Container Traffic for Uganda (TEU/Year)	156,564	267,833	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 295,643	USD 291,728	**USD -3,915**
Time Savings on Inventory			**USD -6,907,850**
Uncertainty savings for Business			**USD -39,874,623**
Uncertainty savings for Extra-Inventory			**USD -2,637,507**
		Import Savings	**USD -49,423,895**
Uganda Exports(Mombasa)			
Container Traffic for Uganda (TEU/Year)	15,484	26,489	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 25,991	USD 22,666	**USD -3,325**
Time Savings on Inventory			**USD -683,194**
Uncertainty savings for Business			**-**
Uncertainty savings for Extra-Inventory			**-**
		Export Savings	**USD -686,519**
		TOTAL Savings	**USD -50,110,414**
TOTAL Savings (attributable to TMEA due to 9.9% investment)			**USD -4,960,931**

Uganda uses mostly the Mombasa Port as compared to very low use of Dar Port. While Uganda still uses Dar Port for imports with 15905 TEUs in 2017 it had exported only 93 TEUs.

Table 39 Savings at port for Uganda (Dar ES Salaam)

Category	2010	2017	Savings(2017 – 2010)
Uganda Imports(Dar ES Salaam)			
Container Traffic for Uganda (TEU/Year)	2,159	15,905	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 756,612	USD 53,832	**USD -711,780**
Time Savings on Inventory			**USD -3,065,689**
Uncertainty savings for Business			**USD -2,083,514**
Uncertainty savings for Extra-Inventory			**USD -676,429**
		Import Savings	**USD -6,537,412**
Uganda Exports(Dar ES Salaam)			
Container Traffic for Uganda (TEU/Year)	5	93	
Costs of all 2017 traffic in 2010 & 2017 tariffs	USD 757	USD 315	**USD -442**
Time Savings on Inventory			**USD -17,926**
Uncertainty savings for Business			**-**
Uncertainty savings for Extra-Inventory			**-**
		Export Savings	**USD -18,368**
		TOTAL Savings	**USD -6,555,780**
TOTAL Savings (attributable to TMEA due to 1.8% investment)			**USD -118,004**

Explained Above

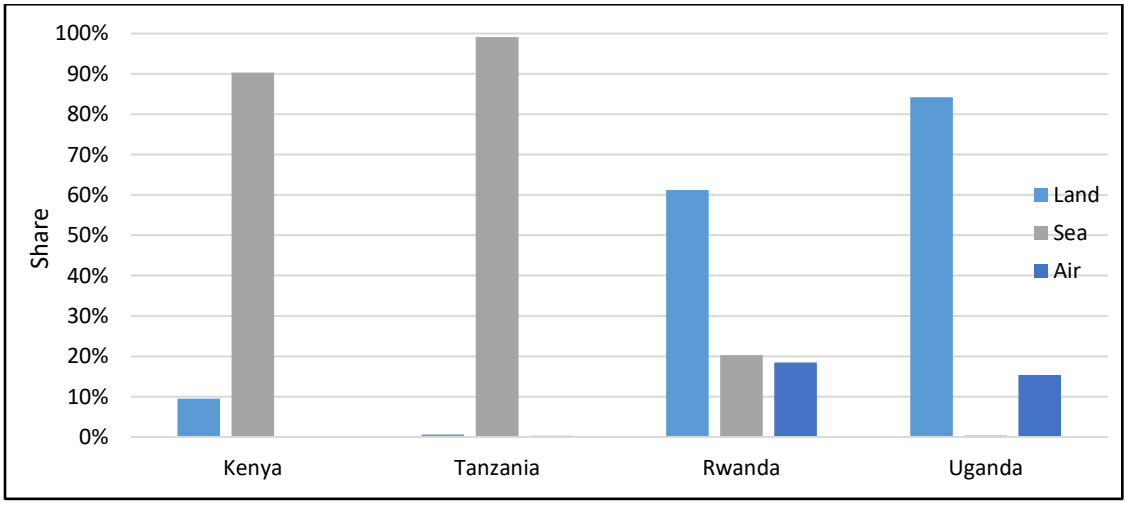
Corridor Interventions

The second stage of our analysis investigates TMEA's interventions across the corridors itself. As part of our analysis is the Northern and the Central Corridor.

Our analysis also includes integrating Customs Management Systems (CMS); establishing Single Windows; and installing a Regional Electronic Cargo Tracking System (RECTS) to facilitate faster, less costly, less risky trade processes for the private sector, eliminating excess weighbridges and other NTBs, etc.

The GTAP database provides us share of transport modes in East African imports from all sectors and partners. As shown in **Figure 16**, Kenya and Tanzania rely almost totally on sea transport for their imports whereas landlocked countries, Rwanda and Uganda tend to rely more on air freight. Clearly, improvement in land border crossings will have a more limited impact in Kenya and Tanzania, as these rely mainly on sea transport, whilst Rwanda and Uganda are more dependent on road and rail infrastructure: 83% of Kenya's rice imports are delivered by sea, whereas 99% of Uganda's sugar imports are by road or rail.

Figure 16 Share of transport modes in East African imports from all sectors and partners



Source: Derived from GTAP database.

There are several methods for estimating the changes in transport costs. One is to observe the transit times and attach a value to the time saved. For example, Eberhard-Ruiz and Calabrese (2017) calculate that a day saved on the trip from Mombasa to Kampala is worth US$128 per container. This is because the capital costs of vehicles can be spread over a greater number of trips. There is no saving in fuel, a major cost, and little savings in wages for drivers. TMEA, in their Results Meter, have previously used a value of US$490 a day, but this includes an allowance for inventory costs and storage. When applied to time saved at ports, which may amount to days or weeks, the calculated costs savings can swamp the actual costs.

Our Approach

The corridor savings as mentioned was analysed by looking at the time variant reductions in cost along the transit corridors, OSBPs as well as importantly the reduction in uncertainties. (business, transporters and extra inventory)

Corridor Savings: = Time variable transport costs + Uncertainties for Impact to the business + Uncertainty Impact to Transporters + Uncertainty Extra Inventory Cost.

Time variable Transport Costs

Using summary notes of interviews from ODI (2017) and Nathan (2011), we have identified the time variable costs, as presented below. We have assumed that the same price structure applies to both the Northern and Central Corridor. This will allow us to compare and analyse the cost savings per day, which amount to US$210 per day saved.

Table 4 Time variable transport costs per trip at the Northern and Central Corridors

Wages	Time Variable	Daily Rate (USD)
Drivers Wages	Yes	24
Truck Costs	**Time Variable attributable to TMEA**	**Daily Rate (USD)**
Allowance	-	-
Breakdown/ truck repair	No	0
Parking Fees	No	0
Offloading of container	No	0
Accommodation	Yes	5
Meals	Yes	3
Bribes/ Fines for traffic offences	No	0
Road user fees	No	0
Truck washing	No	0
Others		
Fuel	No	0
Truck Capital	Yes	128
Time preference value (for inventory)	Yes	50
TOTAL		**USD 210**

Source: ODI (2017), Nathan (2011), Arivs (2007), and authors' calculations

Due to data gaps and unavailability of uncertainties we had to analyse the savings across the corridors according to the following routes:

Please note that given the unviability of export data we made an assumption that **import transit data** will be more or less equal the **export transit data**.

Northern Corridor

We analysed the northern corridor based on the data availability. Our main criteria was to get mean data and standard deviations for 2010 and 2017. This is the main reason we chose to analysis data for the following routes

Kenya Route (Mombasa to Nairobi)

Data was not available from the NCTO team for this route. Hence we had to rely on data from different reliable sources. 2010 data was available from CPCS study and 2016 data from Kenya shipper's council. No standard deviation was available so the risks could not be calculated.

Table 41 – Mombasa Nairobi transits

Route	2010 (days)	2017 (days)	Time Savings (days)	Time Savings Attributable to TMEA	Time Savings (%)	Time Savings (%)Attributable to TMEA
Mombasa - Nairobi						
Mean	1.2	1.1	-0.1	-.0034 days /5 minutes	-8.3	0.3%
Standard Deviation	n/a	n/a	n/a	n/a	n/a	n/a

TMEA Investment = 3.4% of total

Uganda Route (Mombasa to Malaba)

Data with standard deviations was available from NCTO for 2010 and 2017

Table 42 – Mombasa Malaba transits

Route	2010 (days)	2017 (days)	Time Savings (days)	Time Savings Attributable to TMEA	Time Savings (%)	Time Savings (%)Attributable to TMEA
Mombasa - Malaba						
Mean	10.9	4.3	-6.6	-0.4	**-60.6**	**-3.7**
Standard Deviation	6.4	3.5	-2.9	-0.18	**-45.3**	**-2.8**

TMEA Investment = 6.1% of total

Rwanda Route (Mombasa to Malaba + Malaba to Katuna + Gatuna to Akanyaru)

Data with standard deviations was available from NCTO for 2010 and 2017 for the Mombasa to Malaba route and the Gatuna to Akanyaru route. However, we only had data for 2015 with standard deviations for the Malaba to Katuna route.

Table 42 – Mombasa Malaba transits

Route	2010 (days)	2017 (days)	Time Savings (days)	Time Savings Attributable to TMEA	Time Savings (%)	Time Savings (%)Attributable to TMEA
Mombasa - Malaba						
Mean	10.9	4.3	-6.6	-0.4	**-60.6**	**-3.7**
Standard Deviation	6.4	3.5	-2.9	-0.18	**-45.3**	**-2.8**

TMEA Investment = 6.1% of total

Table 43 – Malaba Katuna transits

Route	2015 (days)	2017 (days)	Time Savings (days)	Time Savings Attributable to TMEA	Time Savings (%)	Time Savings (%)Attributable to TMEA
Malaba - Katuna						
Mean	4.03	2.8	-1.2	0.0732 days /4.4 hours	-30.5	1.9
Standard Deviation	3.57	2.36	-1.2	0.0732 days /4.4 hours	-33.9	2.1

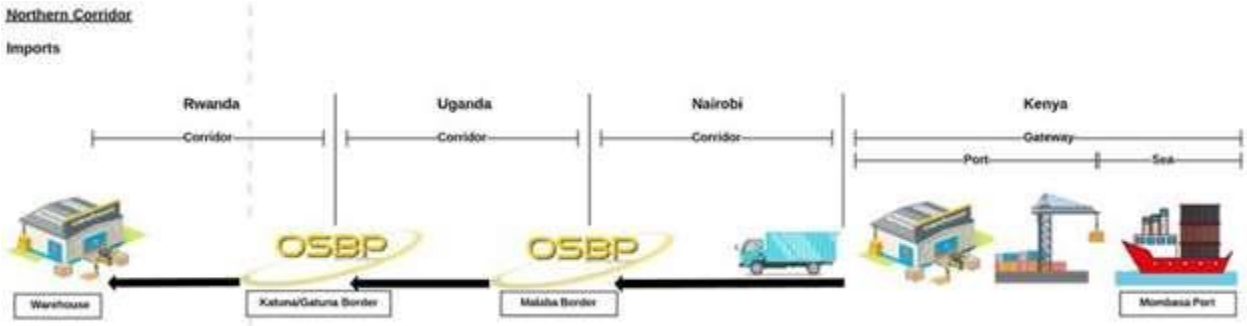
TMEA Investment = 6.1% of total

Table 44 – Gatuna Akanyaru transits

Route	2010 (days)	2017 (days)	Time Savings (days)	Time Savings Attributable to TMEA	Time Savings (%)	Time Savings (%)Attributable to TMEA
Gatuna - Akanyaru						
Mean	3.4	1.6	-1.8	-0.23	-52.9	-6.8
Standard Deviation	3.68	0.7	-3.0	-.4	-81.0	-10.4

TMEA Investment = 12.8% of total

Figure 17: The northern Corridor Imports



On the exports side no data was available. The team made an assumption that the imports and exports time are approximately the same for our calculations.

Figure 18: The northern Corridor Exports

Central Corridor

Tanzania to Uganda and Rwanda Route

Data was available for 2010 and 2017 with standard deviations for the trip from Dar ES Salaam to Rwanda and Uganda. No data was available for Dodoma.

Table 45 – Dar ES Salaam Kampala transits

Route	2010 (days)	2017 (days)	Time Savings (days)	Time Savings Attributable to TMEA	Time Savings (%)	Time Savings (%) Attributable to TMEA
Dar ES Salaam - Kampala						
Mean	7	4.7	-2.3	0.14 days/ 3.3 hours	-32.9	2
Standard Deviation	0.43	0.12	-0.3	0.0183 days/ 26 mins	-72.1	4.4

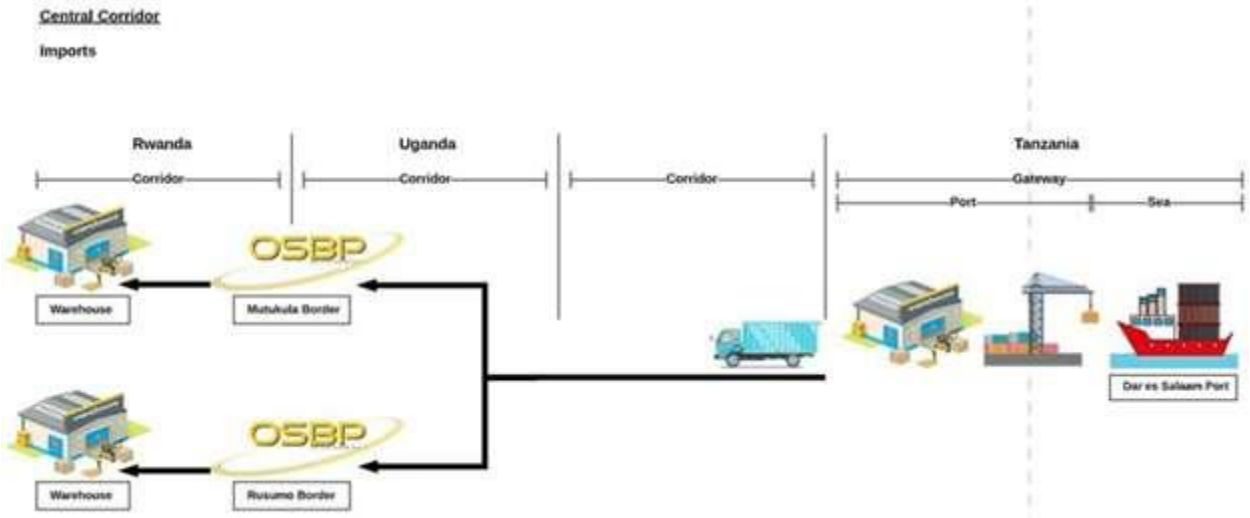
TMEA Investment = 6.1% of total

Table 46 – Dar ES Salaam Kigali transits

Route	2010 (days)	2017 (days)	Time Savings (days)	Time Savings Attributable to TMEA	Time Savings (%)	Time Savings (%) Attributable to TMEA
Dar ES Salaam - Kigali						
Mean	5.9	3.8	-2.1	-0.3 days/ 7.2 hours	-35.6	-4.6
Standard Deviation	0.27	0.06	-0.2	-0.03 days/ 37 mins	-77.8	10

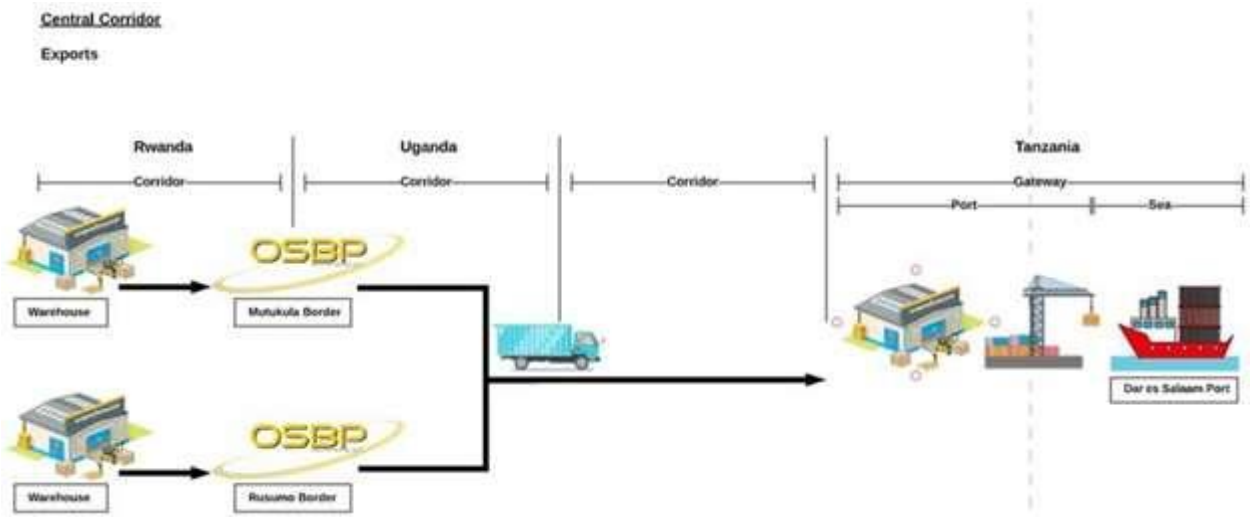
TMEA Investment = 12.8% of total

Figure 19: The Central Corridor Imports



On the exports side no data was available. The team made an assumption that the imports and exports time are approximately the same for our calculations.

Figure 20: The Central Corridor Exports



Taking the above into consideration, and using the transport times for each route, we can analyse the determine the cost and time saving experienced between 2010 and 2017:

Table 5 Evolution of time and cost savings across the Corridors per truck

Route	2010	2017	2017 - 2010	Savings per truck attributable to time reductions	TMEA % of Total Investment	Savings per truck attributable to time reductions and TMEA
Mombasa-Nairobi (Kenya)						
Time	1.2 days	1.1 days	-0.1 days			
Cost	USD 676	USD 668	-USD 8	**- USD 0**	**3.4%**	**0**
Mombasa-Malaba (Kenya)						
Time	10.9 days	4.3 days	-6.6 days			
Cost	USD 3,044	USD 1,614	-USD 1,430	**- USD 1,260**	**6.1%**	**-USD 77**
Malaba-Katuna* (Uganda)						
Time	4.03 days	2.8 days	-1.2 days			
Cost	USD 1,128	USD 700	-USD 428	**- USD 420**	**6.1%**	**-USD 26**
Gatuna-Akanyaru (Rwanda)						
Time	3.4 days	1.6 days	-1.8 days			
Cost	USD 1,096	USD 668	-USD 428	-USD 420	12.8%	**-USD 54**
Kampala via Dar Es Salaam (Uganda)						
Time	7 days	4.7 days	-2.3 days			
Cost	USD 3,749	USD 2,638	-USD 1,111	**- USD 420**	**6.1%**	**-USD 26**
Kigali via Dar Es Salaam (Rwanda)						
Time	5.9 days	3.8 days	-2.1 days			
Cost	USD 2,119	USD 1,474	-USD 645	**- USD 420**	**12.8%**	**-USD 54**
Dodoma via Dar Es Salaam (Tanzania)						
No data available						

*Source: NCTTA and authors' calculations. *: Reflects 2015-2017 data. Note: Savings only appear whenever a full day has been saved. The difference between the 2010-2017 costs not attributable to time reductions indicate changes in fuel prices.*

The reduction in times has also a positive measurable impact on businesses and transporters, due to the reduction in uncertainty. Uncertainty refers to the amount that a truck "can" spend between on the road or crossing the border, rather than the average. Thereby, reducing uncertainty will reduce the

amount of *possible* losses for the traders. However, Kenya does not benefit from reduced uncertainty due to the fact that, as shown above, the transit times have increased.

Uncertainties Savings

There are three levels of uncertainties taken into consideration to associate to the risks.

Business Uncertainty

The business uncertainty is linked to the value of the truck decreasing as the truck's deviate from its expected mean time of arrival. This is similar to the calculations for the business uncertainty for the ports.

Transporters Uncertainty

For transporters also deviating from the expected arrival time is costly. Each day's truck delay is equivalent as per above cost of truck calculations to US$210.

Extra Inventory Uncertainty

For businesses again, being out of stock can have very negative consequences. The uncertainty of the trucks trip time pushes businesses to keep an extra inventory.

Note: We could not calculate the uncertainties for the Mombasa – Nairobi Route as no STD Deviations was available

Table 48 – Northern Corridor - Uncertainty calculations for Mombasa – Malaba route

IMPACT TO BUSINESS	2010			2017		
Mombasa to Malaba						
Mean (days)		10.9			4.3	
SD (days)		3.6			3.6	
SD		Delays (days)	Weighed costs (decay)		Delays (days)	Weighed costs (decay)
1SD	0.3413	6.4	284	0.3413	3.6	231
2SD	0.1359	12.9	180	0.1359	7.1	119
3SD	0.0214	19.3	45	0.0214	10.7	24
Total Variance			509			374
IMPACT TO TRANSPORTERS						
1SD	0.3413	6.4	462	0.3413	3.6	256
2SD	0.1359	12.9	368	0.1359	7.1	204
3SD	0.0214	19.3	87	0.0214	10.7	48
Total Variance			916			508
EXTRA INVENTORY COST						
Cost of unreliability per day			Cost ($)			Cost ($)
2 months inventory value			400000			400000
Std Dev - Road (2 SDs)			12.88			7.15
Extra Stock to be kept			85,883			47,633
Capital Opportunity Cost			8,588			4,763
Extra Stock Opportunity Cost per Day			23.53			13.05
Extra Stock Opportunity Cost per Trip			259			65
TOTAL UNCERTAINTY			**1,684**			**947**
102.7			**57.8**			

Table 49 – Northern Corridor - Uncertainty calculations for Malaba - Katuna route

IMPACT TO BUSINESS	2010			2017		
Malaba - Katuna						
Mean (days)		4			2.8	
SD (days)		3.6			2.4	
SD		Delays (days)	Weighed costs (decay)		Delays (days)	Weighed costs (decay)
1SD	0.3413	3.6	231	0.3413	2.4	211
2SD	0.1359	7.1	119	0.1359	4.7	100
3SD	0.0214	10.7	24	0.0214	7.1	19
Total Variance			374			330
IMPACT TO TRANSPORTERS						
1SD	0.3413	3.57	256	0.3413	2.36	169
2SD	0.1359	7.14	204	0.1359	4.72	135
3SD	0.0214	10.70	48	0.0214	7.08	32
Total Variance			507			336
EXTRA INVENTORY COST						
Cost of unreliability per day			Cost ($)			Cost ($)
2 months inventory value			400000			400000
Std Dev - Road (2 SDs)			7.14			4.72
Extra Stock to be kept			47,572			31,478
Capital Opportunity Cost			4,757			3,148
Extra Stock Opportunity Cost per Day			13.03			8.62
Extra Stock Opportunity Cost per Trip			65			26
TOTAL UNCERTAINTY			**946**			**691**
57.7				**42.2**		

Table 50 – Northern Corridor - Uncertainty calculations for Gatuna - Akanyaru route

IMPACT TO BUSINESS	2010			2017		
Gatuna - Akanyaru						
Mean (days)	3.4			1.6		
SD (days)	3.7			0.7		
SD		Delays (days)	Weighed costs (decay)		Delays (days)	Weighed costs (decay)
1SD	0.3413	3.7	232	0.3413	0.7	187
2SD	0.1359	7.4	121	0.1359	1.4	79
3SD	0.0214	11.1	25	0.0214	2.1	13
Total Variance			378			279
IMPACT TO TRANSPORTERS						
1SD	0.3413	3.68	264	0.3413	0.71	51
2SD	0.1359	7.37	210	0.1359	1.41	40
3SD	0.0214	11.05	50	0.0214	2.12	10
Total Variance			524			100
EXTRA INVENTORY COST						
Cost of unreliability per day			Cost ($)			Cost ($)
2 months inventory value			400000			400000
Std Dev - Road (2 SDs)			7.37			1.41
Extra Stock to be kept			49,117			9,406
Capital Opportunity Cost			4,912			941
Extra Stock Opportunity Cost per Day			13.46			2.58
Extra Stock Opportunity Cost per Trip			54			5
TOTAL UNCERTAINTY			**956**			**384**
TOTAL UNCERTAINTY (Attributable to TMEA 12.8% Investment)			**122**			**49**

Table 51 – Central Corridor - Uncertainty calculations for Dar ES Salaam - Kampala route

IMPACT TO BUSINESS	2010			2017		
Dar - Kampala						
Mean (days)	7			4.7		
SD (days)	0.43			0.12		
SD		Delays (days)	Weighed costs (decay)		Delays (days)	Weighed costs (decay)
1SD	0.3413	0.4	184	0.3413	0.1	180
2SD	0.1359	0.9	75	0.1359	0.2	72
3SD	0.0214	1.3	12	0.0214	0.4	11
Total Variance			271			263
IMPACT TO TRANSPORTERS						
1SD	0.3413	0.43	31	0.3413	0.12	9
2SD	0.1359	0.86	25	0.1359	0.24	7
3SD	0.0214	1.29	6	0.0214	0.36	2
Total Variance			61			17
EXTRA INVENTORY COST						
Cost of unreliability per day			Cost ($)			Cost ($)
2 months inventory value			400000			400000
Std Dev - Road (2 SDs)			0.86			0.24
Extra Stock to be kept			11,467			3,200
Capital Opportunity Cost			1,147			320
Extra Stock Opportunity Cost per Day			3.14			0.88
Extra Stock Opportunity Cost per Trip			22			4
TOTAL UNCERTAINTY			**355**			**285**
TOTAL UNCERTAINTY (Attributable to TMEA 6.1% Investment)			**21.7**			**17.4**

Table 52 – Central Corridor - Uncertainty calculations for Dar ES Salaam - Kigali route

IMPACT TO BUSINESS	2010			2017		
Dar - Kigali						
Mean (days)	5.9			3.8		
SD (days)	0.27			0.06		
SD		Delays (days)	Weighed costs (decay)		Delays (days)	Weighed costs (decay)
1SD	0.3413	0.3	182	0.3413	0.06	179
2SD	0.1359	0.5	74	0.1359	0.12	72
3SD	0.0214	0.8	12	0.0214	0.18	11
Total Variance			267			262
IMPACT TO TRANSPORTERS						
1SD	0.3413	0.27	19	0.3413	0.06	4
2SD	0.1359	0.54	15	0.1359	0.12	3
3SD	0.0214	0.81	4	0.0214	0.18	1
Total Variance			38			9
EXTRA INVENTORY COST						
Cost of unreliability per day			Cost ($)			Cost ($)
2 months inventory value			400000			400000
Std Dev - Road (2 SDs)			0.54			0.12
Extra Stock to be kept			7,200			1,600
Capital Opportunity Cost			720			160
Extra Stock Opportunity Cost per Day			1.97			0.44
Extra Stock Opportunity Cost per Trip			12			2
TOTAL UNCERTAINTY			**308**			**272**
TOTAL UNCERTAINTY (Attributable to TMEA 12.8% Investment)			**39.4**			**34.8**

Table 53 Summary of evolution of time and cost savings across the Corridors, per 40'Ft Container

Route	Uncertainty Impact	Uncertainty Cost		Total Savings		TMEA % of total Investment	Total Savings attributable to TMEA	
		2010 (USD)	2017 (USD)	USD	%		USD	%
Mombasa via Malaba (Kenya)	To Businesses	509	374	**-135**	**-27%**	**6.1%**	**8**	**-2%**
	To Transporters	916	508	**-408**	**-45%**	**6.1%**	**25**	**-3%**
	Extra Inventory	259	65	**-194**	**-75%**	**6.1%**	**12**	**-5%**
Malaba-Katuna* (Uganda)	To Businesses	374	330	**-44**	**-12%**	**6.1%**	**3**	**-1%**
	To Transporters	2,446	1,799	**-647**	**-26%**	**6.1%**	**39**	**-2%**
	Extra Inventory	65	26	**-39**	**-60%**	**6.1%**	**3**	**-4%**
Gatuna-Akanyaru (Rwanda)	To Businesses	378	279	**-99**	**-26%**	**12.8%**	**13**	**-3%**
	To Transporters	524	100	**-424**	**-81%**	**12.8%**	**54**	**-10%**
	Extra Inventory	55	5	**-50**	**-91%**	**12.8%**	**6**	**-12%**
Kampala via Dar Es Salaam (Uganda)	To Businesses	271	263	**-8**	**-3%**	**6.1%**	**0**	**0%**
	To Transporters	61	17	**-44**	**-72%**	**6.1%**	**3**	**-4%**
	Extra Inventory	22	5	**-17**	**-77%**	**6.1%**	**1**	**-5%**
Kigali via Dar Es Salaam (Rwanda)	To Businesses	267	262	**-5**	**-2%**	**12.8%**	**1**	**0%**
	To Transporters	38	9	**-29**	**-76%**	**12.8%**	**4**	**-10%**
	Extra Inventory	12	2	**-10**	**-83%**	**12.8%**	**1**	**-11%**
Dodoma via Dar Es Salaam (Tanzania)	No data available							
Mombasa-Nairobi (Kenya)	No data available							

*Source: NCTTA and authors' calculations. *: Reflects 2015-2017 data. Note: Savings only appear whenever a full day has been saved.*

Summary of Savings

Table 54 – Total savings (costs and risk) along the trade corridors attributed to TMEA in 2017

In comparison to baseline conditions in 2010

Cost Savings			Ports	Roads and OSBPs	Total Savings
Kenya	**Northern Corridor**	**Imports**	**-15,860,414**	**-203,231**	**-16,063,645**
		Exports	**-189,603**	**-20,100**	**-209,703**
Tanzania	**Central Corridor**	**Imports**	**-3,857,459**	**0**	**-3,857,459**
		Exports	**-471,437**	**0**	**-471,437**
Rwanda	Northern Corridor	Imports	-149,358	-1,398,024	-1,547,382
		Exports	-2,074	-28,540	-30,614
Rwanda	Central Corridor	Imports	-416,524	-5,344,350	-5,760,874
		Exports	-4,284	-101,450	-105,734
Rwanda	**Central and Northern Corridor**	**Imports**	**-565,882**	**-6,742,374**	**-7,308,256**
		Exports	**-6,358**	**-129,990**	**-136,348**
Uganda	Northern Corridor	Imports	-4,892,966	-44,651,243	-49,544,209
		Exports	-67,965	-2,310,635	-2,378,600
Uganda	Central Corridor	Imports	-117,673	-1,130,328	-1,248,001
		Exports	-331	-6,300	-6,631
Uganda	**Central and Northen Corridor**	**Imports**	**-5,010,639**	**-45,781,571**	**-50,792,210**
		Exports	**-68,296**	**-2,316,935**	**-2,385,231**
Total	**Imports**		**-30,187,360**	**-97,378,419**	**-78,021,570**
	Exports		**-803,659**	**-4,777,660**	**-3,202,719**
	Imports & Exports		**-30,991,019**	**-102,156,079**	**-81,224,289**

Annex G: Reported NTBs 2010–2016 for TMEA countries

Annex G Reported NTBs 2010–2016 for TMEA countries

The tables have been obtained from the source document “LDP (2016). Formative Evaluation of TMEA Projects on Non-Tariff Barriers to Trade. TMEA Ref. No. PO/20131293”. The last three columns are from the evaluation team and are 1) a subjective assessment of the expected impact that the NTB would have on the TMEA countries’ overall trade (“Expected Impact on Trade”); 2) able to be measured directly (“Measurable”); and 3) whether the NTB would be cross-cutting or sector specific only (“Sector specific”).

Table 1. Unresolved NTBs, as of end 2016

NTB Description	Affected by the NTB	Source of the NTB	Indicative WTO NTB Category (1-6)	Expected Impact on Trade	Measurable	Sector Specific
Lack of coordination on testing	All	All	3. Technical barriers to trade	Medium	No	No
Central corridor weighbridges	Rwanda, Uganda, Burundi	Tanzania	7. Other	Medium	Possible	No
Restriction on beef and beef products	Kenya	Uganda	5. Specific limitations	Medium	Possible	Food
Charges on tea	Burundi	Kenya	6. Charges on imports	Low	Yes	Tea
Not harmonizing border management working hours	All	All	7. Other	Medium	Possible	No
Cigarettes to have 75% local material	Kenya	Tanzania	2. Customs and entry procedures	Low	No	Tobacco
Food and Drugs Authority requires registering	Kenya, Burundi	Tanzania	3. Technical barriers to trade	Low	No	Food
Dairy product fees	All	All	6. Charges on imports	Medium	Possible	Food
Not harmonizing road user charges	All	All	7. Other	Medium	No	No
Central corridor weighing of empty trucks	Rwanda, Burundi	Tanzania	7. Other	Low	No	No
No preferential treatment on rice	Tanzania	Rwanda, Uganda	6. Charges on imports	Medium	Possible	Food
Re-introduction of transit fees	Tanzania	Kenya	2. Customs and entry procedures	Low	No	No
Discrimination of Smirnoff Ice	Kenya	Tanzania	2. Customs and entry procedures	Low	No	No
Numerous weighbridges	Rwanda, Uganda, Burundi	Kenya	7. Other	Medium	Possible	No
Charging tariffs on Vayas Kenya despite EAC duty remission	Kenya	Uganda	2. Customs and entry procedures	Medium	Yes	No
Charing $200 transit permits for containers with chemicals	Burundi	Tanzania	2. Customs and entry procedures	Low	Possible	Chemicals

NTB Description	Affected by the NTB	Source of the NTB	Indicative WTO NTB Category (1-6)	Expected Impact on Trade	Measurable	Sector Specific
National park fee of US$300	Rwanda	Tanzania	7. Other	Low	No	No
Tax on tobacco products	Rwanda	Uganda	2. Customs and entry procedures	Low	Possible	Tobacco
Transit fees on charcoal	Rwanda	Kenya	2. Customs and entry procedures	Low	Possible	Charcoal
No preferential treatment to G&B Soap Ltd	Tanzania	Rwanda	2. Customs and entry procedures	Low	Possible	Yes
Restricting cable corporation from tendering	Uganda	Kenya	1. Government participation & restrictive practices	Low	No	Yes
Railway development levy (1.5%) on Kenya exports	Kenya	Tanzania	5. Specific limitations	Medium	Yes	No
No preferential treatment on Kenya salt exports	Kenya	Tanzania	2. Customs and entry procedures	Low	Yes	Salt
No preferential treatment on Kenya plastics exports	Kenya	Tanzania	2. Customs and entry procedures	Low	Yes	Plastics
No preferential treatment on Kenya Delmote juice exports	Kenya	Rwanda	2. Customs and entry procedures	Medium	Yes	Food
Confiscation of fish exports on transit to DRC	Kenya	Uganda	7. Other	Medium	Yes	Food
No preferential treatment on Kenya Savannah cement exports	Kenya	Uganda	2. Customs and entry procedures	Low	Yes	Cement
Buses (Trinity Express Bus Company) are charged 10,000 Uganda Shillings in each Uganda district they pass through	Rwanda	Uganda	7. Other	Low	Possible	Yes
TFDA registration and retesting of Rwanda exports72	Rwanda	Tanzania	3. Technical barriers to trade	Low	No	No
Delays in issuing certificates by Tanzania's NEMA	Rwanda	Tanzania	7. Other	Low	No	No
Duty charges on ethanol produced by Kilimanjaro Biochem Ltd	Tanzania	Uganda	6. Charges on imports	Low	Yes	Yes
Delays in clearing SCT documents in Tanzania	Kenya	Tanzania, Uganda	7. Other	Low	No	No

Note: "Possible" refers to the Possibility to measure the NTB, but no data is available.

Table 2. Resolved NTBs, as of end 2016

NTB Description	Affected by the NTB	Source of the NTB	Indicative WTO NTB Category (1-6)	Expected Impact on Trade	Measurable	Sector Specific
Rwandan exporters of sugar required to provide cash bonds	Rwanda	Tanzania	6. Charges on imports	Low	No	Sugar
Vehicles from partner states charged entry fees	All	Burundi	2. Customs and entry procedures	Low	No	No
Weighbridges	All	Kenya, Tanzania, Uganda	1. Government participation	Medium	No	No
Burundians having to get visas	Burundi	Tanzania		Low	No	No
Port delays	All	Kenya, Tanzania	2. Customs and entry procedures	High	Captured	No
Restricting Konyagi imports	Tanzania	Kenya	2. Customs and entry procedures	Low	No	Spirits
Resisting preferential treatment on galvanized sheets	Kenya	Rwanda	2. Customs and entry procedures	Low	No	Metals
Not giving mutual recognition of standards	Kenya, Tanzania, Uganda	Rwanda, Burundi	2. Customs and entry procedures	Low	No	No
Charges on Kenya pharmaceuticals	Kenya	Tanzania	3. Technical barriers to trade	Low	Possible	Medicaments
Inspection procedures	Kenya	Tanzania	6. Charges on imports	Medium	Possible	No
Road consignment notes	Kenya	Tanzania	7. Other	Medium	No	No
Cumbersome testing procedures	Kenya	Tanzania	7. Other	Medium	No	No
Clearing processes	All	All	3. Technical barriers to trade	High	Captured	No
Non-recognition of RoO	Kenya	All	7. Other	Low	Yes (Tariff equivalent)	No
Charging withholding tax	Kenya	Uganda	2. Customs and entry procedures	Low	Yes (tax)	Services?
Charing diary levy	Kenya	Uganda	7. Other	Low	Yes (levy)	Dairy
Certifying milk	Kenya	Uganda	6. Charges on imports	Low	No	Dairy
Delays in releasing cargo	All	All	3. Technical barriers to trade	Medium	Captured	No
Requirement to declare herbal product formula	Uganda	Tanzania	7. Other	Low	No	Chemicals
Transit cargo duration (days)	All	Tanzania	4. Sanitary & phyto-sanitary measures	Medium	Yes	No
Not using EAC harmonised procedure	All	All	7. Other	Medium	Possible	No
Visa charges of US$250 for businessmen	Uganda, Kenya,	Tanzania	7. Other	Medium	Yes (tax)	Services?

NTB Description	Affected by the NTB	Source of the NTB	Indicative WTO NTB Category (1-6)	Expected Impact on Trade	Measurable	Sector Specific
	Rwanda and Burundi					
Delays issuing tea bonds	Rwanda	Kenya		Low	No	Tea
Plastic products being charged tariffs	Kenya	Tanzania	2. Customs and entry procedures	Low		No
Not part of customs system interface	All	Burundi	7. Other	Low	No	No
Restrictive immigration requirements	All	Kenya	6. Charges on imports	Low	No	No
Container freight station charges vary	Uganda, Burundi, Rwanda	Kenya	7. Other	Low	No	No
Inadequate police cover	All	All	2. Customs and entry procedures	Medium	No	No
Trucks not allowed to travel at night	Uganda, Burundi, Rwanda	Tanzania	7. Other	Medium	Possible	No
Ban on food imports	Rwanda	Burundi	7. Other	Medium	No	Food products
Requirements on tea imports	Uganda	Kenya	5. Specific limitations	Low	No	Tea
Lack of sheds at border posts	All	All	5. Specific limitations	Low	No	No
Numerous central corridor road blocks	Uganda, Burundi, Rwanda	Tanzania	6. Charges on imports	Medium	Captured	No
Lack of harmonized port procedures	Uganda, Burundi, Rwanda	Tanzania, Kenya	7. Other	Medium	No	No
Standards fraud	Kenya	Uganda	1. Government participation	Medium	No	No
Requiring bond	Uganda	Kenya	7. Other	Low	No	No
Yellow fever vaccination requirement	Uganda, Burundi, Rwanda	Tanzania, Kenya	3. Technical barriers to trade	Low	No	No
Vehicles from partner states charged tariffs	Kenya	Tanzania, Uganda	7. Other	Low	Yes	Autos
Auctioning of goods	Uganda	Kenya	2. Customs and entry procedures	Medium	No	No
Standards processes	All	All	2. Customs and entry procedures	Medium	No	No
Delays at Malaba border	Rwanda	Kenya	7. Other	Medium	No	No
Cash bond requirement on clothes	Uganda	Kenya	3. Technical barriers to trade	Low	No	No
Kenya trucks charged US$200 levy	Kenya	Tanzania	7. Other	Medium	No	No

NTB Description	Affected by the NTB	Source of the NTB	Indicative WTO NTB Category (1-6)	Expected Impact on Trade	Measurable	Sector Specific
Not issuing simple RoO certificates	Kenya	Tanzania	6. Charges on imports	Low	No	No
Not using EAC documents	All	All	2. Customs and entry procedures	High	No	No
Requiring cash bond on vehicles	Uganda, Rwanda and Burundi	Kenya	2. Customs and entry procedures	Medium	No	Autos
Non-recognition of RoO on furniture	Kenya	Tanzania	7. Other	Medium	Possible	Furniture
Documents required for port clearance	Burundi	Kenya, Tanzania		Low	No	No
Levy of 2khs per kg on agricultural products	Tanzania	Kenya	2. Customs and entry procedures	Low	Possible	No
Tourist vans not allowed entry	Kenya	Tanzania	2. Customs and entry procedures	Low	No	No
Requirements for bulk fuel procurement	Burundi	Tanzania	7. Other	Medium	No	No
Rice being charged levy	Kenya	Uganda	6. Charges on imports	Low	No	No
Cut flowers being blocked	Tanzania	Kenya	5. Specific limitations	Low	No	No
Restrictive right to work for NGOs	Tanzania	Uganda	1. Government participation	Low	No	No
Port delays	Uganda, Burundi, Rwanda	Tanzania	6. Charges on imports	Medium	No	No
Double handling charges	Burundi	Tanzania	5. Specific limitations	Low	Yes	No
Harassment at border	Tanzania	Kenya	7. Other	Medium	No	No
Requirements on form of RoO certificates	Tanzania	Kenya	7. Other	Low	No	No
Restricted export of mosquito nets	Tanzania	Uganda	7. Other	Low	No	Mosquito nets
Food imports denied entry	Burundi	Rwanda	7. Other	Medium	No	Food products
Not accepting bills of landing	Kenya	Tanzania	2. Customs and entry procedures	Low	No	No
Customs warehousing	Uganda	Kenya	5. Specific limitations	Low	No	No
Inspection procedures	Tanzania	Kenya	5. Specific limitations	Low	No	No
Beer denied entry	Burundi	Tanzania	2. Customs and entry procedures	Low	Possible	Beer
Bond guarantees required on oil	Uganda	Kenya	7. Other	Low	No	Oil
Cigarettes to have 75% local material	Uganda	Kenya	7. Other	Low	No	Tobacco
Duty charged on aluminium products	Kenya	Uganda	5. Specific limitations	Low	Possible	No
Railway levy	Kenya	All	6. Charges on imports	Medium	Possible	No

NTB Description	Affected by the NTB	Source of the NTB	Indicative WTO NTB Category (1-6)	Expected Impact on Trade	Measurable	Sector Specific
Metal products charged tariffs	Kenya	Burundi	2. Customs and entry procedures	Low	Possible	No
Plastic products being charged tariffs	Kenya	Tanzania	6. Charges on imports	Low	Possible	No
Non-recognition of RoO on vehicles	Kenya	Tanzania, Uganda, Rwanda	7. Other	Medium	Yes	Autos
Fees on sugar imports	Uganda	Kenya	2. Customs and entry procedures	Low	Yes	Sugar
No mutual recognition of insurance companies	Uganda	Kenya	2. Customs and entry procedures	Low	No	No
High administration procedures at freight stations	Uganda	Kenya		Low	No	No
Delays in clearing goods	Tanzania	Kenya		Low	No	No
Charging US$90 transit container fees	Burundi	Tanzania	6. Charges on imports	Low	Yes	No
Scanning of goods	Uganda	Kenya	7. Other	Low	No	No
No preferential treatment on Candy Kenya Ltd	Kenya	Rwanda	7. Other	Low	Yes	Yes

Note: Orange highlighted rows represent high impact NTBs on trade flows for the region as a whole. "Possible" refers to the Possibility to measure the NTB.

Annex H: CGE Results

Annex H CGE Results

Table A1 Imports by sector, Ports

	Kenya	Tanzania	Rwanda	Uganda
	%	%	%	%
Rice	-0.63	4.77	2.06	-0.2
Wheat	-1	1.63	-0.03	-0.95
Vegetables, fruit, nuts	0.39	1.35	0.17	0.07
Sugar	0.24	0.87	-0.94	-0.03
Plant fibres	0.12	-1.02	-1.4	-0.41
Other crops	0.63	2.27	0.11	0.06
Forestry & fishing	0.5	0.47	0.13	-0.06
Resources	-0.66	0.26	-0.04	-0.03
Beef and veal	1.56	1.84	4.02	1.11
Pork and poultry	0.92	2.7	0.75	0.14
Dairy products	0.54	1.99	0.63	0.46
Food products nec	0.35	1.39	0.08	0.06
Beverages & tobacco	0.2	0.4	0.04	-0.1
Textiles	0.19	-0.07	-0.2	0.39
Wearing apparel	0.81	1.53	0.97	1.4
Leather	0.67	0.15	-0.3	-0.05
Electronics	-0.35	-0.65	-0.56	0.1
Petroleum, coal products	-0.13	-0.54	-0.1	-0.07
Motor vehicle & trans equip	-0.58	-0.71	-0.06	-0.39
Wood & paper products	0.49	0.38	-0.3	0.15
Chemical, rubber & plastics	-0.02	-0.5	0.35	0.26
Machinery and equipment nec	-0.32	-0.7	0	0.25
Mineral products nec	0.64	1.66	-0.21	-0.06
Manufactures	-0.56	0.29	-0.72	0.15

Source: GTAP simulations.

Table A2 Exports by sector, Ports

	Kenya	Tanzania	Rwanda	Uganda
	%	%	%	%
Rice	-0.05	-0.48	0.51	0.26
Wheat	-3.7	2.83	4.42	7.71
Vegetables, fruit, nuts	0.09	0.41	0.1	0.15
Sugar	-0.9	0.41	1.45	-1.56
Plant fibres	0.89	2.87	-1.12	0.15
Other crops	-0.07	0.59	-0.42	0.11
Forestry & fishing	-0.78	-0.4	-0.07	0.15
Resources	0.36	-0.29	0.05	0.06
Beef and veal	-0.09	0.08	0.25	0.7
Pork and poultry	-1.89	0.37	-1.84	0.39
Dairy products	-0.62	0.28	0.61	0.05
Food products nec	-0.15	0.5	-0.07	0.28
Beverages & tobacco	-0.14	0.42	0.12	0.11
Textiles	-0.81	-1.36	-1.12	-0.39
Wearing apparel	1.49	1.83	0.56	1.16
Leather	-0.32	2.14	1.42	1.12
Electronics	-2.29	0.08	1.67	-2.36
Petroleum, coal products	0.01	-0.44	0.16	-0.07
Motor vehicle & trans equip	-3.17	1.13	0.77	-0.91
Wood & paper products	-1.44	0.11	-2.6	-1.58
Chemical, rubber & plastics	-3.16	1.14	0.69	-0.56
Machinery and equipment nec	-4.03	0.99	0.75	-3.65
Mineral products nec	-2.63	0.43	0.59	-0.51
Manufactures	-1.78	1.89	1.49	0.09

Source: GTAP simulations.

Table A3 Imports by sector, Corridor (excluding Ports)

	Kenya	Tanzania	Rwanda	Uganda
	%	%	%	%
Rice	0.17	0.18	0.52	7.09
Wheat	0.26	0.08	0.15	-0.11
Vegetables, fruit, nuts	0.63	0.06	0.32	4.23
Sugar	0.75	0.07	0.1	0.1
Plant fibres	-0.18	1.28	0.76	-1.58
Other crops	0.75	0.09	0.53	2.74
Forestry & fishing	0.6	0.13	0.41	-0.19
Resources	0.42	0.07	-0.23	-0.43
Beef and veal	1.19	-0.23	0.29	11.93
Pork and poultry	0.82	-0.12	0.71	5.22
Dairy products	1.38	-0.09	0.6	13.27
Food products nec	0.72	0.07	0.14	3.24
Beverages & tobacco	0.46	0.05	0.15	0.49
Textiles	0.31	0.07	0.14	1.58
Wearing apparel	0.64	0.09	0.17	0.85
Leather	0.53	0.04	0.14	1.12
Electronics	0.33	0.02	0.06	-0.05
Petroleum, coal products	0.07	0.01	0.01	-0.14
Motor vehicle & trans equip	0.15	0.02	0.09	-0.05
Wood & paper products	0.67	0.08	0.19	2.48
Chemical, rubber & plastics	0.42	0.05	0.21	0.64
Machinery and equipment nec	0.25	0.02	0.07	-0.24
Mineral products nec	0.72	0.08	0.43	7.52
Manufactures	0.71	0.03	0.04	1.76

Source: GTAP simulations.

Table A4 Exports by sector, Corridor (excluding Ports)

	Kenya	Tanzania	Rwanda	Uganda
	%	%	%	%
Rice	9.36	2.37	-0.45	1.07
Wheat	67.77	-0.29	-0.49	0.82
Vegetables, fruit, nuts	-0.31	-0.09	-0.09	0.38
Sugar	3.65	0	-0.23	0.63
Plant fibres	-0.18	-0.2	19	0.46
Other crops	-1.01	-0.02	-0.12	0.61
Forestry & fishing	-1.05	-0.14	-0.28	0.3
Resources	-0.48	-0.17	-0.03	0.14
Beef and veal	-1.4	-0.34	-0.15	1.38
Pork and poultry	2.31	-0.3	11.87	1.34
Dairy products	2.54	-0.3	0.11	1.51
Food products nec	0.75	0.07	3.55	0.7
Beverages & tobacco	0.7	-0.03	-0.02	0.56
Textiles	4.33	2.08	14.84	1.5
Wearing apparel	-1.15	-0.04	-0.24	1.61
Leather	1.43	-0.02	0.2	1.67
Electronics	7.02	2.11	0.6	1.83
Petroleum, coal products	3.67	2.64	-0.07	0.32
Motor vehicle & trans equip	7.04	1.8	1.19	1.33
Wood & paper products	5.86	1.91	0.74	1.47
Chemical, rubber & plastics	6.7	2.34	0.05	1.4
Machinery and equipment nec	2.58	0.8	4.42	1.81
Mineral products nec	21.97	0.97	-0.01	0.34
Manufactures	10.18	-0.22	0.66	2.52

Source: GTAP simulations.

Annex I: Econometric Results

Annex Tables: Regression Results

Table A.1: Impacts of LPI Sub-indices on exports (weighted average)				
	Factor loading	Weight	Individual impact	Weighted impacts on exports
LPI: ability to track and trace consignments	0.41	0.17	689	115.1
LPI: quality of trade and transport related infrastructure	0.42	0.17	910	155.8
LPI: Timeliness	0.4	0.16	485	79.1
LPI: Customs efficiency	0.4072	0.17	541	89.8
LPI: Competitively priced shipment	0.3961	0.16	609	98.3
LPI: Quality of logistics services	0.42	0.17	1083	185.4
	2.4533	1	-	723.5

Table A.2: Impacts of LPI Sub-indices on imports (weighted average)				
	Factor loading	Weight	Individual impact	Weighted impacts on Imports
LPI: ability to track and trace consignments	0.41	0.17	358	59.8
LPI: quality of trade and transport related infrastructure	0.42	0.17	504	86.3
LPI: Timeliness	0.4	0.16	210	34.2
LPI: Customs efficiency	0.4072	0.17	324	53.8
LPI: Competitively priced shipment	0.3961	0.16	334	53.9
LPI: Quality of logistics services	0.42	0.17	573	98.1
	2.4533	1.00	-	386.2

Table A.3: Impact of LPI on exports: OLS Estimates

	(1) POLS1	(2) POLS2	(3) POLS3	(4) POLS4	(5) POLS5	(6) POLS6	(7) POLS7	(8) POLS8	(9) POLS9	(10) POLS10	(11) POLS11
log of GDP of country i	1.76***	1.78***	1.77***	1.71***	1.72***	1.95***	1.75***	1.74***	1.76***	1.76***	1.68***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of GDP of country j	0.95***	1.02***	0.96***	0.93***	0.95***	1.13***	0.94***	0.94***	1.01***	0.95***	0.91***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)
log of distance between i and j	-1.32***	-1.34***	-1.32***	-1.31***	-1.32***	-1.36***	-1.31***	-1.31***	-1.34***	-1.32***	-1.30***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
1 for contiguity	1.17***	1.11***	1.14***	1.14***	1.13***	1.04***	1.14***	1.18***	1.12***	1.14***	1.15***
	(0.12)	(0.11)	(0.11)	(0.11)	(0.12)	(0.11)	(0.12)	(0.12)	(0.11)	(0.11)	(0.11)
1 for common official of primary language	0.70***	0.68***	0.69***	0.73***	0.68***	0.69***	0.69***	0.72***	0.70***	0.71***	0.76***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
1 if countries were or are the same country	0.96***	0.94***	0.94***	0.99***	0.99***	0.91***	1.02***	0.96***	0.93***	0.93***	0.98***
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
1 for common colonizer post 1945	0.92***	0.92***	0.93***	0.88***	0.92***	0.93***	0.90***	0.94***	0.94***	0.95***	0.90***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i	1.34***							1.33***			
	(0.03)							(0.03)			
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j	0.51***							0.51***			
	(0.04)							(0.04)			

	(1) POLS1	(2) POLS2	(3) POLS3	(4) POLS4	(5) POLS5	(6) POLS6	(7) POLS7	(8) POLS8	(9) POLS9	(10) POLS10	(11) POLS11
log of remoteness index of country i	0.65***	0.65***	0.66***	0.55***	0.53***	0.79***	0.61***	0.63***	0.64***	0.64***	0.53***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of remoteness index of country j	0.06	0.13**	0.07	0.03	0.03	0.21***	0.05	0.05	0.12*	0.06	0.01
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
lpi Ability to track and trace consignments (1=low 5) cou i		1.14***							1.14***		
		(0.03)							(0.03)		
lpi Ability to track and trace consignments (1=low 5) cou j		0.44***							0.44***		
		(0.03)							(0.03)		
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i			1.22***							1.21***	
			(0.03)							(0.03)	
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j			0.47***							0.46***	
			(0.03)							(0.03)	
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i				1.35***							1.35***
				(0.03)							(0.03)

	(1) POLS1	(2) POLS2	(3) POLS3	(4) POLS4	(5) POLS5	(6) POLS6	(7) POLS7	(8) POLS8	(9) POLS9	(10) POLS10	(11) POLS11
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j				0.52***							0.53***
				(0.03)							(0.03)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i					1.00***						
					(0.03)						
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j					0.41***						
					(0.03)						
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i						1.19***					
						(0.03)					
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j						0.36***					
						(0.03)					
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i							0.99***				
							(0.03)				

	(1) POLS1	(2) POLS2	(3) POLS3	(4) POLS4	(5) POLS5	(6) POLS6	(7) POLS7	(8) POLS8	(9) POLS9	(10) POLS10	(11) POLS11
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j							0.40***				
							(0.03)				
tmea_lpi_i								-0.22***			
								(0.04)			
tmea_lpi_j								-0.15***			
								(0.03)			
tmea_lpi_track_i									-0.24***		
									(0.04)		
tmea_lpi_track_j									-0.15***		
									(0.03)		
tmea_lpi_comp_i										-0.21***	
										(0.04)	
tmea_lpi_comp_j										-0.15***	
										(0.03)	
tmea_lpi_ease_i											-0.27***
											(0.03)
tmea_lpi_ease_j											-0.16***
											(0.03)
Constant	-64.67***	-67.97***	-65.17***	-59.56***	-58.30***	-80.46***	-61.50***	-63.17***	-66.41***	-63.86***	-57.51***
	(3.92)	(3.92)	(3.93)	(3.94)	(3.97)	(3.93)	(3.96)	(3.92)	(3.92)	(3.93)	(3.95)
Observations	81688	81688	81688	81688	81688	81688	81688	81688	81688	81688	81688
Adjusted R^2	0.657	0.655	0.655	0.655	0.652	0.653	0.653	0.657	0.655	0.656	0.656

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Impact of LPI: OLS Estimates (Cont.)

	(1) POLS12	(2) POLS13	(3) POLS14	(4) POLS15	(5) POLS16	(6) POLS17	(7) POLS18	(8) POLS19	(9) POLS20	(10) POLS21
log of GDP of country i	1.70***	1.92***	1.74***	1.70***	1.71***	1.70***	1.65***	1.66***	1.88***	1.69***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of GDP of country j	0.93***	1.11***	0.93***	0.98***	1.04***	0.98***	0.96***	0.97***	1.14***	0.96***
	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)
log of distance between i and j	-1.32***	-1.35***	-1.31***	-1.31***	-1.33***	-1.31***	-1.30***	-1.31***	-1.35***	-1.30***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
1 for contiguity	1.14***	1.05***	1.15***	1.18***	1.13***	1.16***	1.15***	1.15***	1.06***	1.16***
	(0.12)	(0.11)	(0.12)	(0.12)	(0.11)	(0.12)	(0.11)	(0.12)	(0.11)	(0.12)
1 for common official of primary language	0.71***	0.72***	0.71***	0.73***	0.73***	0.74***	0.77***	0.73***	0.74***	0.73***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
1 if countries were or are the same country	0.98***	0.91***	1.02***	0.97***	0.95***	0.95***	1.00***	1.00***	0.93***	1.03***
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
1 for common colonizer post 1945	0.94***	0.95***	0.92***	0.94***	0.95***	0.96***	0.90***	0.95***	0.95***	0.92***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i	0.99***							0.97***		
	(0.03)							(0.03)		

	(1) POLS12	(2) POLS13	(3) POLS14	(4) POLS15	(5) POLS16	(6) POLS17	(7) POLS18	(8) POLS19	(9) POLS20	(10) POLS21
tmea_lpi_eff_i	-0.24***									
	(0.04)									
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j	0.41***							0.42***		
	(0.03)							(0.03)		
tmea_lpi_eff_j	-0.16***									
	(0.04)									
log of remoteness index of country i	0.51***	0.78***	0.60***	0.61***	0.61***	0.62***	0.51***	0.49***	0.75***	0.58***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of remoteness index of country j	0.02	0.19***	0.04	0.08	0.13**	0.08	0.04	0.04	0.21***	0.06
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i		1.19***							1.16***	
		(0.03)							(0.03)	
tmea_lpi_fre_i		-0.21***								
		(0.03)								

	(1) POLS12	(2) POLS13	(3) POLS14	(4) POLS15	(5) POLS16	(6) POLS17	(7) POLS18	(8) POLS19	(9) POLS20	(10) POLS21
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j		0.36***							0.37***	
		(0.03)							(0.03)	
tmea_lpi_fre_j		-0.13***								
		(0.03)								
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i			0.99***							0.97***
			(0.03)							(0.03)
tmea_lpi_trade_i			-0.22***							
			(0.04)							
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j			0.40***							0.42***
			(0.03)							(0.03)
tmea_lpi_trade_j			-0.15***							
			(0.04)							
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i				1.30***						
				(0.03)						

	(1) POLS12	(2) POLS13	(3) POLS14	(4) POLS15	(5) POLS16	(6) POLS17	(7) POLS18	(8) POLS19	(9) POLS20	(10) POLS21
ssa_lpi_i				-0.15***						
				(0.02)						
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j				0.53***						
				(0.04)						
ssa_lpi_j				0.07***						
				(0.02)						
lpi Ability to track and trace consignments (1=low 5) cou i					1.12***					
					(0.03)					
ssa_lpi_track_i					-0.18***					
					(0.02)					
lpi Ability to track and trace consignments (1=low 5) cou j					0.45***					
					(0.03)					
ssa_lpi_track_j					0.06***					
					(0.02)					
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i						1.19***				
						(0.03)				
ssa_lpi_comp_i						-0.18***				
						(0.02)				

	(1) POLS12	(2) POLS13	(3) POLS14	(4) POLS15	(5) POLS16	(6) POLS17	(7) POLS18	(8) POLS19	(9) POLS20	(10) POLS21
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j						0.48***				
						(0.03)				
ssa_lpi_comp_j						0.06***				
						(0.02)				
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i							1.32***			
							(0.03)			
ssa_lpi_ease_i							-0.16***			
							(0.02)			
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j							0.54***			
							(0.03)			
ssa_lpi_ease_j							0.07***			
							(0.02)			
ssa_lpi_eff_i								-0.19***		
								(0.02)		
ssa_lpi_eff_j								0.06***		
								(0.02)		

	(1) POLS12	(2) POLS13	(3) POLS14	(4) POLS15	(5) POLS16	(6) POLS17	(7) POLS18	(8) POLS19	(9) POLS20	(10) POLS21
ssa_lpi_fre_i									-0.14***	
									(0.02)	
ssa_lpi_fre_j									0.05***	
									(0.01)	
ssa_lpi_trade_i										-0.18***
										(0.02)
ssa_lpi_trade_j										0.06***
										(0.02)
Constant	-56.83***	-78.71***	-60.38***	-63.31***	-65.64***	-62.99***	-58.02***	-56.38***	-77.98***	-59.93***
	(3.97)	(3.94)	(3.97)	(3.92)	(3.93)	(3.93)	(3.94)	(3.97)	(3.95)	(3.95)
Observations	81688	81688	81688	81688	81688	81688	81688	81688	81688	81688
Adjusted R^2	0.653	0.654	0.654	0.658	0.656	0.657	0.656	0.654	0.654	0.655

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.4: Impact of LPI: PPML Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	PPML1	PPML2	PPML3	PPML4	PPML5	PPML6	PPML7	PPML8	PPML9	PPML10	PPML11
log of GDP of country i	1.23***	1.23***	1.24***	1.20***	1.22***	1.28***	1.22***	1.22***	1.22***	1.24***	1.20***
	(0.13)	(0.14)	(0.13)	(0.13)	(0.14)	(0.13)	(0.14)	(0.13)	(0.13)	(0.13)	(0.13)
log of GDP of country j	1.26***	1.26***	1.28***	1.22***	1.25***	1.31***	1.25***	1.26***	1.26***	1.28***	1.22***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
log of distance between i and j	-0.58***	-0.60***	-0.58***	-0.57***	-0.59***	-0.59***	-0.58***	-0.58***	-0.59***	-0.58***	-0.57***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
1 for contiguity	0.72***	0.69***	0.71***	0.72***	0.70***	0.70***	0.71***	0.72***	0.69***	0.71***	0.72***
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.16)	(0.15)	(0.15)	(0.15)	(0.15)
1 for common official of primary language	0.04	0.04	0.04	0.08	0.05	0.05	0.04	0.04	0.04	0.05	0.08
	(0.11)	(0.11)	(0.11)	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.10)
1 if countries were or are the same country	0.93***	0.93***	0.93***	0.86***	0.94***	0.93***	0.94***	0.93***	0.93***	0.92***	0.86***
	(0.33)	(0.34)	(0.34)	(0.31)	(0.34)	(0.34)	(0.34)	(0.33)	(0.34)	(0.34)	(0.31)
1 for common colonizer post 1945	0.68***	0.68***	0.68***	0.65***	0.65***	0.68***	0.68***	0.70***	0.69***	0.70***	0.67***
	(0.23)	(0.23)	(0.23)	(0.22)	(0.24)	(0.23)	(0.23)	(0.23)	(0.23)	(0.23)	(0.22)
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i	0.27***							0.27***			
	(0.09)							(0.09)			

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	PPML1	PPML2	PPML3	PPML4	PPML5	PPML6	PPML7	PPML8	PPML9	PPML10	PPML11
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j	0.37***							0.37***			
	(0.09)							(0.09)			
log of remoteness index of country i	0.48***	0.47***	0.49***	0.45***	0.45***	0.52***	0.47***	0.47***	0.47***	0.49***	0.45***
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
log of remoteness index of country j	0.53***	0.54***	0.55***	0.48***	0.50***	0.57***	0.52***	0.53***	0.54***	0.55***	0.48***
	(0.13)	(0.14)	(0.14)	(0.13)	(0.13)	(0.14)	(0.14)	(0.13)	(0.14)	(0.14)	(0.13)
lpi Ability to track and trace consignments (1=low 5) cou i		0.18**							0.18**		
		(0.09)							(0.09)		
lpi Ability to track and trace consignments (1=low 5) cou j		0.34***							0.34***		
		(0.09)							(0.09)		
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i			0.24***							0.24***	
			(0.09)							(0.09)	

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	PPML1	PPML2	PPML3	PPML4	PPML5	PPML6	PPML7	PPML8	PPML9	PPML10	PPML11
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j			0.34***							0.35***	
			(0.08)							(0.08)	
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i				0.39***							0.39***
				(0.09)							(0.09)
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j				0.43***							0.43***
				(0.09)							(0.09)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i					0.18**						
					(0.08)						
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j					0.27***						
					(0.07)						

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	PPML1	PPML2	PPML3	PPML4	PPML5	PPML6	PPML7	PPML8	PPML9	PPML10	PPML11
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i						0.30***					
						(0.09)					
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j						0.38***					
						(0.09)					
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i							0.21***				
							(0.08)				
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j							0.28***				
							(0.08)				
tmea_lpi_i								-0.51***			
								(0.06)			
tmea_lpi_j								-0.08			
								(0.06)			
tmea_lpi_track_i									-0.51***		
									(0.06)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	PPML1	PPML2	PPML3	PPML4	PPML5	PPML6	PPML7	PPML8	PPML9	PPML10	PPML11
tmea_lpi_track_j									-0.09		
									(0.06)		
tmea_lpi_comp_i										-0.53***	
										(0.06)	
tmea_lpi_comp_j										-0.08	
										(0.07)	
tmea_lpi_ease_i											-0.49***
											(0.05)
tmea_lpi_ease_j											-0.09
											(0.06)
Constant	-80.35***	-79.86***	-81.86***	-77.50***	-77.67***	-85.29***	-78.68***	-80.20***	-79.71***	-81.70***	-77.34***
	(8.00)	(8.22)	(8.01)	(7.72)	(8.14)	(7.99)	(8.20)	(7.98)	(8.20)	(7.99)	(7.70)
Observations	110600	110600	110600	110600	110600	110600	110600	110600	110600	110600	110600
Adjusted R^2											

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.5: Impact of LPI: PPML Estimates (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PPML12	PPML13	PPML14	PPML15	PPML16	PPML17	PPML18	PPML19	PPML20	PPML21
log of GDP of country i	1.21***	1.27***	1.21***	1.22***	1.22***	1.24***	1.20***	1.21***	1.27***	1.21***
	(0.14)	(0.13)	(0.14)	(0.13)	(0.13)	(0.13)	(0.13)	(0.14)	(0.13)	(0.14)
log of GDP of country j	1.25***	1.31***	1.24***	1.26***	1.26***	1.27***	1.22***	1.25***	1.30***	1.24***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
log of distance between i and j	-0.59***	-0.59***	-0.58***	-0.57***	-0.59***	-0.58***	-0.57***	-0.58***	-0.59***	-0.58***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
1 for contiguity	0.70***	0.70***	0.71***	0.71***	0.69***	0.71***	0.72***	0.70***	0.70***	0.70***
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
1 for common official of primary language	0.05	0.05	0.04	0.05	0.05	0.05	0.09	0.06	0.06	0.05
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.10)	(0.11)	(0.11)	(0.11)
1 if countries were or are the same country	0.94***	0.92***	0.94***	0.92***	0.92***	0.92***	0.86***	0.93***	0.92***	0.93***
	(0.34)	(0.34)	(0.34)	(0.33)	(0.34)	(0.34)	(0.31)	(0.34)	(0.34)	(0.34)
1 for common colonizer post 1945	0.67***	0.69***	0.70***	0.69***	0.69***	0.69***	0.66***	0.66***	0.68***	0.69***
	(0.24)	(0.23)	(0.23)	(0.23)	(0.23)	(0.23)	(0.22)	(0.24)	(0.23)	(0.23)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i	0.18**							0.17**		
	(0.08)							(0.08)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PPML12	PPML13	PPML14	PPML15	PPML16	PPML17	PPML18	PPML19	PPML20	PPML21
tmea_lpi_eff_i	-0.57***									
	(0.06)									
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j	0.27***							0.27***		
	(0.07)							(0.07)		
tmea_lpi_eff_j	-0.10									
	(0.07)									
log of remoteness index of country i	0.45***	0.52***	0.47***	0.47***	0.46***	0.49***	0.45***	0.45***	0.52***	0.47***
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
log of remoteness index of country j	0.50***	0.57***	0.52***	0.53***	0.53***	0.55***	0.48***	0.50***	0.57***	0.52***
	(0.13)	(0.13)	(0.14)	(0.13)	(0.14)	(0.13)	(0.13)	(0.13)	(0.13)	(0.14)
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i		0.30***							0.29***	
		(0.09)							(0.09)	
tmea_lpi_fre_i		-0.43***								
		(0.05)								

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PPML12	PPML13	PPML14	PPML15	PPML16	PPML17	PPML18	PPML19	PPML20	PPML21
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j		0.38***							0.38***	
		(0.09)							(0.09)	
tmea_lpi_fre_j		-0.08								
		(0.05)								
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i			0.21***							0.20***
			(0.08)							(0.08)
tmea_lpi_trade_i			-0.57***							
			(0.06)							
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j			0.28***							0.28***
			(0.08)							(0.08)
tmea_lpi_trade_j			-0.09							
			(0.07)							
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i				0.26***						
				(0.09)						

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PPML12	PPML13	PPML14	PPML15	PPML16	PPML17	PPML18	PPML19	PPML20	PPML21
ssa_lpi_i				-0.08*						
				(0.04)						
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j				0.37***						
				(0.09)						
ssa_lpi_j				-0.03						
				(0.03)						
lpi Ability to track and trace consignments (1=low 5) cou i					0.18**					
					(0.09)					
ssa_lpi_track_i					-0.09**					
					(0.04)					
lpi Ability to track and trace consignments (1=low 5) cou j					0.34***					
					(0.09)					
ssa_lpi_track_j					-0.04					
					(0.03)					
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i						0.23***				
						(0.09)				
ssa_lpi_comp_i						-0.09**				
						(0.04)				

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PPML12	PPML13	PPML14	PPML15	PPML16	PPML17	PPML18	PPML19	PPML20	PPML21
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j						0.34***				
						(0.08)				
ssa_lpi_comp_j						-0.03				
						(0.03)				
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i							0.38***			
							(0.09)			
ssa_lpi_ease_i							-0.07*			
							(0.04)			
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j							0.43***			
							(0.09)			
ssa_lpi_ease_j							-0.03			
							(0.03)			
ssa_lpi_eff_i								-0.10**		
								(0.05)		
ssa_lpi_eff_j								-0.04		
								(0.04)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PPML12	PPML13	PPML14	PPML15	PPML16	PPML17	PPML18	PPML19	PPML20	PPML21
ssa_lpi_fre_i									-0.07*	
									(0.04)	
ssa_lpi_fre_j									-0.03	
									(0.03)	
ssa_lpi_trade_i										-0.09**
										(0.04)
ssa_lpi_trade_j										-0.03
										(0.04)
Constant	-77.52***	-85.14***	-78.54***	-79.89***	-79.33***	-81.35***	-77.12***	-77.20***	-84.68***	-78.26***
	(8.12)	(7.97)	(8.18)	(7.98)	(8.20)	(7.99)	(7.70)	(8.11)	(7.99)	(8.18)
Observations	110600	110600	110600	110600	110600	110600	110600	110600	110600	110600
Adjusted R^2										

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.6: Impact of LPI: Heckman estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
ln_export											
log of GDP of country i	1.76***	1.77***	1.77***	1.70***	1.70***	1.97***	1.73***	1.74***	1.75***	1.76***	1.68***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of GDP of country j	0.97***	1.04***	0.98***	0.94***	0.97***	1.13***	0.95***	0.96***	1.03***	0.97***	0.92***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
log of distance between i and j	-1.26***	-1.28***	-1.26***	-1.25***	-1.26***	-1.30***	-1.25***	-1.25***	-1.28***	-1.26***	-1.25***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
1 for contiguity	1.15***	1.10***	1.13***	1.14***	1.12***	1.02***	1.13***	1.16***	1.11***	1.13***	1.15***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.11)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
1 for common official of primary language	0.62***	0.61***	0.61***	0.66***	0.61***	0.64***	0.61***	0.64***	0.63***	0.63***	0.68***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
1 if countries were or are the same country	0.86***	0.83***	0.85***	0.89***	0.87***	0.82***	0.90***	0.86***	0.82***	0.84***	0.89***
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
1 for common colonizer post 1945	0.90***	0.91***	0.91***	0.85***	0.90***	0.91***	0.88***	0.93***	0.95***	0.94***	0.89***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i	1.27***							1.27***			
	(0.04)							(0.04)			
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j	0.50***							0.50***			
	(0.04)							(0.04)			
log of remoteness index of country i	0.67***	0.67***	0.68***	0.57***	0.52***	0.83***	0.61***	0.65***	0.66***	0.67***	0.55***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of remoteness index of country j	0.09	0.15**	0.10	0.04	0.06	0.21***	0.07	0.07	0.14**	0.09	0.02
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
lpi Ability to track and trace consignments (1=low 5) cou i		1.15***							1.15***		
		(0.03)							(0.03)		
lpi Ability to track and trace consignments (1=low 5) cou j		0.43***							0.43***		
		(0.03)							(0.03)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i			1.19***							1.18***	
			(0.03)							(0.03)	
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j			0.46***							0.45***	
			(0.03)							(0.03)	
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i				1.40***							1.40***
				(0.04)							(0.04)
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j				0.52***							0.53***
				(0.03)							(0.04)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i					0.92***						
					(0.03)						

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j					0.40***						
					(0.03)						
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i						1.17***					
						(0.03)					
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j						0.36***					
						(0.03)					
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i							0.93***				
							(0.03)				
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j							0.39***				
							(0.03)				

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
tmea_lpi_i								-0.20***			
								(0.04)			
tmea_lpi_j								-0.14***			
								(0.03)			
tmea_lpi_track_i									-0.21***		
									(0.04)		
tmea_lpi_track_j									-0.14***		
									(0.03)		
tmea_lpi_comp_i										-0.20***	
										(0.04)	
tmea_lpi_comp_j										-0.13***	
										(0.04)	
tmea_lpi_ease_i											-0.24***
											(0.04)
tmea_lpi_ease_j											-0.15***
											(0.03)
Constant	-66.36***	-69.30***	-67.26***	-61.01***	-58.93***	-82.28***	-61.67***	-65.08***	-68.00***	-66.14***	-59.32***
	(4.10)	(4.09)	(4.11)	(4.08)	(4.14)	(4.15)	(4.15)	(4.11)	(4.10)	(4.12)	(4.10)
select											
log of GDP of country i	0.13***	0.15***	0.12***	0.14***	0.07*	0.28***	0.09**	0.13***	0.15***	0.11***	0.13***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
log of GDP of country j	0.17***	0.24***	0.16***	0.18***	0.15***	0.28***	0.13***	0.18***	0.24***	0.17***	0.18***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
log of distance between i and j	-0.42***	-0.44***	-0.42***	-0.42***	-0.42***	-0.44***	-0.41***	-0.43***	-0.44***	-0.42***	-0.42***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
1 for contiguity	-0.00	-0.05	-0.03	-0.03	-0.01	-0.11	0.02	0.00	-0.05	-0.03	-0.03
	(0.15)	(0.15)	(0.15)	(0.15)	(0.14)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
1 for common official of primary language	0.58***	0.57***	0.58***	0.59***	0.56***	0.58***	0.57***	0.58***	0.57***	0.57***	0.59***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
1 if countries were or are the same country	1.23***	1.21***	1.21***	1.25***	1.22***	1.23***	1.24***	1.23***	1.21***	1.21***	1.24***
	(0.20)	(0.20)	(0.20)	(0.20)	(0.19)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1 for common colonizer post 1945	0.01	0.02	0.02	0.01	0.02	0.02	0.00	0.01	0.02	0.01	0.01
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i	0.84***							0.84***			
	(0.03)							(0.03)			
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j	0.34***							0.34***			
	(0.02)							(0.02)			

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
log of remoteness index of country i	-0.12***	-0.11***	-0.14***	-0.15***	-0.23***	-0.01	-0.18***	-0.12***	-0.11***	-0.14***	-0.15***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
log of remoteness index of country j	-0.09**	-0.03	-0.10**	-0.09**	-0.13***	0.00	-0.14***	-0.09**	-0.02	-0.10**	-0.09**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Lead time to export, median case (days)cou i	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
lpi Ability to track and trace consignments (1=low 5) cou i		0.67***							0.67***		
		(0.02)							(0.02)		
lpi Ability to track and trace consignments (1=low 5) cou j		0.28***							0.28***		
		(0.02)							(0.02)		
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i			0.78***							0.78***	
			(0.02)							(0.02)	

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j			0.30***							0.31***	
			(0.02)							(0.02)	
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i				0.72***							0.72***
				(0.02)							(0.02)
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j				0.32***							0.32***
				(0.02)							(0.02)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i					0.69***						
					(0.02)						
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j					0.28***						
					(0.02)						

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i						0.60***					
						(0.02)					
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j						0.19***					
						(0.02)					
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i							0.65***				
							(0.02)				
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j							0.27***				
							(0.02)				
tmea_lpi_i								-0.01			
								(0.02)			
tmea_lpi_j								0.03			
								(0.02)			

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heckman 1	Heckman 2	Heckman 3	Heckman 4	Heckman 5	Heckman 6	Heckman 7	Heckman 8	Heckman 9	Heckman10	Heckman11
tmea_lpi_track_i									-0.00		
									(0.02)		
tmea_lpi_track_j									0.03		
									(0.02)		
tmea_lpi_comp_i										0.01	
										(0.02)	
tmea_lpi_comp_j										0.04*	
										(0.02)	
tmea_lpi_ease_i											-0.03*
											(0.02)
tmea_lpi_ease_j											0.01
											(0.02)
Constant	-0.77	-3.94	0.82	-0.14	5.71**	-11.25***	4.71*	-0.82	-4.02	0.68	-0.07
	(2.61)	(2.58)	(2.60)	(2.59)	(2.63)	(2.60)	(2.61)	(2.61)	(2.59)	(2.61)	(2.60)
athrho											
Constant	-0.06***	-0.06***	-0.06***	-0.04***	-0.07***	-0.04***	-0.07***	-0.06***	-0.06***	-0.06***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
lnsigma											
Constant	0.83***	0.83***	0.83***	0.83***	0.84***	0.84***	0.84***	0.83***	0.83***	0.83***	0.83***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	77832	77832	77832	77832	77832	77832	77832	77832	77832	77832	77832
Adjusted R^2											

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.7: Impact of lpi on exports: Heckman estimates (Cont.)

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
ln_export										
log of GDP of country i	1.68***	1.95***	1.71***	1.71***	1.72***	1.72***	1.66***	1.65***	1.91***	1.68***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of GDP of country j	0.95***	1.11***	0.94***	1.01***	1.07***	1.01***	0.98***	1.00***	1.16***	0.98***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
log of distance between i and j	-1.26***	-1.29***	-1.25***	-1.25***	-1.28***	-1.26***	-1.25***	-1.26***	-1.29***	-1.25***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
1 for contiguity	1.13***	1.04***	1.14***	1.17***	1.13***	1.15***	1.15***	1.14***	1.04***	1.15***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
1 for common official of primary language	0.63***	0.66***	0.63***	0.67***	0.66***	0.67***	0.70***	0.66***	0.69***	0.66***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
1 if countries were or are the same country	0.87***	0.82***	0.90***	0.86***	0.83***	0.85***	0.89***	0.88***	0.83***	0.91***
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
1 for common colonizer post 1945	0.93***	0.95***	0.90***	0.93***	0.95***	0.95***	0.88***	0.93***	0.94***	0.91***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i	0.92***							0.89***		
	(0.03)							(0.03)		

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
tmea_lpi_eff_i	-0.23***									
	(0.04)									
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j	0.40***							0.42***		
	(0.03)							(0.03)		
tmea_lpi_eff_j	-0.15***									
	(0.04)									
log of remoteness index of country i	0.51***	0.81***	0.60***	0.64***	0.64***	0.66***	0.55***	0.50***	0.79***	0.59***
	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
log of remoteness index of country j	0.05	0.20***	0.06	0.11*	0.16**	0.11*	0.06	0.07	0.23***	0.09
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i		1.17***							1.11***	
		(0.03)							(0.03)	
tmea_lpi_fre_i		-0.20***								
		(0.03)								

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j		0.36***							0.38***	
		(0.03)							(0.03)	
tmea_lpi_fre_j		-0.12***								
		(0.03)								
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i			0.92***							0.89***
			(0.03)							(0.03)
tmea_lpi_trade_i			-0.20***							
			(0.04)							
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j			0.39***							0.41***
			(0.03)							(0.03)
tmea_lpi_trade_j			-0.14***							
			(0.04)							
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i				1.22***						
				(0.04)						

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
ssa_lpi_i				-0.20***						
				(0.02)						
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j				0.53***						
				(0.04)						
ssa_lpi_j				0.08***						
				(0.02)						
lpi Ability to track and trace consignments (1=low 5) cou i					1.12***					
					(0.03)					
ssa_lpi_track_i					-0.22***					
					(0.02)					
lpi Ability to track and trace consignments (1=low 5) cou j					0.44***					
					(0.03)					
ssa_lpi_track_j					0.07***					
					(0.02)					
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i						1.15***				
						(0.03)				
ssa_lpi_comp_i						-0.23***				
						(0.02)				

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j						0.47***				
						(0.03)				
ssa_lpi_comp_j						0.07***				
						(0.02)				
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i							1.34***			
							(0.04)			
ssa_lpi_ease_i							-0.20***			
							(0.02)			
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j							0.55***			
							(0.03)			
ssa_lpi_ease_j							0.09***			
							(0.02)			
ssa_lpi_eff_i								-0.24***		
								(0.02)		
ssa_lpi_eff_j								0.08***		
								(0.02)		

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
ssa_lpi_fre_i									-0.18***	
									(0.02)	
ssa_lpi_fre_j									0.06***	
									(0.01)	
ssa_lpi_trade_i										-0.23***
										(0.02)
ssa_lpi_trade_j										0.08***
										(0.02)
Constant	-57.67***	-80.81***	-60.73***	-66.05***	-68.16***	-66.32***	-60.80***	-58.19***	-80.76***	-61.32***
	(4.15)	(4.16)	(4.15)	(4.11)	(4.11)	(4.12)	(4.10)	(4.14)	(4.17)	(4.14)
select										
log of GDP of country i	0.07*	0.27***	0.09**	0.06	0.07*	0.04	0.06	-0.00	0.20***	0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
log of GDP of country j	0.15***	0.29***	0.13***	0.24***	0.31***	0.23***	0.25***	0.21***	0.35***	0.20***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
log of distance between i and j	-0.42***	-0.45***	-0.40***	-0.43***	-0.45***	-0.43***	-0.43***	-0.42***	-0.45***	-0.41***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
1 for contiguity	-0.01	-0.10	0.02	-0.01	-0.06	-0.04	-0.04	-0.02	-0.12	0.01
	(0.14)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
1 for common official of primary language	0.56***	0.58***	0.56***	0.60***	0.61***	0.61***	0.61***	0.59***	0.61***	0.59***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
1 if countries were or are the same country	1.22***	1.23***	1.25***	1.23***	1.23***	1.22***	1.25***	1.23***	1.24***	1.25***
	(0.19)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.19)	(0.20)	(0.20)
1 for common colonizer post 1945	0.02	0.02	-0.00	0.02	0.02	0.02	0.01	0.02	0.03	0.01
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou i	0.69***							0.68***		
	(0.02)							(0.02)		
tmea_lpi_eff_i	-0.02									
	(0.02)									
LPI: Efficiency of customs clearance process (1 = L, 5 =H), cou j	0.28***							0.29***		
	(0.02)							(0.02)		
tmea_lpi_eff_j	0.04									
	(0.02)									
log of remoteness index of country i	-0.23***	-0.01	-0.18***	-0.18***	-0.18***	-0.20***	-0.21***	-0.29***	-0.08*	-0.24***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
log of remoteness index of country j	-0.12***	0.00	-0.13***	-0.03	0.03	-0.05	-0.03	-0.07*	0.05	-0.08*
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Lead time to export, median case (days)cou i	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.01***	-0.02***	-0.02***	-0.02***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou i		0.60***							0.58***	
		(0.02)							(0.02)	
tmea_lpi_fre_i		-0.03*								
		(0.02)								
LPI: Frequency with which shipments reach consignee with (1 = L, 5 =H), cou j		0.19***							0.20***	
		(0.02)							(0.02)	
tmea_lpi_fre_j		0.02								
		(0.02)								
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou i			0.65***							0.63***
			(0.02)							(0.02)

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
tmea_lpi_trade_i			0.03							
			(0.02)							
LPI: Quality of trade and transport-related infrastructu (1 = L, 5 =H), cou j			0.27***							0.28***
			(0.02)							(0.02)
tmea_lpi_trade_j			0.06**							
			(0.03)							
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou i				0.82***						
				(0.03)						
ssa_lpi_i				-0.07***						
				(0.01)						
LPI: Overall (1=low to 5=high) (1 = L, 5 =H), cou j				0.36***						
				(0.02)						
ssa_lpi_j				0.05***						
				(0.01)						
lpi Ability to track and trace consignments (1=low 5) cou i					0.67***					
					(0.02)					

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
ssa_lpi_track_i					-0.09***					
					(0.01)					
lpi Ability to track and trace consignments (1=low 5) cou j					0.29***					
					(0.02)					
ssa_lpi_track_j					0.04***					
					(0.01)					
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou i						0.77***				
						(0.02)				
ssa_lpi_comp_i						-0.09***				
						(0.01)				
LPI: Competence and quality of logistics services (1 = L, 5 =H), cou j						0.31***				
						(0.02)				
ssa_lpi_comp_j						0.04***				
						(0.01)				

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou i							0.69***			
							(0.02)			
ssa_lpi_ease_i							-0.09***			
							(0.01)			
LPI Ease of arranging competitively priced shipments (1 = L, 5 =H), cou j							0.33***			
							(0.02)			
ssa_lpi_ease_j							0.05***			
							(0.01)			
ssa_lpi_eff_i								-0.09***		
								(0.01)		
ssa_lpi_eff_j								0.05***		
								(0.01)		
ssa_lpi_fre_i									-0.07***	
									(0.01)	
ssa_lpi_fre_j									0.04***	
									(0.01)	
ssa_lpi_trade_i										-0.09***
										(0.01)
ssa_lpi_trade_j										0.05***
										(0.01)

	(1) Heckman12	(2) Heckman13	(3) Heckman14	(4) Heckman15	(5) Heckman16	(6) Heckman17	(7) Heckman18	(8) Heckman19	(9) Heckman20	(10) Heckman21
Constant	5.70**	-11.23***	4.52*	-0.62	-3.23	1.36	0.22	6.17**	-10.40***	4.72*
	(2.64)	(2.60)	(2.61)	(2.62)	(2.60)	(2.62)	(2.61)	(2.64)	(2.61)	(2.62)
athrho										
Constant	-0.07***	-0.04***	-0.07***	-0.05***	-0.05***	-0.05***	-0.03***	-0.06***	-0.03***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Insigma										
Constant	0.84***	0.84***	0.84***	0.83***	0.83***	0.83***	0.83***	0.83***	0.83***	0.83***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	77832	77832	77832	77832	77832	77832	77832	77832	77832	77832
Adjusted R^2										

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.8: Impact of Trading Across Borders Indicators: OLS Estimates

	(1) POLS22	(2) POLS23	(3) POLS24	(4) POLS25	(5) POLS26	(6) POLS27	(7) POLS28	(8) POLS29	(9) POLS30	(10) POLS31	(11) POLS32	(12) POLS33
log of GDP of country i	1.65***	1.83***	3.22***	2.07***	1.65***	1.81***	3.28***	2.05***	1.62***	1.79***	3.13***	2.04***
	(0.06)	(0.06)	(0.15)	(0.06)	(0.06)	(0.06)	(0.15)	(0.06)	(0.06)	(0.06)	(0.15)	(0.06)
log of GDP of country j	0.95***	1.12***	1.44***	1.44***	0.95***	1.10***	1.45***	1.43***	1.00***	1.15***	1.47***	1.44***
	(0.07)	(0.07)	(0.13)	(0.07)	(0.07)	(0.07)	(0.13)	(0.07)	(0.07)	(0.07)	(0.13)	(0.07)
log of distance between i and j	-1.44***	-1.45***	-1.53***	-1.43***	-1.44***	-1.44***	-1.54***	-1.43***	-1.45***	-1.45***	-1.54***	-1.43***
	(0.02)	(0.02)	(0.04)	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)
1 for contiguity	0.98***	1.00***	0.94***	1.02***	0.99***	1.01***	0.94***	1.03***	0.98***	1.01***	0.94***	1.04***
	(0.12)	(0.12)	(0.17)	(0.12)	(0.12)	(0.12)	(0.17)	(0.12)	(0.12)	(0.12)	(0.17)	(0.12)
1 for common official of primary language	0.86***	0.75***	0.71***	0.50***	0.87***	0.77***	0.71***	0.53***	0.86***	0.76***	0.71***	0.54***
	(0.05)	(0.05)	(0.09)	(0.05)	(0.05)	(0.05)	(0.09)	(0.05)	(0.05)	(0.05)	(0.09)	(0.05)
1 if countries were or are the same country	1.16***	1.11***	1.23***	1.06***	1.16***	1.11***	1.23***	1.07***	1.16***	1.11***	1.23***	1.07***
	(0.14)	(0.14)	(0.19)	(0.17)	(0.14)	(0.14)	(0.19)	(0.17)	(0.14)	(0.14)	(0.19)	(0.17)
1 for common colonizer post 1945	0.69***	0.80***	0.44***	0.64***	0.69***	0.81***	0.43***	0.66***	0.69***	0.80***	0.45***	0.65***
	(0.06)	(0.06)	(0.12)	(0.07)	(0.06)	(0.06)	(0.12)	(0.07)	(0.06)	(0.06)	(0.12)	(0.07)
ln_cost_exp_de_i	-0.87***				-0.86***				-0.82***			
	(0.03)				(0.03)				(0.03)			
ln_cost_imp_de_j	-0.43***				-0.42***				-0.47***			
	(0.02)				(0.02)				(0.03)			
log of remoteness index of country i	0.38***	0.59***	1.93***	0.78***	0.37***	0.57***	1.99***	0.76***	0.35***	0.56***	1.85***	0.78***
	(0.06)	(0.06)	(0.15)	(0.06)	(0.06)	(0.06)	(0.15)	(0.06)	(0.06)	(0.06)	(0.15)	(0.06)
log of remoteness index of country j	0.08	0.25***	0.53***	0.49***	0.08	0.23***	0.55***	0.48***	0.12*	0.27***	0.56***	0.48***
	(0.07)	(0.07)	(0.13)	(0.07)	(0.07)	(0.07)	(0.13)	(0.07)	(0.07)	(0.07)	(0.13)	(0.07)

	(1) POLS22	(2) POLS23	(3) POLS24	(4) POLS25	(5) POLS26	(6) POLS27	(7) POLS28	(8) POLS29	(9) POLS30	(10) POLS31	(11) POLS32	(12) POLS33
Time to export (days) (DB06-15 methodology) [TRD.ACRS.BRDR.EXPT.DURS.DY.DB0615]		-0.04***				-0.04***				-0.04***		
		(0.00)				(0.00)				(0.00)		
Time to import (days) (DB06-15 methodology) [TRD.ACRS.BRDR.IMP.DURS.DY.DB0615]		-0.01***				-0.01***				-0.01***		
		(0.00)				(0.00)				(0.00)		
Average time to clear exports through customs (days) cou i			-0.03***				-0.03***				-0.03***	
			(0.01)				(0.01)				(0.01)	
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou i				0.46***				0.45***				0.46***
				(0.01)				(0.01)				(0.01)
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou j				0.32***				0.32***				0.32***
				(0.01)				(0.01)				(0.01)
tmea_cost_exp_i					-0.02*							
					(0.01)							
tmea_cost_imp_j					-0.03***							
					(0.01)							
tmea_time_exp_i						-0.01***						
						(0.00)						
tmea_time_imp_j						-0.01***						
						(0.00)						

	(1) POLS22	(2) POLS23	(3) POLS24	(4) POLS25	(5) POLS26	(6) POLS27	(7) POLS28	(8) POLS29	(9) POLS30	(10) POLS31	(11) POLS32	(12) POLS33
tmea_time_cus_i							0.14***					
							(0.03)					
tmea_port_i								-0.14***				
								(0.03)				
tmea_port_j								-0.03				
								(0.02)				
ssa_cost_exp_i									-0.03***			
									(0.01)			
ssa_cost_imp_j									0.02***			
									(0.01)			
ssa_time_exp_i										-0.00***		
										(0.00)		
ssa_time_imp_j										0.00***		
										(0.00)		
ssa_time_cus_i											-0.01	
											(0.01)	
ssa_port_i												-0.12***
												(0.01)
ssa_port_j												0.07***
												(0.01)
Constant	-39.85***	-66.01***	-149.53***	-95.46***	-39.39***	-64.31***	-153.32***	-94.00***	-40.38***	-65.60***	-146.87***	-94.65***
	(4.24)	(4.12)	(8.17)	(4.00)	(4.24)	(4.14)	(8.30)	(4.03)	(4.24)	(4.15)	(8.27)	(4.03)
Observations	88759	88759	10024	85442	88759	88759	10024	85442	88759	88759	10024	85442
Adjusted R^2	0.638	0.639	0.565	0.674	0.638	0.639	0.566	0.675	0.639	0.639	0.565	0.676

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.9: Impact of Trading Across Borders Indicators: PPML Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	PPML22	PPML23	PPML24	PPML25	PPML26	PPML27	PPML28	PPML29	PPML30	PPML31	PPML32	PPML33
log of GDP of country i	1.00***	1.22***	2.40***	1.31***	1.00***	1.22***	2.40***	1.31***	1.00***	1.21***	2.50***	1.31***
	(0.13)	(0.12)	(0.29)	(0.13)	(0.13)	(0.12)	(0.29)	(0.13)	(0.13)	(0.12)	(0.32)	(0.13)
log of GDP of country j	1.17***	1.36***	1.08***	1.32***	1.17***	1.35***	1.08***	1.32***	1.17***	1.36***	1.07***	1.32***
	(0.11)	(0.11)	(0.22)	(0.13)	(0.11)	(0.11)	(0.22)	(0.13)	(0.11)	(0.11)	(0.22)	(0.13)
log of distance between i and j	-0.65***	-0.67***	-0.74***	-0.58***	-0.65***	-0.67***	-0.74***	-0.58***	-0.65***	-0.67***	-0.75***	-0.58***
	(0.04)	(0.04)	(0.10)	(0.05)	(0.04)	(0.04)	(0.10)	(0.05)	(0.04)	(0.04)	(0.11)	(0.05)
1 for contiguity	0.67***	0.60***	0.69***	0.72***	0.67***	0.60***	0.69***	0.72***	0.68***	0.60***	0.70***	0.72***
	(0.12)	(0.12)	(0.27)	(0.16)	(0.12)	(0.12)	(0.27)	(0.16)	(0.12)	(0.12)	(0.27)	(0.16)
1 for common official of primary language	0.23***	0.06	0.71***	-0.01	0.23***	0.07	0.71***	-0.01	0.23***	0.07	0.70***	-0.00
	(0.09)	(0.09)	(0.21)	(0.11)	(0.09)	(0.09)	(0.21)	(0.11)	(0.09)	(0.09)	(0.21)	(0.11)
1 if countries were or are the same country	0.59***	0.73***	0.30	0.93***	0.59***	0.73***	0.30	0.93***	0.59***	0.72***	0.30	0.92***
	(0.23)	(0.28)	(0.52)	(0.33)	(0.23)	(0.28)	(0.52)	(0.33)	(0.23)	(0.28)	(0.52)	(0.33)
1 for common colonizer post 1945	0.38**	0.70***	0.18	0.55**	0.39**	0.72***	0.18	0.56**	0.37**	0.71***	0.17	0.55**
	(0.17)	(0.19)	(0.41)	(0.23)	(0.17)	(0.19)	(0.41)	(0.23)	(0.17)	(0.19)	(0.41)	(0.23)
ln_cost_exp_de_i	-0.60***				-0.59***				-0.60***			
	(0.07)				(0.07)				(0.07)			
ln_cost_imp_de_j	-0.54***				-0.54***				-0.56***			
	(0.06)				(0.06)				(0.07)			
log of remoteness index of country i	0.20	0.43***	1.44***	0.55***	0.20	0.43***	1.44***	0.55***	0.20	0.43***	1.54***	0.55***
	(0.13)	(0.13)	(0.29)	(0.14)	(0.13)	(0.13)	(0.29)	(0.14)	(0.13)	(0.13)	(0.31)	(0.14)
log of remoteness index of country j	0.40***	0.61***	0.27	0.57***	0.40***	0.61***	0.27	0.57***	0.40***	0.61***	0.26	0.57***
	(0.11)	(0.12)	(0.22)	(0.14)	(0.11)	(0.12)	(0.22)	(0.13)	(0.11)	(0.12)	(0.22)	(0.13)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	PPML22	PPML23	PPML24	PPML25	PPML26	PPML27	PPML28	PPML29	PPML30	PPML31	PPML32	PPML33
Time to export (days) (DB06-15 methodology) [TRD.ACRS.BRDR.EXPT.DURS.DY.DB0615]		-0.01*				-0.01				-0.00		
		(0.00)				(0.00)				(0.00)		
Time to import (days) (DB06-15 methodology) [TRD.ACRS.BRDR.IMP.DURS.DY.DB0615]		-0.02***				-0.02***				-0.02***		
		(0.00)				(0.00)				(0.00)		
Average time to clear exports through customs (days) cou i			-0.03**				-0.03**				-0.04**	
			(0.02)				(0.02)				(0.02)	
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou i				0.15***				0.15***				0.15***
				(0.04)				(0.04)				(0.04)
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou j				0.20***				0.20***				0.20***
				(0.04)				(0.04)				(0.04)
tmea_cost_exp_i					-0.11***							
					(0.02)							
tmea_cost_imp_j					0.01							
					(0.02)							
tmea_time_exp_i						-0.05***						
						(0.01)						
tmea_time_imp_j						-0.01						
						(0.01)						

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	PPML22	PPML23	PPML24	PPML25	PPML26	PPML27	PPML28	PPML29	PPML30	PPML31	PPML32	PPML33
tmea_time_cus_i							-0.05					
							(0.05)					
tmea_port_i								-0.38***				
								(0.04)				
tmea_port_j								-0.04				
								(0.05)				
ssa_cost_exp_i									0.00			
									(0.01)			
ssa_cost_imp_j									0.03**			
									(0.01)			
ssa_time_exp_i										-0.01***		
										(0.00)		
ssa_time_imp_j										0.00		
										(0.00)		
ssa_time_cus_i											0.03	
											(0.02)	
ssa_port_i												-0.06**
												(0.03)
ssa_port_j												-0.01
												(0.03)
Constant	-51.78***	-80.20***	-119.73** *	-86.50***	-51.85***	-79.90***	-119.57** *	-86.23***	-51.47***	-79.88***	-123.96** *	-86.08***
	(8.32)	(8.64)	(15.59)	(8.42)	(8.30)	(8.62)	(15.64)	(8.40)	(8.36)	(8.65)	(16.76)	(8.41)
Observations	139562	139562	16244	106290	139562	139562	16244	106290	139562	139562	16244	106290
Adjusted R^2												

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.10: Impact of Trading Across Borders Indicators: Heckman Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Heckman22	Heckman23	Heckman24	Heckman25	Heckman26	Heckman27	Heckman28	Heckman29	Heckman30	Heckman31	Heckman32	Heckman33
ln_export												
log of GDP of country i	1.67***	1.92***	3.24***	1.94***	1.75***	1.91***	2.69***	2.12***	1.75***	1.93***	2.67***	2.10***
	(0.07)	(0.08)	(0.20)	(0.06)	(0.08)	(0.08)	(0.19)	(0.07)	(0.08)	(0.08)	(0.19)	(0.07)
log of GDP of country j	0.80***	1.06***	1.35***	1.36***	0.95***	1.05***	1.23***	1.36***	1.03***	1.11***	1.18***	1.36***
	(0.08)	(0.08)	(0.17)	(0.07)	(0.08)	(0.08)	(0.16)	(0.07)	(0.09)	(0.09)	(0.16)	(0.07)
log of distance between i and j	-1.34***	-1.33***	-1.45***	-1.31***	-1.32***	-1.33***	-1.34***	-1.35***	-1.34***	-1.34***	-1.32***	-1.34***
	(0.02)	(0.03)	(0.05)	(0.02)	(0.03)	(0.03)	(0.05)	(0.02)	(0.03)	(0.03)	(0.05)	(0.02)
1 for contiguity	1.09***	0.97***	1.22***	1.01***	0.97***	0.98***	1.41***	0.92***	0.95***	0.96***	1.42***	0.93***
	(0.13)	(0.14)	(0.20)	(0.12)	(0.15)	(0.14)	(0.21)	(0.13)	(0.15)	(0.14)	(0.21)	(0.13)
1 for common official of primary language	0.85***	0.80***	0.86***	0.43***	0.92***	0.82***	1.02***	0.53***	0.88***	0.78***	1.03***	0.56***
	(0.05)	(0.06)	(0.12)	(0.05)	(0.06)	(0.06)	(0.11)	(0.05)	(0.06)	(0.06)	(0.11)	(0.05)
1 if countries were or are the same country	1.01***	0.97***	1.18***	1.15***	1.04***	0.97***	1.17***	1.08***	1.05***	0.97***	1.18***	1.09***
	(0.16)	(0.16)	(0.26)	(0.19)	(0.16)	(0.16)	(0.26)	(0.18)	(0.16)	(0.16)	(0.26)	(0.18)
1 for common colonizer post 1945	0.65***	0.79***	-0.01	0.60***	0.66***	0.79***	0.06	0.55***	0.62***	0.77***	0.06	0.55***
	(0.07)	(0.08)	(0.17)	(0.08)	(0.08)	(0.08)	(0.16)	(0.08)	(0.08)	(0.08)	(0.16)	(0.08)
ln_cost_exp_de_i	-1.00***				-0.79***				-0.77***			
	(0.03)				(0.04)				(0.04)			
ln_cost_imp_de_j	-0.45***				-0.49***				-0.58***			
	(0.03)				(0.03)				(0.03)			
log of remoteness index of country i	0.37***	0.60***	1.99***	0.68***	0.39***	0.59***	1.29***	0.80***	0.40***	0.61***	1.27***	0.81***
	(0.07)	(0.08)	(0.20)	(0.06)	(0.08)	(0.08)	(0.19)	(0.07)	(0.08)	(0.08)	(0.19)	(0.07)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Heckman22	Heckman23	Heckman24	Heckman25	Heckman26	Heckman27	Heckman28	Heckman29	Heckman30	Heckman31	Heckman32	Heckman33
log of remoteness index of country j	-0.10	0.13	0.40**	0.40***	0.02	0.12	0.18	0.41***	0.06	0.17**	0.14	0.39***
	(0.08)	(0.08)	(0.17)	(0.07)	(0.08)	(0.08)	(0.16)	(0.07)	(0.09)	(0.09)	(0.16)	(0.07)
Time to export (days) (DB06-15 methodology) [TRD.ACRS.BRDR.EXPT.DURS.DY.DB0615]		-0.04***				-0.03***				-0.03***		
		(0.00)				(0.00)				(0.00)		
Time to import (days) (DB06-15 methodology) [TRD.ACRS.BRDR.IMP.DURS.DY.DB0615]		-0.02***				-0.02***				-0.02***		
		(0.00)				(0.00)				(0.00)		
Average time to clear exports through customs (days) cou i			-0.07***				-0.01				-0.01	
			(0.01)				(0.01)				(0.01)	
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou i				0.45***				0.40***				0.40***
				(0.02)				(0.02)				(0.02)
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou j				0.28***				0.34***				0.34***
				(0.01)				(0.02)				(0.02)
tmea_cost_exp_i					-0.02							
					(0.01)							
tmea_cost_imp_j					0.02							
					(0.01)							
tmea_time_exp_i						-0.01***						
						(0.00)						

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Heckman22	Heckman23	Heckman24	Heckman25	Heckman26	Heckman27	Heckman28	Heckman29	Heckman30	Heckman31	Heckman32	Heckman33
tmea_time_imp_j						-0.00						
						(0.00)						
tmea_time_cus_i							0.15***					
							(0.04)					
tmea_port_i								-0.13***				
								(0.03)				
tmea_port_j								0.01				
								(0.03)				
ssa_cost_exp_i									-0.01			
									(0.01)			
ssa_cost_imp_j									0.06***			
									(0.01)			
ssa_time_exp_i										-0.00		
										(0.00)		
ssa_time_imp_j										0.01***		
										(0.00)		
ssa_time_cus_i											0.01	
											(0.01)	
ssa_port_i												-0.10***
												(0.01)
ssa_port_j												0.04***
												(0.01)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Heckman22	Heckman23	Heckman24	Heckman25	Heckman26	Heckman27	Heckman28	Heckman29	Heckman30	Heckman31	Heckman32	Heckman33
Constant	-31.43***	-65.23***	-146.59***	-85.99***	-42.13***	-64.09***	-108.43***	-93.63***	-44.86***	-67.76***	-105.54***	-92.94***
	(4.94)	(5.48)	(11.20)	(4.26)	(5.59)	(5.51)	(11.16)	(4.44)	(5.58)	(5.55)	(11.03)	(4.45)
select												
log of GDP of country i	-0.03	0.30***	0.76***	0.28***	0.14***	0.30***	0.62***	0.51***	0.00	0.21***	0.52***	0.43***
	(0.04)	(0.04)	(0.09)	(0.05)	(0.04)	(0.04)	(0.09)	(0.05)	(0.04)	(0.04)	(0.10)	(0.05)
log of GDP of country j	0.01	0.30***	0.20***	0.44***	0.27***	0.31***	0.28***	0.56***	0.33***	0.35***	0.30***	0.59***
	(0.05)	(0.04)	(0.08)	(0.05)	(0.04)	(0.04)	(0.08)	(0.05)	(0.04)	(0.04)	(0.08)	(0.05)
log of distance between i and j	-0.47***	-0.47***	-0.46***	-0.48***	-0.45***	-0.47***	-0.40***	-0.53***	-0.45***	-0.47***	-0.41***	-0.53***
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
1 for contiguity	-0.13	0.06	-0.17	-0.10	0.04	0.06	0.17	0.02	0.04	0.06	0.16	0.02
	(0.20)	(0.18)	(0.23)	(0.20)	(0.18)	(0.18)	(0.27)	(0.24)	(0.18)	(0.18)	(0.27)	(0.24)
1 for common official of primary language	0.58***	0.46***	0.55***	0.50***	0.50***	0.46***	0.53***	0.47***	0.49***	0.45***	0.53***	0.51***
	(0.03)	(0.03)	(0.06)	(0.05)	(0.03)	(0.03)	(0.06)	(0.04)	(0.03)	(0.03)	(0.06)	(0.04)
1 if countries were or are the same country	1.06***	0.97***	5.86***	1.55***	0.96***	0.97***	6.38***	1.25***	0.97***	0.98***	6.33***	1.29***
	(0.27)	(0.22)	(0.14)	(0.30)	(0.22)	(0.22)	(0.17)	(0.25)	(0.22)	(0.22)	(0.17)	(0.26)
1 for common colonizer post 1945	-0.07*	0.12***	0.09	-0.14***	0.08**	0.11***	-0.01	0.02	0.08**	0.11***	-0.00	0.03
	(0.04)	(0.04)	(0.07)	(0.05)	(0.04)	(0.04)	(0.06)	(0.05)	(0.04)	(0.04)	(0.06)	(0.05)
ln_cost_exp_de_i	-0.41***				-0.41***				-0.37***			
	(0.02)				(0.02)				(0.02)			
ln_cost_imp_de_j	-0.21***				-0.25***				-0.29***			
	(0.02)				(0.02)				(0.02)			
log of remoteness index of country i	-0.39***	-0.07*	0.53***	-0.07	-0.25***	-0.08*	0.32***	0.13***	-0.37***	-0.15***	0.21**	0.08*
	(0.04)	(0.04)	(0.09)	(0.05)	(0.04)	(0.04)	(0.09)	(0.05)	(0.04)	(0.04)	(0.09)	(0.05)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Heckman22	Heckman23	Heckman24	Heckman25	Heckman26	Heckman27	Heckman28	Heckman29	Heckman30	Heckman31	Heckman32	Heckman33
log of remoteness index of country j	-0.28***	0.01	-0.10	0.14***	-0.02	0.01	-0.04	0.24***	0.02	0.05	-0.01	0.26***
	(0.05)	(0.04)	(0.07)	(0.05)	(0.04)	(0.04)	(0.08)	(0.05)	(0.04)	(0.04)	(0.08)	(0.05)
Lead time to import, median case (days) cou i	-0.01***		-0.03***	-0.02***								
	(0.00)		(0.00)	(0.00)								
Time to export (days) (DB06-15 methodology) [TRD.ACRS.BRDR.EXPT.DURS.DY.DB0615]		-0.02***				-0.02***				-0.02***		
		(0.00)				(0.00)				(0.00)		
Time to import (days) (DB06-15 methodology) [TRD.ACRS.BRDR.IMP.DURS.DY.DB0615]		-0.01***				-0.01***				-0.01***		
		(0.00)				(0.00)				(0.00)		
Lead time to import, median case (days) cou j		-0.00			-0.00**	-0.00*	-0.01***	-0.01***	-0.00***	-0.00***	-0.01***	-0.01***
		(0.00)			(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Average time to clear exports through customs (days) cou i			-0.03***				-0.02***				-0.02***	
			(0.00)				(0.00)				(0.00)	
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou i				0.23***				0.24***				0.25***
				(0.01)				(0.01)				(0.01)
Quality of port infrastructure, WEF (1=extremely underdev, 7=well dev), cou j				0.12***				0.12***				0.11***
				(0.01)				(0.01)				(0.01)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Heckman22	Heckman23	Heckman24	Heckman25	Heckman26	Heckman27	Heckman28	Heckman29	Heckman30	Heckman31	Heckman32	Heckman33
tmea_cost_exp_i					0.00							
					(0.01)							
tmea_cost_imp_j					0.02***							
					(0.01)							
tmea_time_exp_i						-0.00						
						(0.00)						
tmea_time_imp_j						0.00**						
						(0.00)						
tmea_time_cus_i							0.22***					
							(0.04)					
tmea_port_i								-0.04***				
								(0.02)				
tmea_port_j								0.04***				
								(0.02)				
ssa_cost_exp_i									-0.03***			
									(0.00)			
ssa_cost_imp_j									0.03***			
									(0.00)			
ssa_time_exp_i										-0.00***		
										(0.00)		
ssa_time_imp_j										0.00***		
										(0.00)		
ssa_time_cus_i											-0.00	
											(0.00)	
ssa_port_i												-0.07***
												(0.01)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Heckman22	Heckman23	Heckman24	Heckman25	Heckman26	Heckman27	Heckman28	Heckman29	Heckman30	Heckman31	Heckman32	Heckman33
ssa_port_j												0.02***
												(0.01)
Constant	26.95***	-7.78***	-29.47***	-15.65***	6.61**	-7.66***	-24.87***	-31.66***	10.61***	-5.64*	-20.72***	-29.35***
	(3.25)	(2.88)	(5.45)	(3.16)	(3.04)	(2.89)	(5.63)	(3.14)	(3.07)	(2.91)	(5.59)	(3.14)
athrho												
Constant	0.01	0.03***	0.06**	-0.11***	0.04***	0.03***	0.05**	-0.08***	0.04***	0.03***	0.05**	-0.08***
	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
lnsigma												
Constant	0.84***	0.92***	0.99***	0.78***	0.92***	0.92***	0.99***	0.83***	0.92***	0.92***	1.00***	0.83***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	61758	61758	8404	62989	61758	61758	8535	62989	61758	61758	8535	62989
Adjusted R^2												

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Annex J: Sensitivity Analysis

Annex J Sensitivity Analysis

Under the CGE model, the welfare analysis is based on many parameters and variables. The most important variables are the changes in transit times through the ports and OSBPs. This can be measured objectively, yet, it is difficult to place a value on the time saved as this is more subjective.

Two variables that influence the value of time saved are the value of the trucks hauling the cargo and the value of the cargo itself. In the standard analysis, trucks are valued at US$128 per day, using an estimate obtained by an ODI study.[1] The contents of a container are assumed to be worth US$40,000. To assess the importance of these variables, we vary the standard values by 25% either way.

The value of the cargo affects the cost of delays. This affects the risk component of the cost of uncertainties.

Table 1 Cost savings per container per trip with alternative content values.

Value of container	US$40,000	+25%	-25%
		US$50,000	US$30,000
	US$	US$	US$
Kenya	-429	-503	-354
Rwanda	-369	-444	-295
Uganda	-369	-444	-295
Tanzania	-1,088	-1,152	-1,022
Rwanda	-822	-888	-757
Uganda	-822	-888	-757

Source Authors' estimates.

Truck capital values affect inland trips only. What happens at the port is of no consequence; assuming the vehicle is not waiting at the port. Truck capital cost are influenced by timing not the variability in delays. If the vehicle can make a round trip in five days rather than seven, more trips can be made in a year, and the capital cost spread over more trips. Hence, this variable is relevant only to the Corridor scenario.

Table 2 Transit cost savings per container per trip with alternative truck capital values.

Cost of truck capital values	US$128	+25%	-25%
		US$160	US$96
	US$	US$	US$
Mombasa to Nairobi	-8	-8	-8
Mombasa to Malaba	-1,984	-2,238	-1,729
Malaba to Katuna	-607	-697	-517
Gatuna to Akanyaru	-961	-1,090	-833
Dar to Kilgali	-682	-746	-618
Dar to Kampala	-1,165	-1,236	-1,094

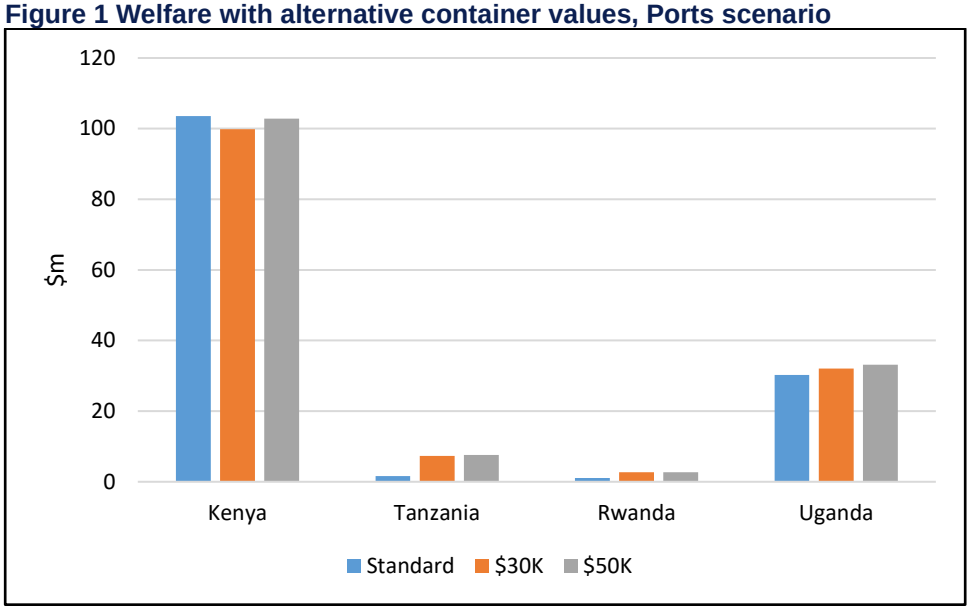
Source Authors' estimates.

The results of these variations in the container values and truck capital values are shown in Figures 1 and 2. National welfare estimates do not vary greatly based on the assumptions used for the value of contents of a container or the value of a truck. The variation in welfare is somewhat less than the

[1] Eberhard-Ruiz, A. & Calabrese, L. (2017).

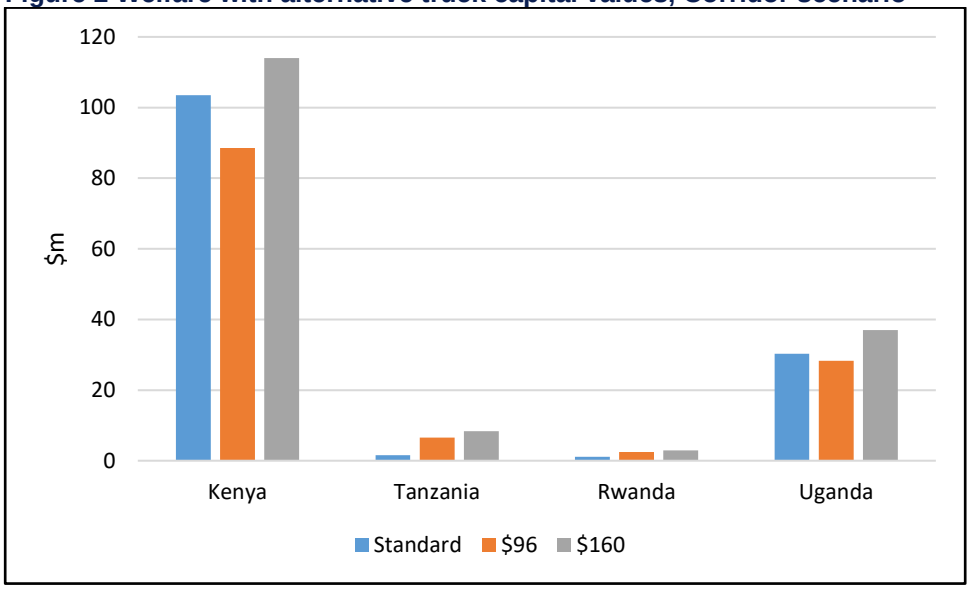
variation in the key variable because there are other variables that have an important bearing on the welfare effects.

Figure 1 Welfare with alternative container values, Ports scenario



Source GTAP simulations.

Figure 2 Welfare with alternative truck capital values, Corridor scenario



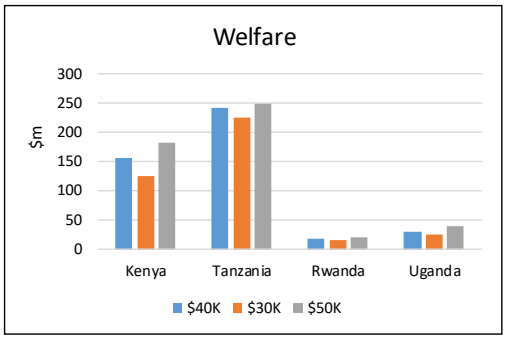
Source GTAP simulations.

The full results of the sensitivity analysis on GDP, welfare, exports, and imports are presented in Figure 3.

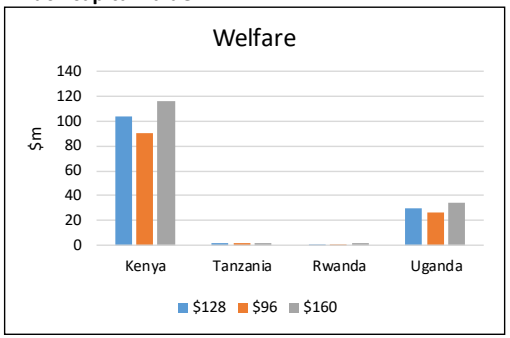
Figure 3 Welfare, GDP, Imports and Export Results with alternative truck capital and container values

Welfare (USD m)	Container value $40K	$30K	$50K	Truck capital value $128	$96	$160
Kenya	156	125	182	104	90	117
Tanzania	242	225	249	2	1	2
Rwanda	18	16	19	1	1	1
Uganda	29	26	39	30	26	34

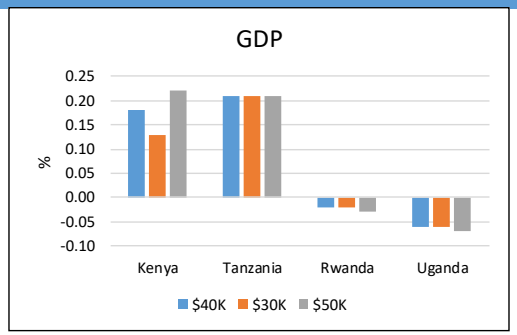
Container value

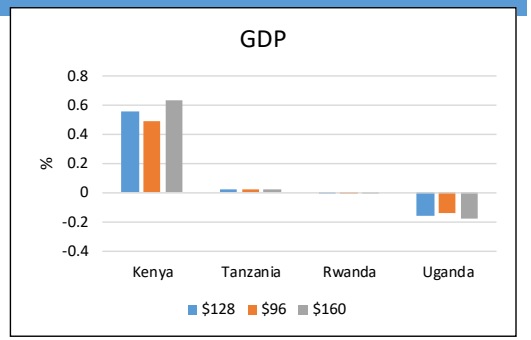


Truck capital value

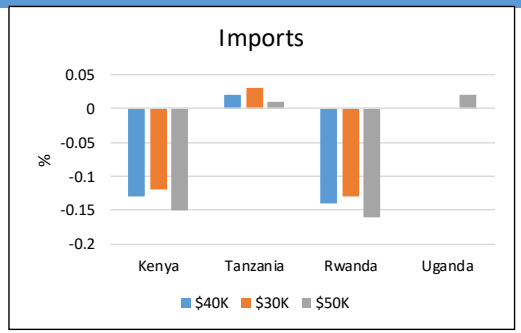


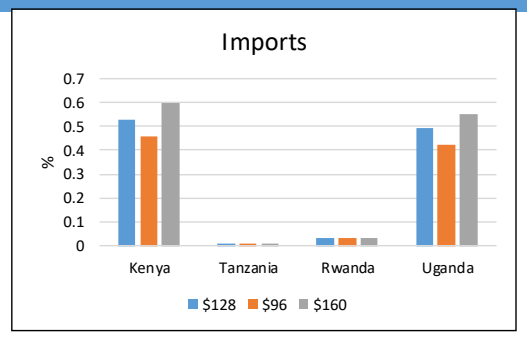
GDP (% Change)	Container value $40K	$30K	$50K	Truck capital value $128	$96	$160
Kenya	0.18	0.13	0.22	0.56	0.49	0.63
Tanzania	0.21	0.21	0.21	0.02	0.02	0.02
Rwanda	-0.02	-0.02	-0.03	-0.01	-0.01	-0.01
Uganda	-0.06	-0.06	-0.07	-0.16	-0.14	-0.18



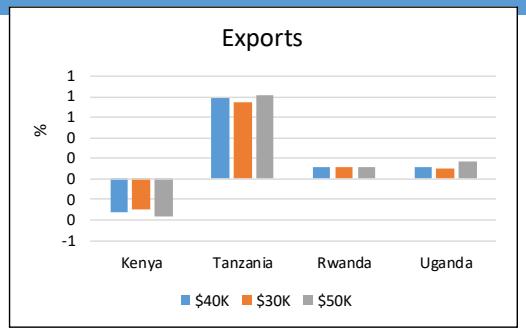


Imports (% change)	Container value $40K	$30K	$50K	Truck capital value $128	$96	$160
Kenya	-0.13	-0.12	-0.15	0.53	0.46	0.6
Tanzania	0.02	0.03	0.01	0.01	0.01	0.01
Rwanda	-0.14	-0.13	-0.16	0.03	0.03	0.03
Uganda	0	0	0.02	0.49	0.42	0.55





Exports (% change)	Container value			Truck capital value		
	$40K	**$30K**	**$50K**	**$128**	**$96**	**$160**
Kenya	-0.33	-0.29	-0.37	0.66	0.57	0.74
Tanzania	0.79	0.75	0.81	0.01	0.01	0.01
Rwanda	0.11	0.11	0.12	0.07	0.07	0.07
Uganda	0.12	0.1	0.17	0.55	0.47	0.62



Source GTAP simulations.

Annex K: Innovation Results

Annex K Innovation Results

Figure 1 Kenya's export births (2010-2017)

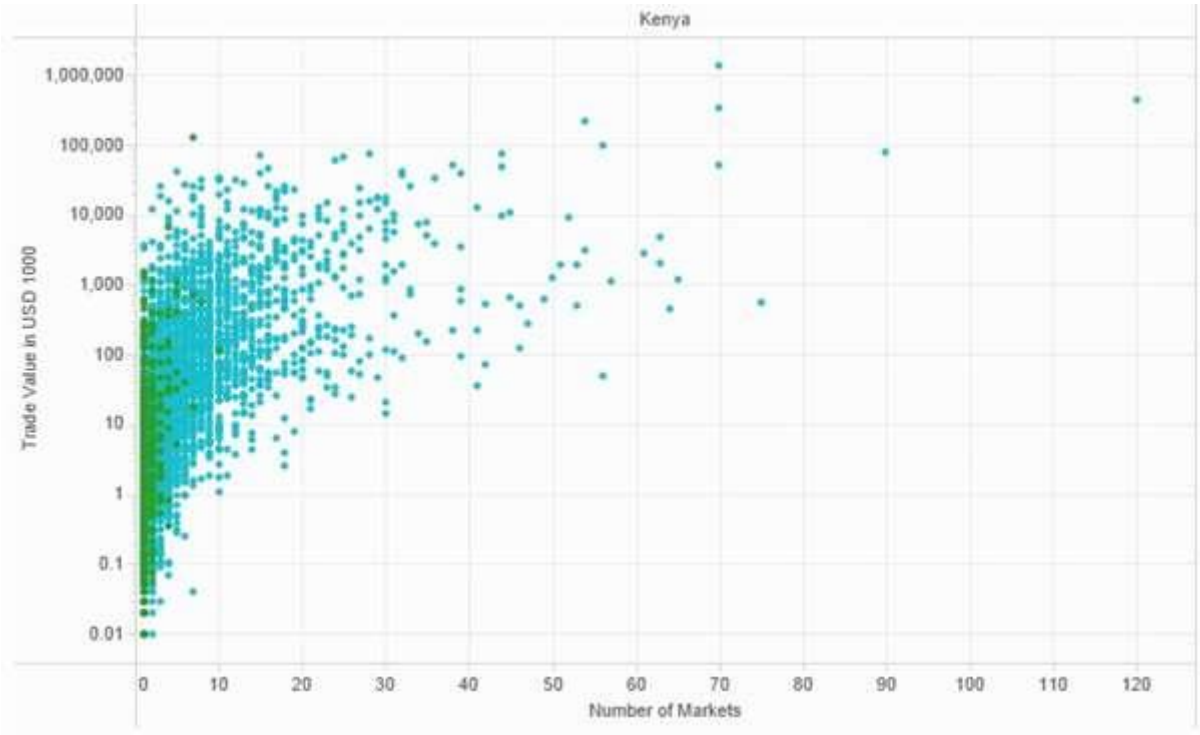


Figure 2 Rwanda's export births (2010-2017)

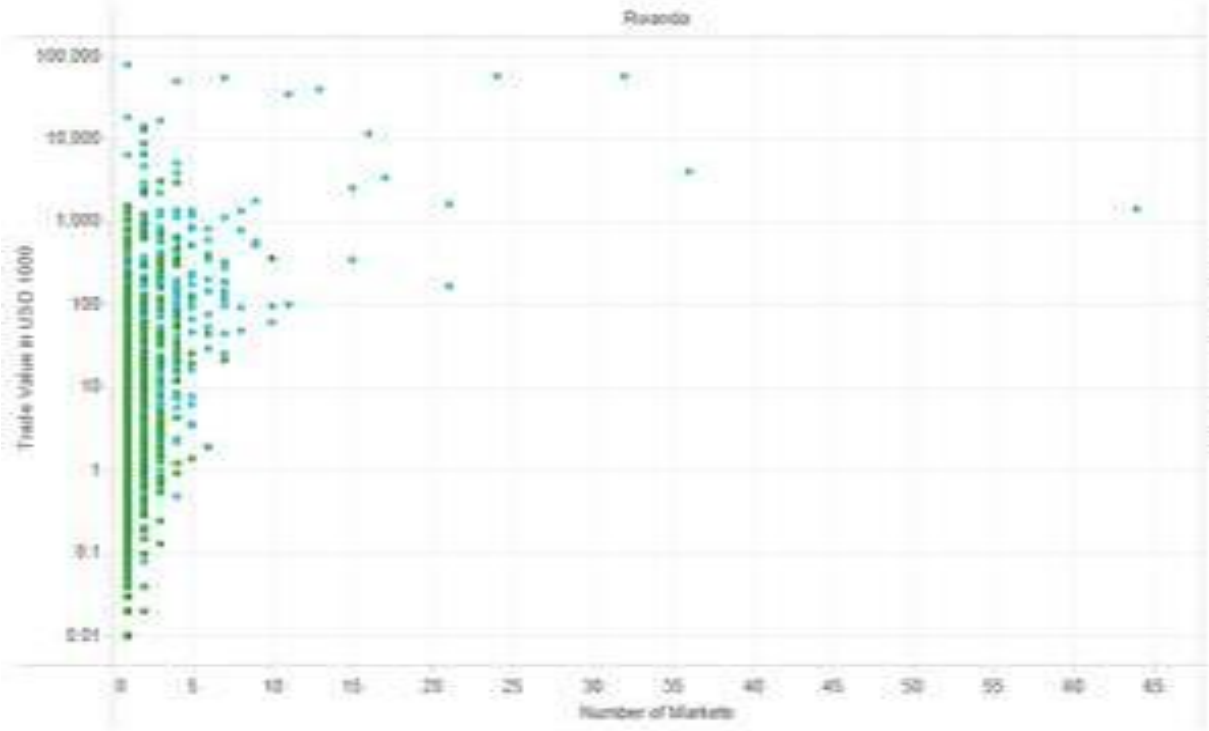


Figure 3 Tanzania's export births (2010-2017)

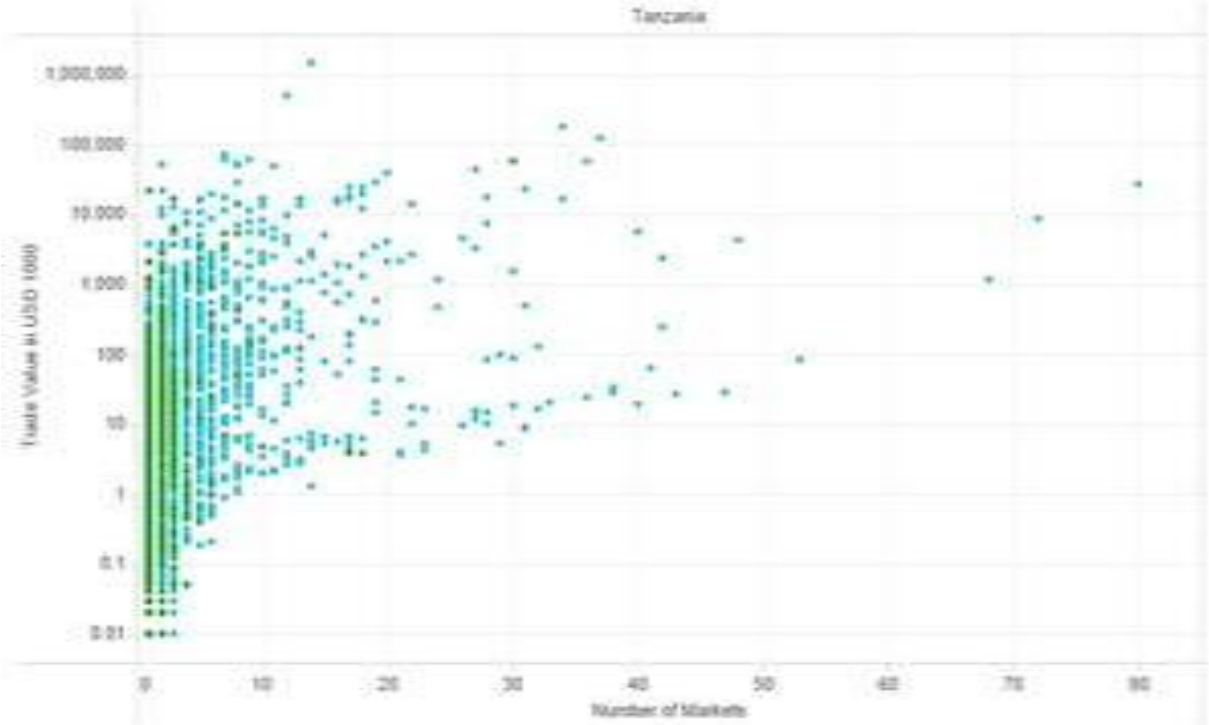
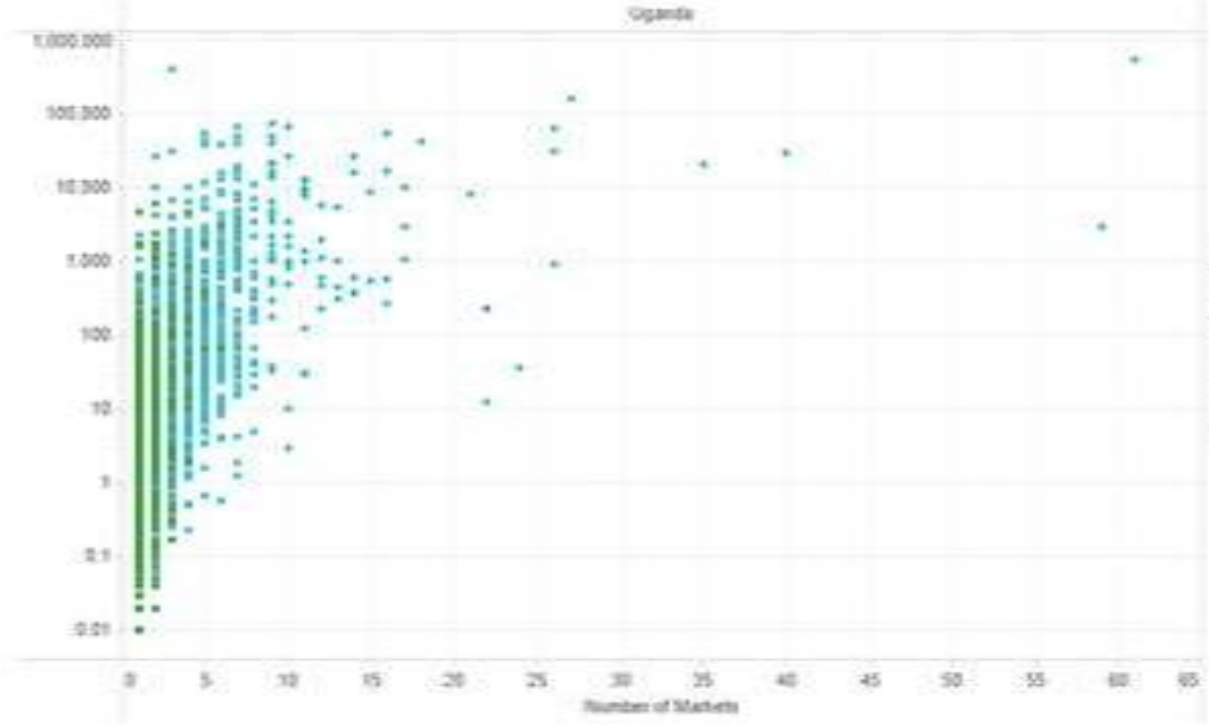


Figure 4 Uganda's export births (2010-2017)



Note: Green dots represents new products, while blue dots represent existing products. The x axis is the scale of markets reached, while the y axis represents value in thousands of USD (logarithmic scale).
Source: World Bank WITS Database, based on UNSD COMTRADE Data

Figure 5 Kenya's export deaths (2010-2017)

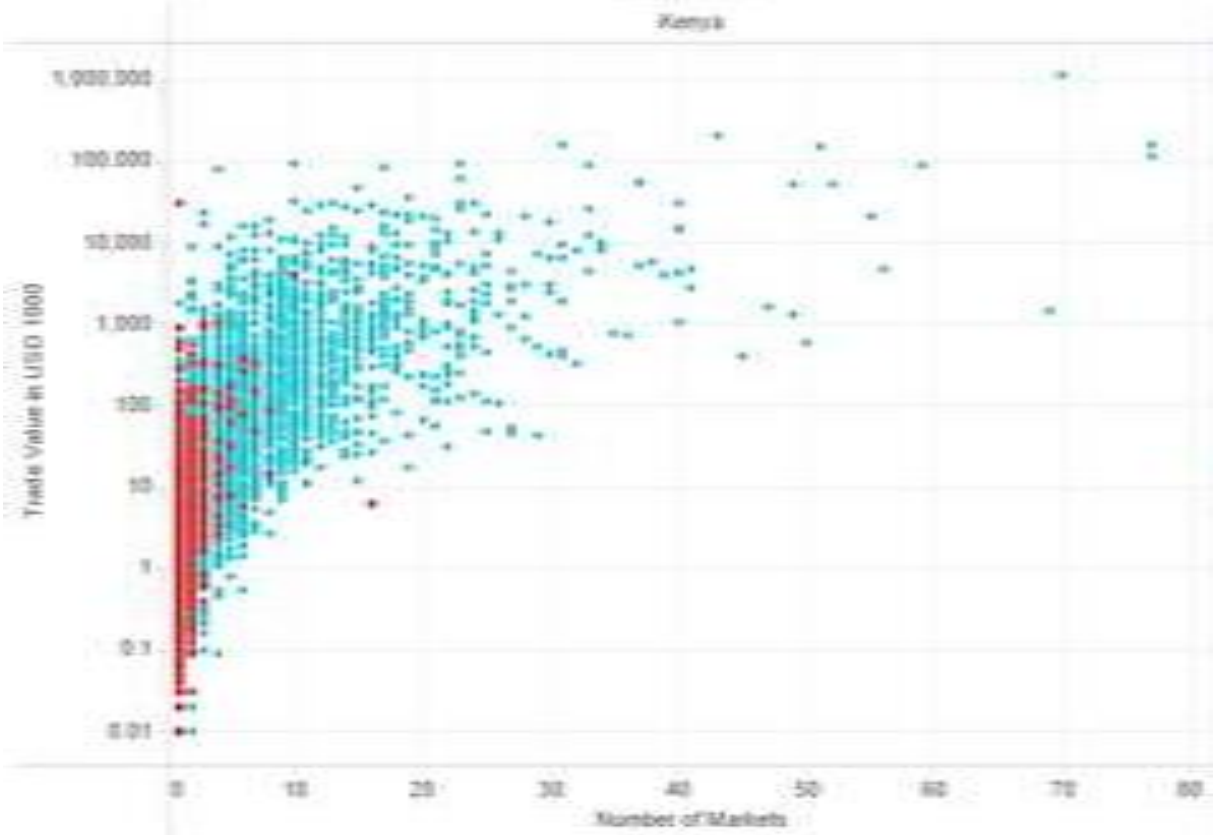


Figure 6 Rwanda's export deaths (2010-2017)

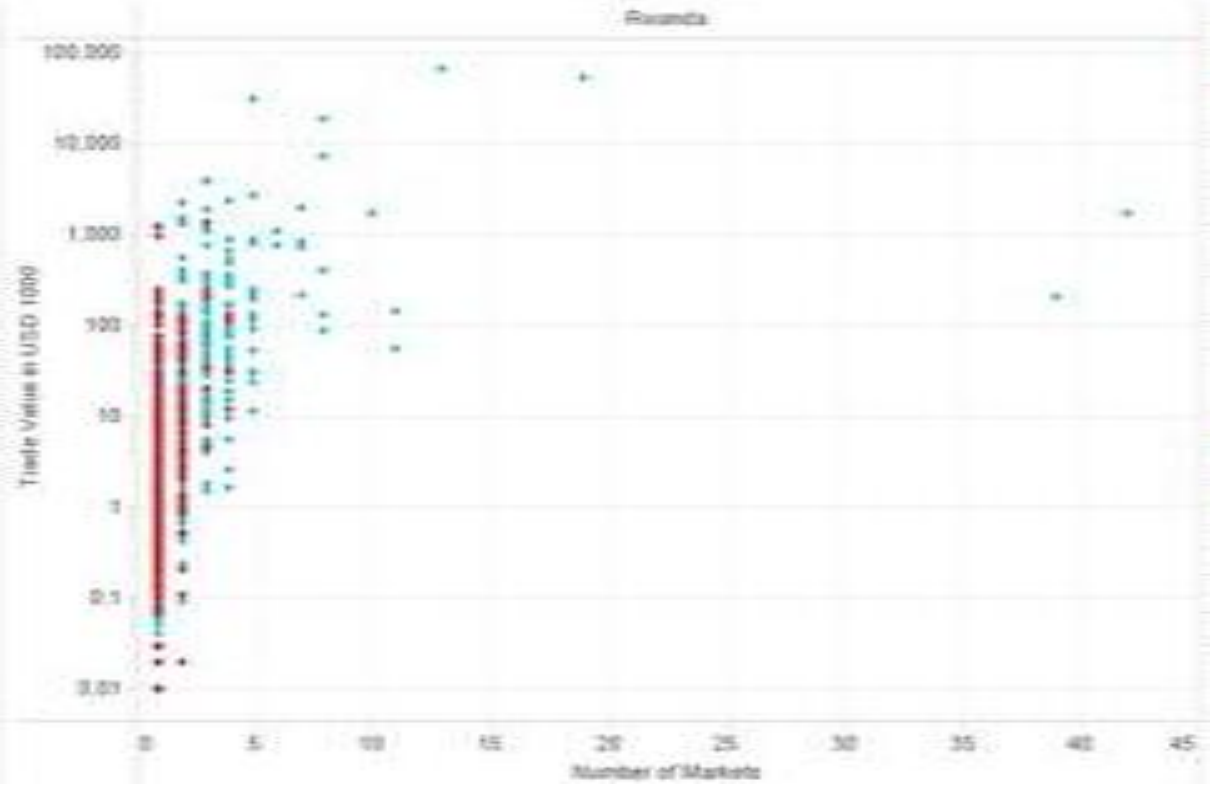
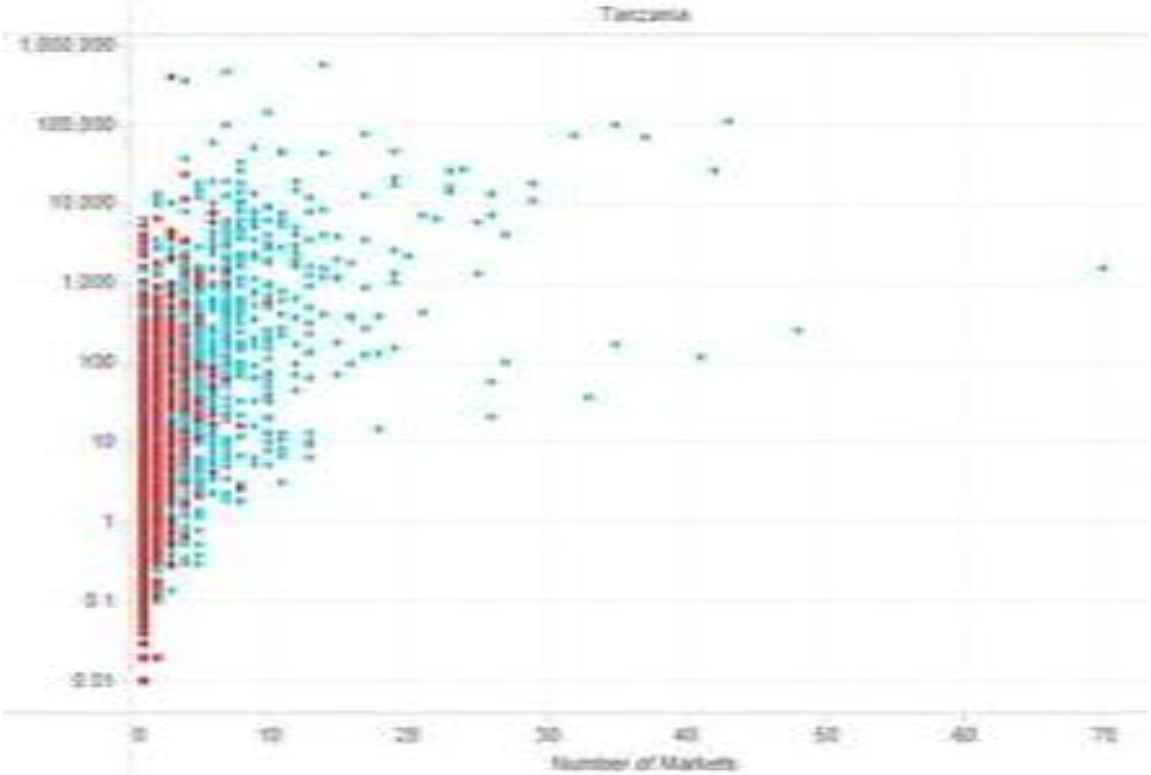


Figure7 Tanzania's export deaths (2010-2017)



Note: Red dots represents extinct products, while blue dots represent existing products. The x axis is the scale of markets reached, while the y axis represents value in thousands of USD (logarithmic scale).
Source: World Bank WITS Database, based on UNSD COMTRADE Data

Figure 8 Uganda's export deaths (2010-2017

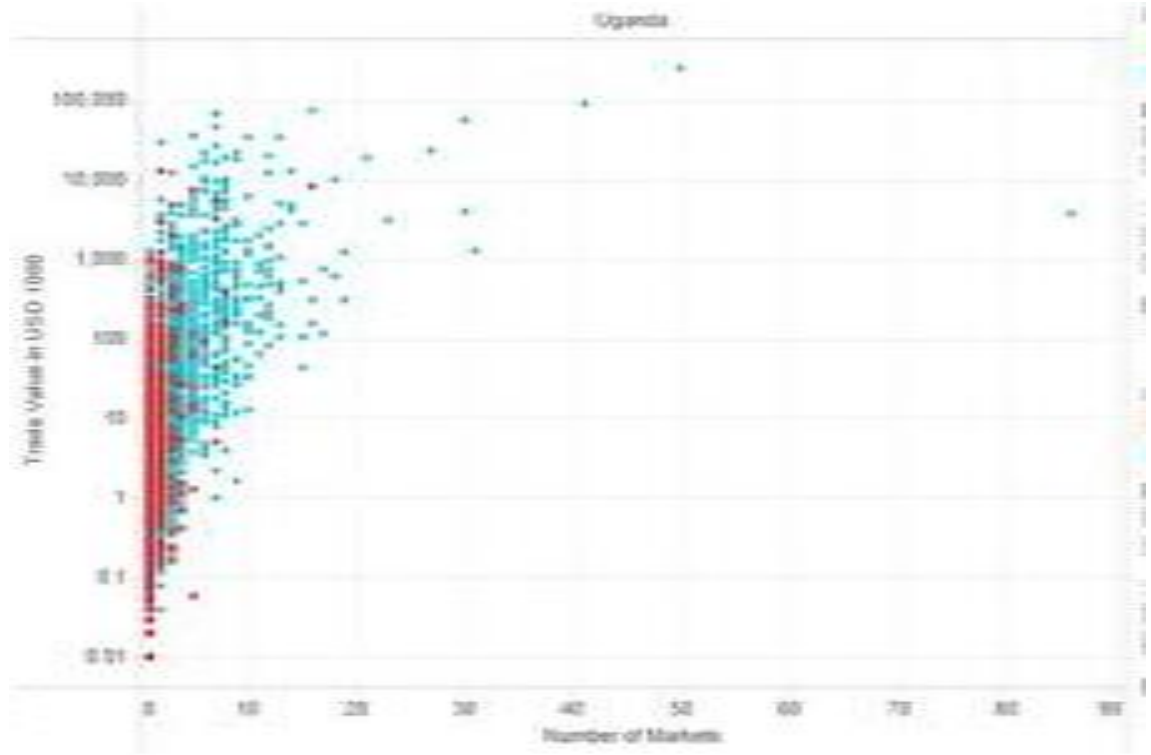
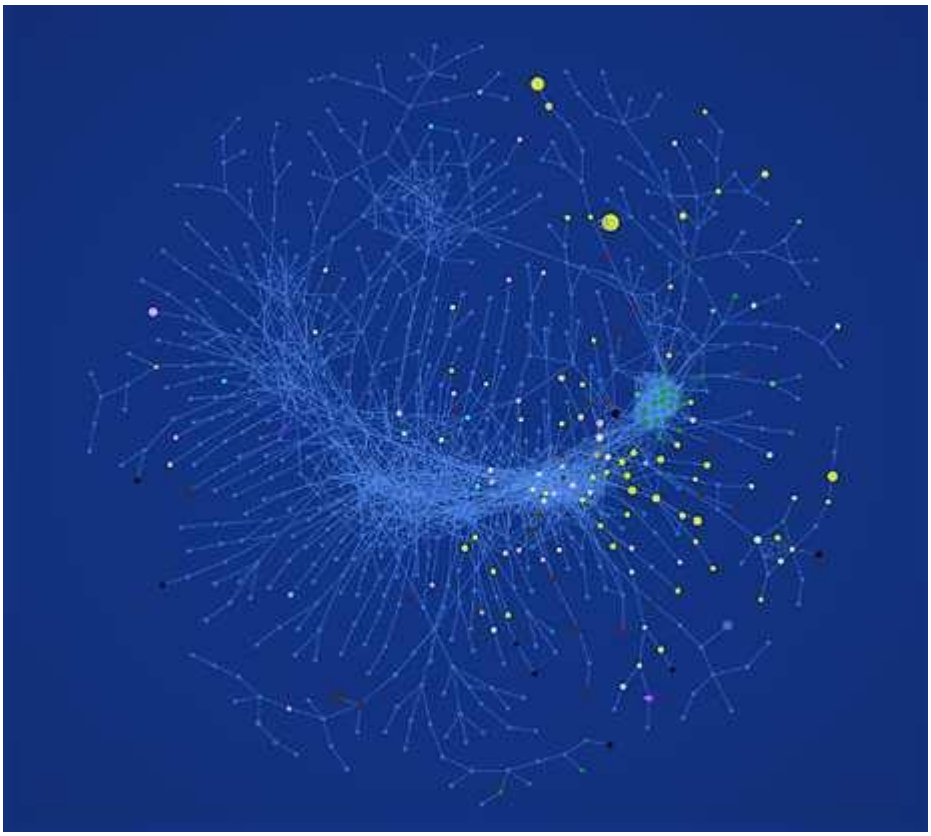


Figure 9 Kenya's product space map



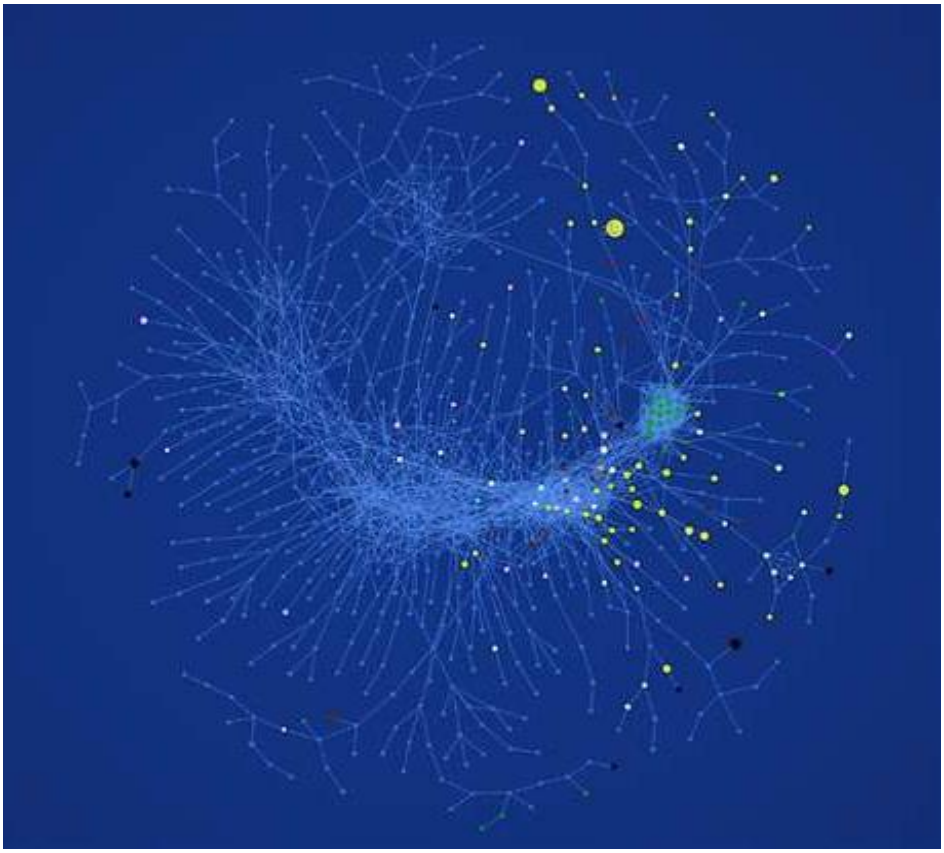
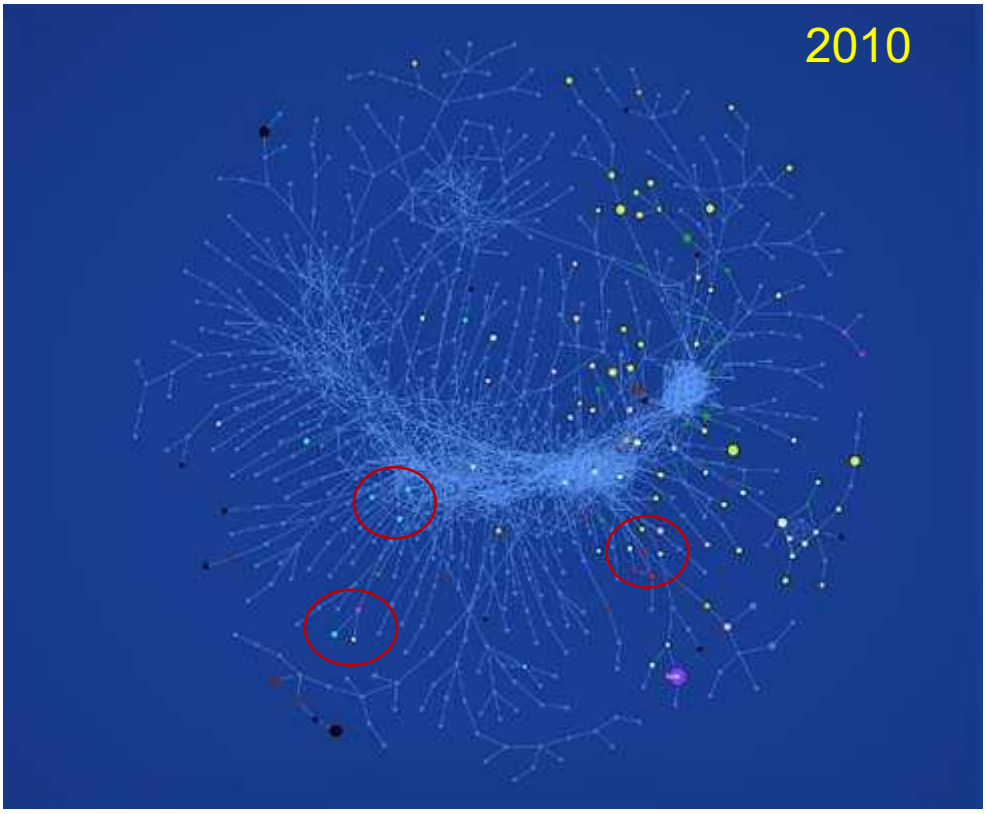


Figure 10 Rwanda's export deaths (2010-2017)



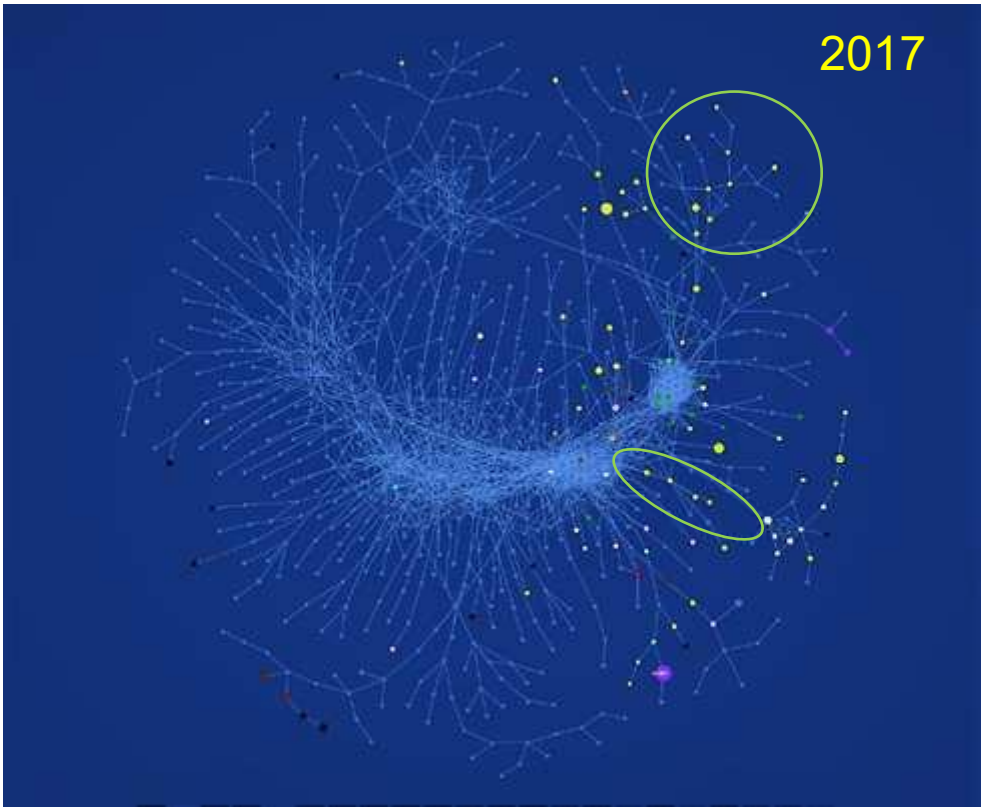
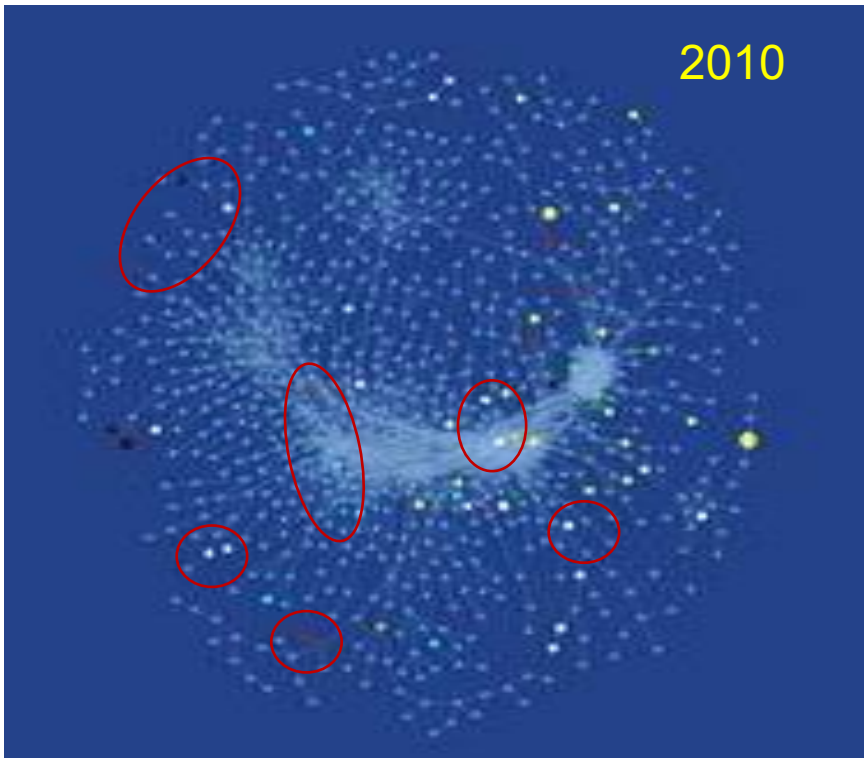


Figure 11 Rwanda's export deaths (2010-2017)



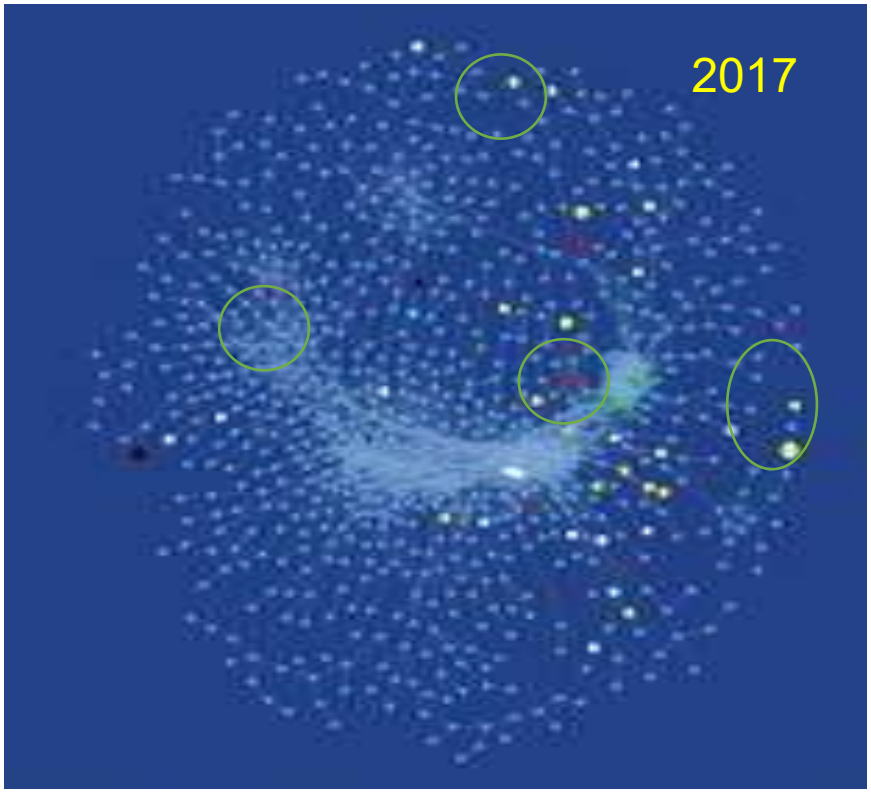
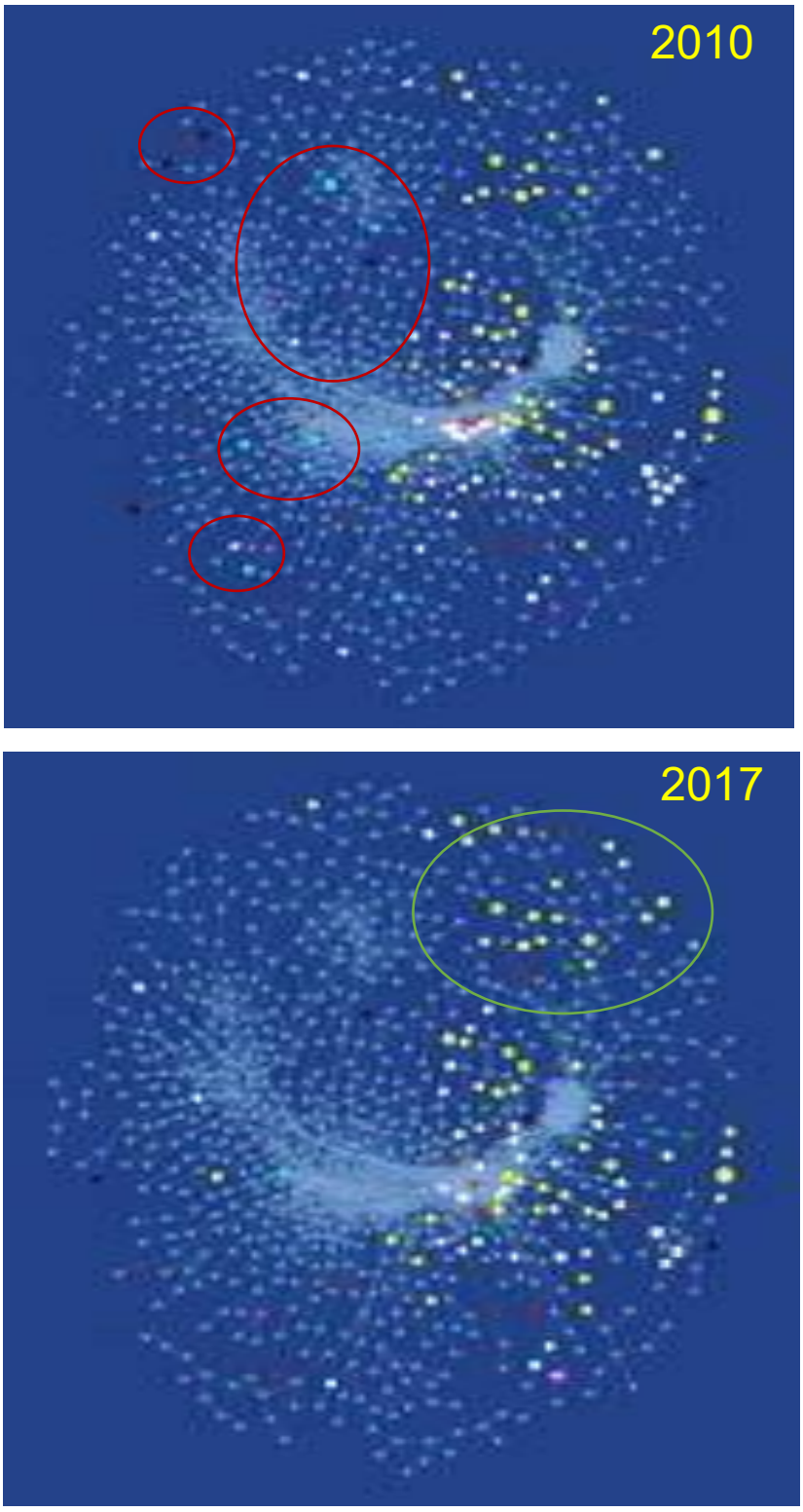


Figure 12 Uganda's product space map



Note: Red circles represent deaths of products from 2010 to 2017; green circles highlight newborn products in 2017 compared to 2010
Source: Observatory of Economic Complexity

Annex L: Primary and Secondary Survey Results

Annex L Primary and Secondary Survey Results

A2.1 The Port Infrastructure

Which ports are used to imports and export goods?

Imports and exports increased from 2010 to 2017 for each of the four countries, either at Mombasa or Dar Ports.

As expected, Kenya is the biggest importer from Mombasa Port followed by Tanzania from Dar ES Salaam. Uganda mostly imports from Mombasa, while Rwanda from Dar ES Salaam.

Figure 1 : Imports

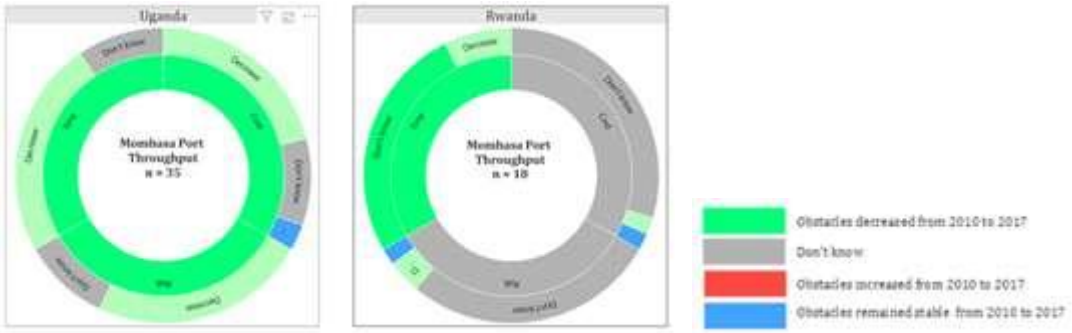
Exports are very low compared to imports. Exports from Uganda through Dar ES Salaam and Rwanda through Mombasa Port are relatively low.

Figure 2 : Exports

Source for Mombasa port : Kenya Ports Authority
Source for Dar ES Salaam port : Tanzania Ports Authority

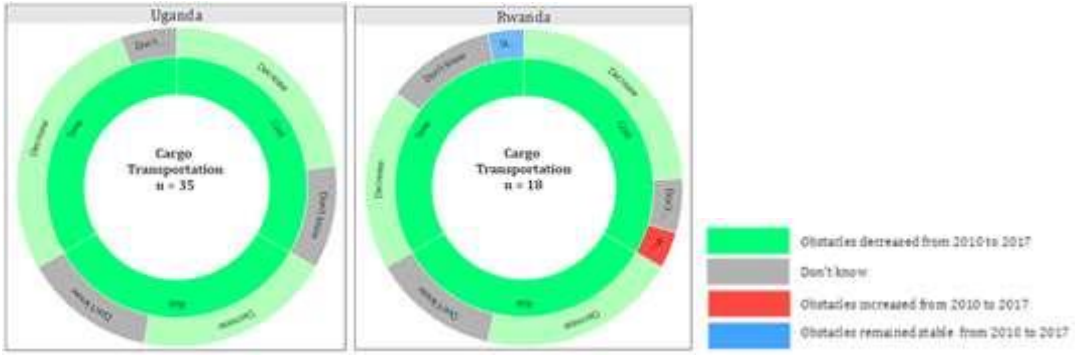
How has Mombasa Port through-put obstacles changed from 2010 to 2017?

The Ugandan feedback in regard to the port, was very positive, including that of time, cost and risk. Rwandan respondents stated that there were improvements in terms of time handling at Mombasa Port, yet the results from Kenyan respondents was inconclusive.



How have the obstacles around Cargo Transportation changed from 2010 to 2017?

Ugandan and Rwandan respondents noted positive feedback in all areas. The article taken from, "AllAfrica" https://allafrica.com/stories/201810050495.html, shows that the deputy commissioner of Rwanda Revenue Authority further reiterated the positive outcomes within an interview. The results from Kenyan respondents were inconclusive.



A2.2 The evolution of quality of the Northern Corridor Infrastructure (2010-2017)

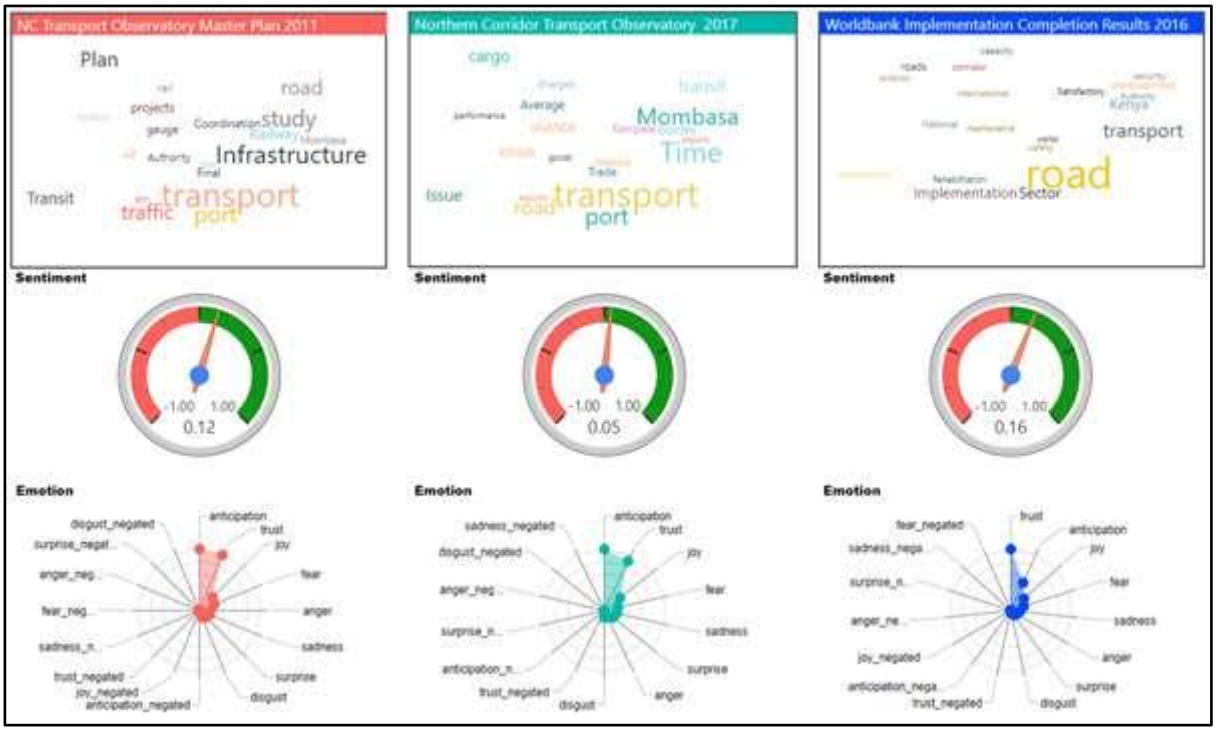
Quantitative Results – Survey Data and Sentiment

Three major documents were analysed using text and sentiment analytics techniques to investigate the major areas identified in 2011 by the Northern Corridor Observatory, and the Progress Report of 2017. A report by World Bank (WB), which highlights the areas the latter has been focusing on, was also screened.

The three documents analysed were:

- Northern Corridor Transport Observatory Masterplan
- Northern Corridor Transport Observatory report in 2017
- World Bank Implementation Completion results in 2016

The **WB** report relates more to the **road and transport** in Kenya.



Physical Infrastructure

Kenya (27 Interviewees)

From the interviews completed, it became apparent that there were positive opinions regarding improved road conditions and improved warehousing facilities. Further, respondents noted positive impacts in regard to the **SGR** railway and **port** enhancements.

On the negative side there is need to increase the road networks specially around the **feeder roads** from the factories, plantations, and stations. Some of the interviewees claim that more work needs to be done around the **railway** network as well as security and transit times.

Uganda (35 Interviewees)

The **road infrastructure** has very much improved in Uganda and this has helped improve efficient and timely delivery. Some respondents claimed that there was a positive impact of **digitalization** as well as improved access to **international** markets.

The road improvements linking Uganda from Mombasa showed significant improvement

Source: Ncto (Mombasa to Kampala improvements)

High costs are an issue in Uganda especially in regard to **power and electricity**. Some interviewees claimed that there were irregularities in this area. Other areas where costs were claimed to be high were transport and warehousing. There were also concerns reagrding the quality of roads, i.e., the need for better regulations and monitoring.

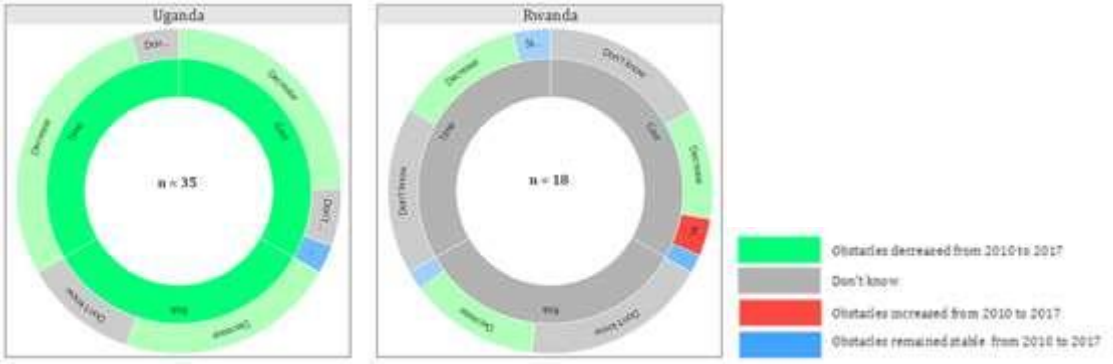
Rwanda (18 Interviewees)

The surveys in Rwanda highlighted improvements in time for transportation taking place on the **roads**. Furthermore, new infrastructure such as **warehouses**, **OSBPS**, **stations** and **communication** are well valued.

Electricity and water facilities need to be improved with respect to reliability of supply, in Rwanda. Although main roads have improved, there is a concern regarding the state of **feeder roads** which are in poor physical condition. Some interviewees claimed that there was a need for a **railway** to quickly export and import in bulk.

Transit times

Ugandan interviewees stated that transit times had significantly improved whilst Rwandan respondents were unsure that times had improved at all.



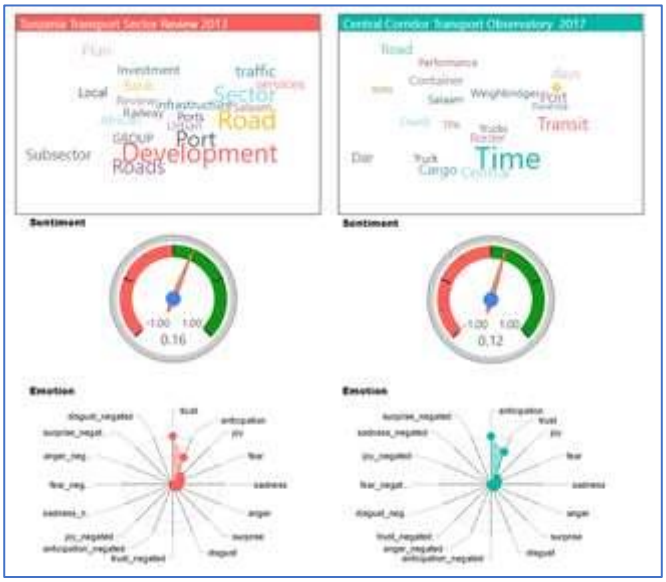
A2.3 The evolution of quality of the Central Corridor Infrastructure (2010-2017)

Quantitative Results – Survey Data and Sentiment

Two major documents were analysed, using text and sentiment analytic techniques to review the Tanzania Transport Sector and its progress in 2017, as highlighted by the Central Observatory.

These documents were:

- The Tanzania Transport Sector review by the African Development Bank 2013; and,
- The Central Corridor Annual Performance Monitoring Report, 2017



A2.4 The EAC Borders

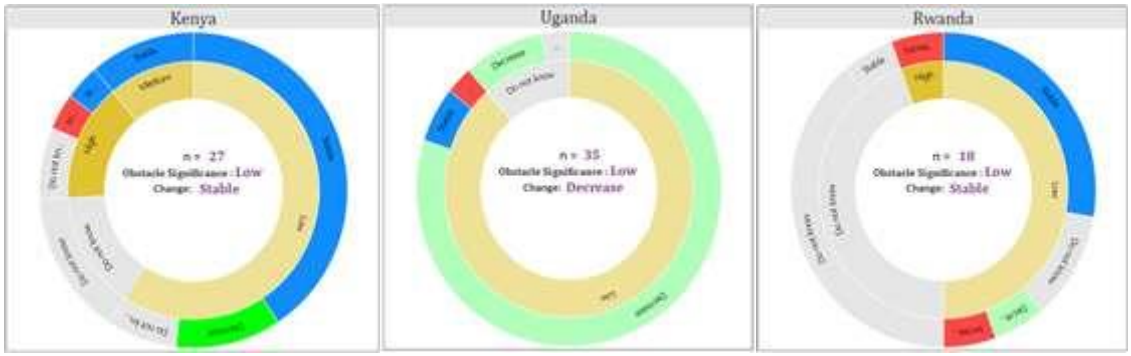
According to the primary survey results, only 1 out 27 Kenyan interviewees mentioned crossing the EAC Borders for Trade.

Eight out of **18** Rwandan interviewees (44%) mentioned crossing borders. Regarding the Ugandan Border, seven respondents claimed it now took around **0.34** days to cross the border. This is an improvement of an average of **1.3** days compared to 2010.

31 out of 35 Ugandan Interviewees (89%) mentioned crossing borders. Regarding the Kenyan Border 28 respondents claimed it now took **1** day to cross the border. This is an improvement of **2.6** days compared to 2010.

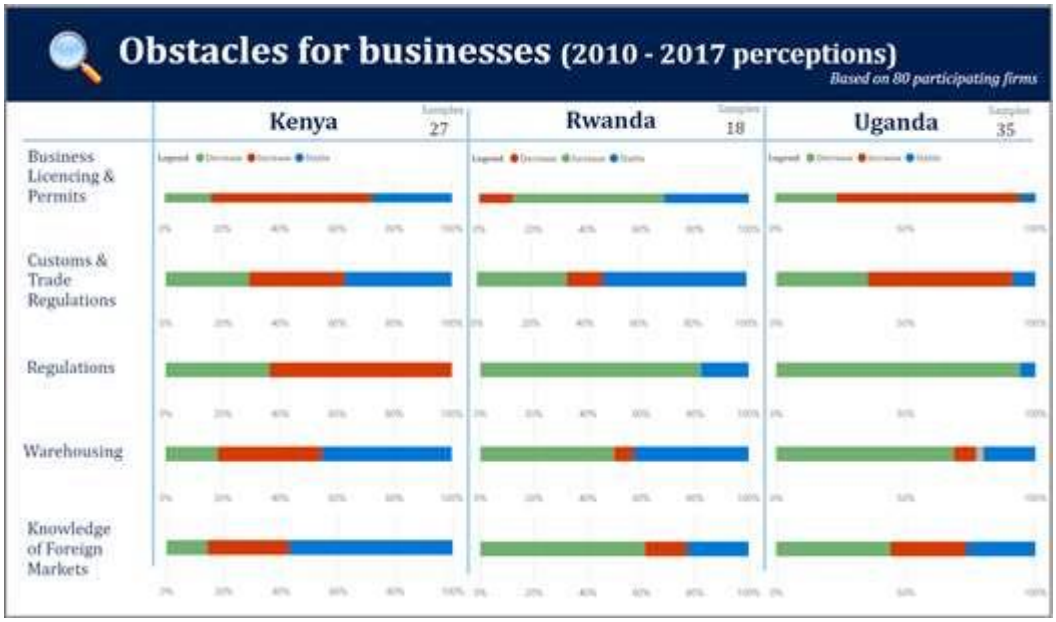
Changes in obstacles around the One Stop Border Post infrastructure

All three countries in general consider the significance of the OSBP as a low obstacle for trade. While Uganda sees satisfying improvements in the OSBPs between 2010 and 2017, Kenya perceives slightly fewer positive improvements.



2.5 Regulations and Standards

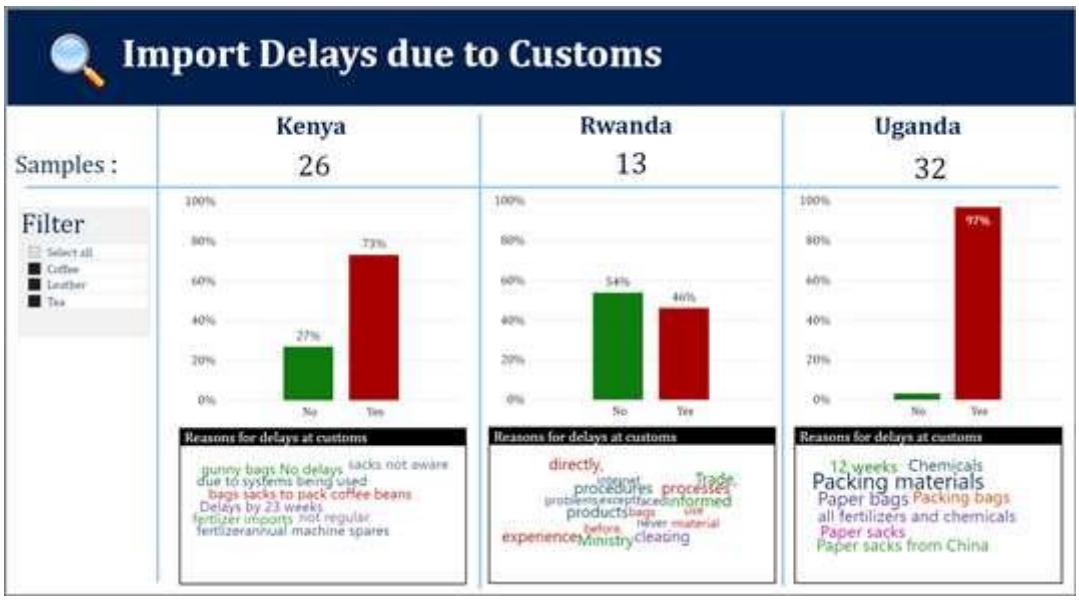
In terms of the obstacles for businesses, out of those who responded, there seem few obstacles mentioned by Rwanda firms, as compared to others, especially in regard to licensing, permits and customs.



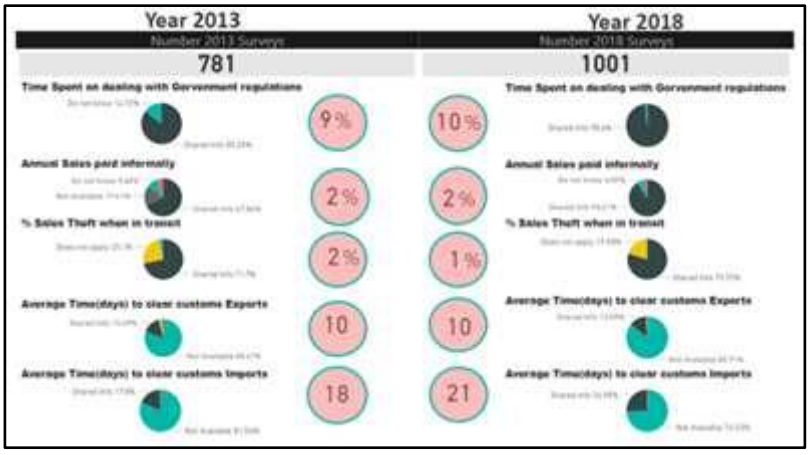
Import delays due to customs

There is a high percentage of delays due to customs while importing. (97% in Uganda and 73% for Kenya).

Most of these delays are due to packing, paper bags and sacks.



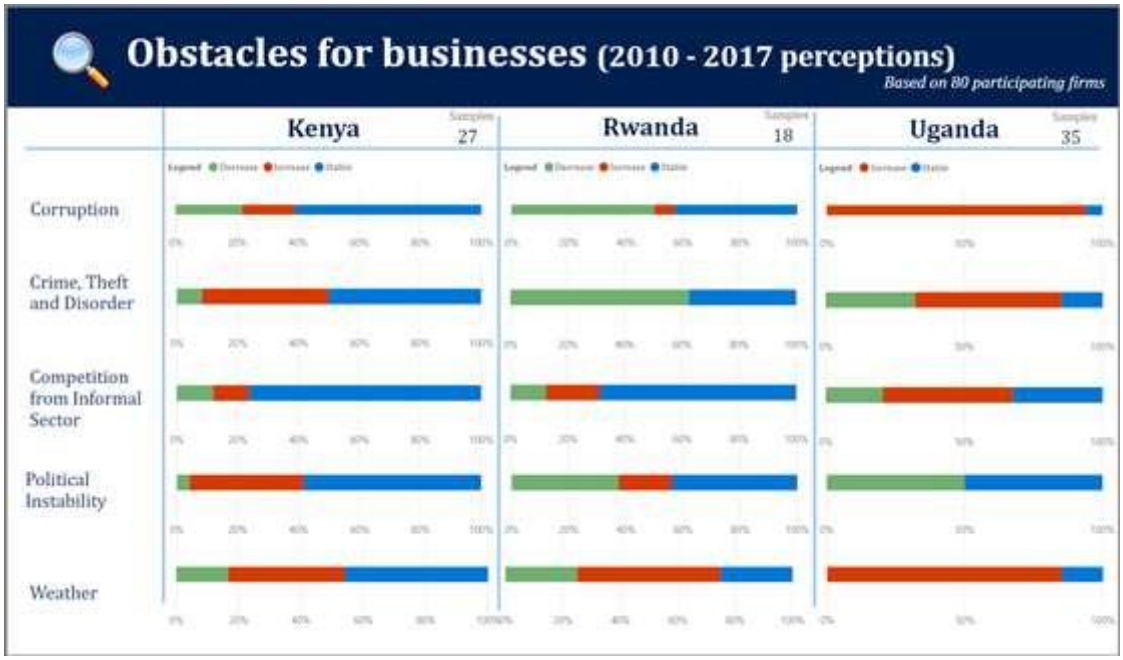
The World Bank's (WB) enterprise survey for **Kenya,** notes the average time to clear customs for imports has actually increased from 2013 to 2018. (18 days to 21 days)

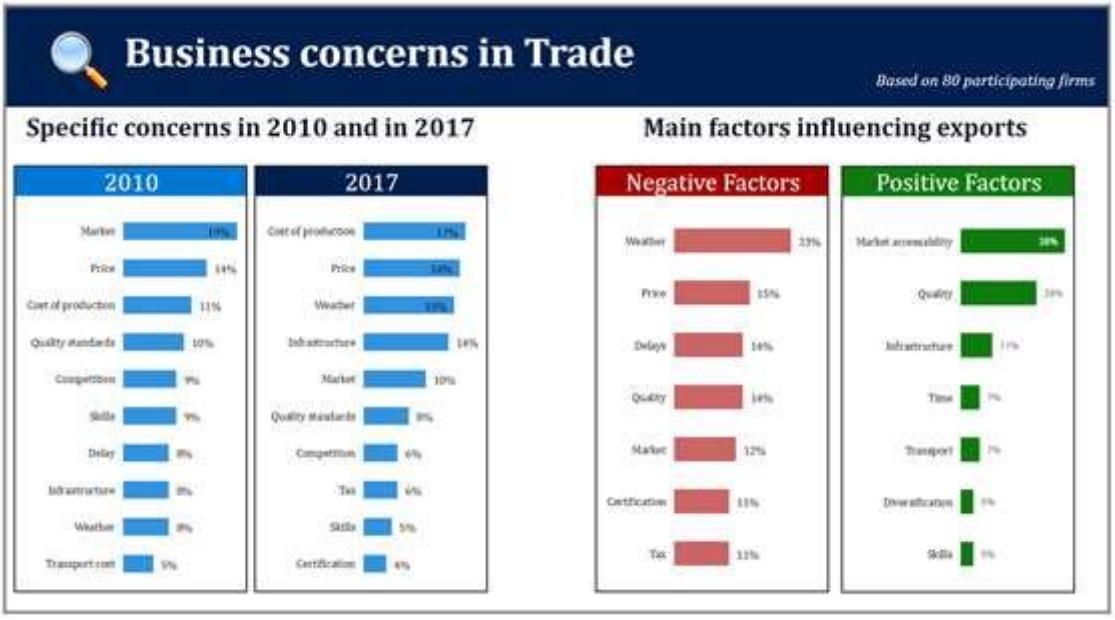


A2.5 External Factors influencing Trade

Within primary surveys, the team explored external factors that influenced trade, specifically those that were not controlled by organisations such as Trademark East Africa.

Major changes in the business landscape that affected firms, between 2010 and 2017





The major business concerns for trade shifted from 2010 to 2017. In 2010 market accessibility was the major concern, however, market accessibility improved in 2017 with interviewees noting it as a major positive factor that was influencing exports. In 2017, price, as well as the cost of production, was now the major concern amongst respondents.

Negative factors that were noted include climate change which is having more influence on respondents. For example, the changes in weather are impacting the growth of commodities such as tea and coffee. Furthermore, commodity prices were also noted as an external factor affecting trade.

The influence of climate change

Ugandan respondents were those who perceived climate change as a major risk to trade, with the country suffering droughts in the monitored period of 2010 to 2017. In Kenya, the perception of weather as being a challenge is also highlighted as a problem, in the survey results.

Quote from the Global Facility for Disaster Reduction and Recovery (GFDRR)

Natural Hazard Risk

Uganda is regularly affected by multiple natural hazards, including droughts, earthquakes, floods, landslides, and volcanoes. Flooding, particularly in low-lying areas, presents the largest risk. Each year, floods impact nearly 50,000 people and over $62 million in gross domestic product.

Droughts affected close to 2.4 million people between 2004 and 2013, and drought conditions in 2010 and 2011 caused an estimated loss and damage value of $1.2 billion, equivalent to 7.5 percent of Uganda's 2010 gross domestic product. Environmental degradation, underdeveloped irrigation systems, and near-absence of disaster preparedness at the community level are contributing factors to increasing drought risk in Uganda.

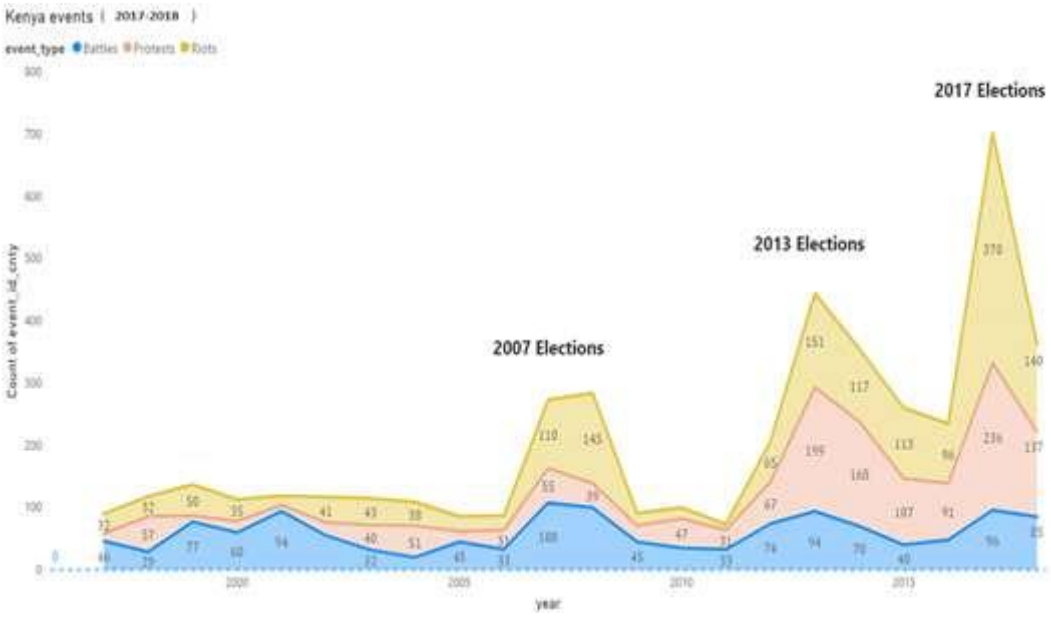
Climate change is likely to increase average temperatures in Uganda up to 1.5 degrees Centigrade by 2030 and 4.3 degrees Centigrade by 2080. Rainfall variability and rising temperatures are expected to lead to higher incidences of droughts and water scarcity.

Source : https://www.gfdrr.org/en/uganda

Political Instability and Corruption

When asked about significant obstacles, such as political instability, Kenyan respondents considered this as a highly significant, and an increasing obstacle to trade. Such political risk was considered to be lower in Rwanda and Uganda.

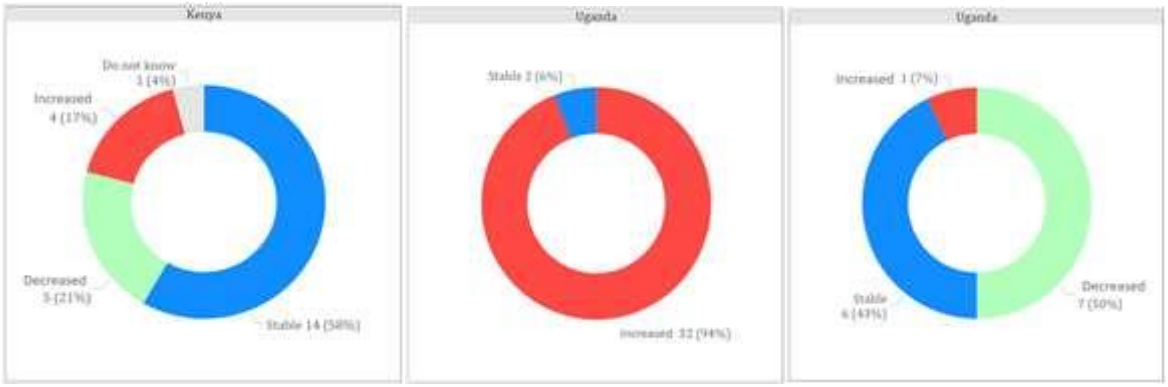
Illustrative of this perception, the chart below shows the number of protests, riots, and armed clashes occurring in Kenya from 1997 to 2018. There is an increase of such events during election periods. Kenya held two elections between 2010 and 2017.



Source: www.gdeltproject.org

Good governance

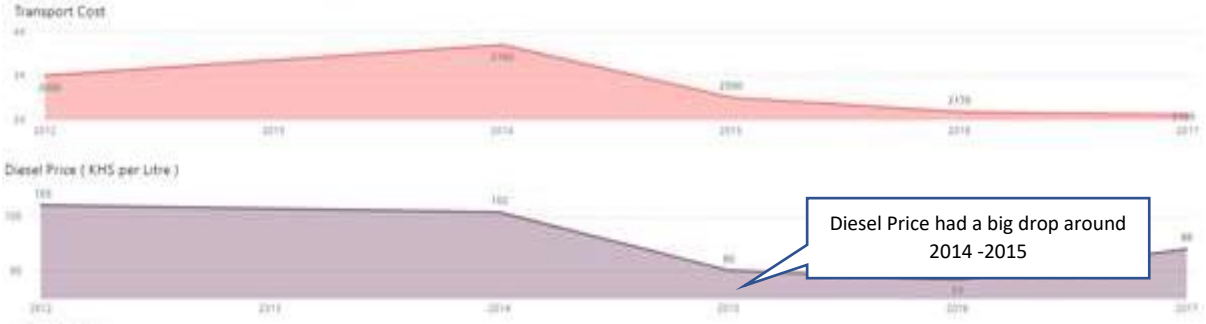
According to the survey results, corruption has been perceived as a major problem in Uganda. This is confirmed by the evidence put forward by Transparency International. Uganda is ranked as the 149th most corrupt nation out of 175 countries, according to the 2018 Corruption Perceptions Index. Corruption in Uganda reached an all-time high of 151st in 2016, while it was a record low of 43rd in 1996.



Fuel prices

Due to global price realignment, there was a significant drop in transport costs across EAC countries in 2014 to 2015 (of over 30%). It was found that at this time, fuel prices for diesel had also dropped, thus showing that the price of fuel has a major influence on transport costs.

The charts below show the value of transport costs compared to the price of diesel.



Annex M: Design and Work Plan

Annex M Design and Work Plan

Independent Evaluation of Trademark East Africa

Phase 2

Evaluation Design and Work Plan

Paul Baker, Keri Culver, Frances Hansford, Chris Hearle, Alex Hurrell, Claire Hutchings

October 2018

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Preface

This design and work plan represents the evaluation team's combined approach to the remaining contractual deliverables, with slight adjustment from the Inception Report (November 2016). Though DFID will ultimately decide on this point, we feel this document makes a strong case for the continuity of the original design, rather than significant changes that warrant an additional round of EQuALS approval.

The one key aspect that was not delivered in earlier reporting as set out in the IR is the "outcome-level evaluation" component, which was intended to assess the extent to which TMEA programming can be said to have caused or contributed to outcome targets, through a theory-based exercise to link conclusively the project outputs to programme-level outcomes. The pathway mapping proposed in the IR was not possible without further data collection, which has now begun. This aspect is part of this design and work plan document, as part of the methods proposed to substantiate the hypothesised TMEA impacts and effectiveness. The method proposed in the Inception Report to substantiate strategic outcome contribution claims was Process Tracing, for which the current design substitutes a closely related method called Contribution Tracing.

Table of Contents

List of tables, figures, and boxes

Acronyms

AI	Appreciative Inquiry (an evaluation method)
AVE	Ad valorem equivalents
CBA	Cost-benefit analysis
CBT	Cross-border traders
CEPII	Centre d'Études Prospectives et d'Informations Internationales
CGE	Computable general equilibrium – economic model
COO	Certificate of Origin
CSO	Civil Society Organisation
CT	Contribution Tracing (an evaluation method)
DBI	Doing Business Indicator (a World Bank data activity)
DEQ	Detailed Evaluation Question
DFID	(UK) Department for International Development
DID	Difference in Differences
EAC	East African Community
EATH	East Africa Trade Hub (USAID project on trade in the region)
EC	European Commission
EQUALS	Evaluation Quality Assurance and Learning System
FGD	Focus Group Discussion
GIZ	German cooperation agency
GTAP	Global Trade Analysis Project
HEQ	High-level Evaluation Question
HQ	Headquarters
IBM	Integrated Border Management
ICBTs	Informal cross-border traders
IGC	International Growth Centre
IMF	International Monetary Fund (part of the World Bank Group)
IR	Inception Report (of the Independent Evaluation)

IRR	Internal Rate of Return
ITC	International Trade Centre
I-TIP	Integrated Trade Intelligence Portal (a WTO data activity)
KPI	Key performance indicator
LPI	Logistics Performance Index (a World Bank data activity)
MSC	Most significant change (evaluation method)
NMC	National Monitoring Committees (EAC body tasked to monitor and eliminate NTBs)
NPV	Net Present Value
NTB	Non-tariff barriers
NTM	Non-tariff measures
ODI	Overseas Development Institute
OECD	Organisation for Economic Cooperation and Development
OPM	Oxford Policy Management
OSBP	One-Stop Border Post
PAR	Project Appraisal Review (TMEA project approval process step)
PGIS	Poverty and gender impact study
PPA	Preliminary Poverty Analysis (deliverable in Phase 1 of the Independent Evaluation)
PSO	Private Sector Organisations, also referred to as Business Membership Organisations
PT	Process Training (evaluation method)
RF	Results Framework (a TMEA spreadsheet of output, outcome and impact indicators)
ROO	Rules of Origin
SMART	Software for Market Analysis and Restrictions on Trade
SO	Strategic Objective (in TMEA TOC, the top-most programme goal)
SROI	Social Return on Investment
SWIFT	Single window interface for facilitating trade
TFA	Trade Facilitation Agreement (of the WTO)

TGIS	Trade and growth impact study
TMEA	TradeMark East Africa
TOC	Theory of Change
TOR	Terms of Reference
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UPU	Universal Postal Union
USAID	United States Agency for International Development
VC	Value Chain
VFM	Value for Money
WB	World Bank
WCBTs	Women cross-border traders
WCO	World Customs Organization
WEF	World Economic Forum
WITS	World Integrated Trade Solution (A World Bank activity)
WTO	World Trade Organization

1 Introduction

1.1 The independent evaluation

The Trademark East Africa programme (Trademark, or TMEA) is a high-profile, multi-donor project that seeks to lift existing barriers to trade to bring about positive and sustainable change via a combination of regional and national initiatives and an investment of over $500 million. TMEA is a large and complex programme, with national and regional dimensions and many sub-projects implemented across a number of countries.[1]

The independent external evaluation of this programme presents a unique opportunity to gain a detailed understanding of its effects, make recommendations for improvements, and identify lessons for trade reform interventions and policies over the longer term in the region and beyond.

1.2 Evaluation purpose, audience and intended uses

The evaluation has two specific purposes:

- **Accountability**: Assessing TMEA processes, results and overall value in an independent and impartial manner consistent with generally accepted principles and standards for professional evaluation.
- **Learning**: Identifying and feeding lessons learnt into the management of the remainder of the current programme and the design of any potential continuation of the TMEA programme, as well as future regional trade integration programmes.

In addition to the two purposes of the evaluation, the terms of reference (TORs) also identify four core evaluation objectives:

1. Test the **theory of change (TOC)**, assessing all causal links and the robustness of underlying assumptions (including links between trade, growth and poverty reduction), and adjusting the TOC to serve as a reliable guide to interpret the programme and to make programme improvements.
2. Analyse and, to the extent possible, measure: the regional integration programmes' **impact** on regional trade, growth and poverty (and on the various stakeholders – in particular on men and women separately, poor and vulnerable groups, as well as traders and consumers); and **sustainability**.
3. Assess the **effectiveness** of the TMEA programme, including organisational effectiveness, and whether the programme represents **value for money (VFM)**.
4. Throughout, identify **lessons learnt relevant beyond TMEA**, i.e. insights on enabling and constraining factors, critical actions and gaps which would be generalisable to future programmes or to other contexts.

It is valuable to set the evaluation purpose and objectives in context. At the inception phase, one implicit goal for the evaluation was to provide key inputs into decision-making for any potential follow-on programming for TMEA. Due to a challenging inception phase and the tragic loss of the independent evaluation team leader, the evaluation was unavoidably and

[1] This design includes text from the Independent Evaluation Inception Report, November, 2016, where that information remains the same.

significantly delayed; nonetheless, several key deliverables were submitted to DFID for review, and some have already received approval.

The key difficulty in this change to the timeline was that one crucial element of the design proposed in the IR was not completed: an evaluation of the degree to which any outcomes seen in TMEA's data can be directly linked to TMEA's interventions. Showing TMEA's contribution to these key trade outcomes – cost and time reductions in trade – is the centrepiece of their strategy, of donors' expectations, and of the evaluation design, and as such is being taken up again with an adjustment to the design of the current evaluation phase, as will be shown in the performance evaluation chapter of this document.

DFID and the other donors made the decision to continue funding TMEA for an additional six years, from 2018 to 2023. As a result, the accountability purpose of the evaluation takes on new meaning, as a backward-looking exercise designed to capture the extent of TMEA processes, results and value relative to the scope and potential of its original design and funding.

This has also meant that the role of learning as a foundational purpose for the evaluation is somewhat changed. Where possible, the upcoming evaluation cycle will indeed provide lessons learnt in order to inform TMEA's ongoing work, as well as for developmental efforts beyond TMEA in trade and regional integration. At the same time, the evaluation team acknowledges the significant and important learning that TMEA have already undertaken and put into action for their current Strategy 2 activities.

1.3 Evaluation questions

This section lists the high-level and detailed evaluation questions (HEQs and DEQs, respectively) that the evaluation research and deliverables will address. Deliverables from the earlier phase of the evaluation answered a selection of these, particularly HEQ1, "Has the programme been effective in delivering its outputs and outcomes? How has this been affected by the programme's organisational performance and how could this be improved?".[2] The evaluation team's response to this HEQ and its DEQs will be recapped in the performance evaluation, so readers can follow the logic easily.

The performance evaluation, therefore, will examine HEQ2 and HEQ5; the trade and impact study covers HEQ3; the poverty and gender impact study is HEQ4; and the VFM study will answer DEQs 5.21 and 5.22. Their interpretation and the evaluation response to each is covered in the study-by-study chapters that follow, as well as the detailed evaluation matrix (by DEQ) in Annex A.

[2] The status of each evaluation originally stated in the Independent Evaluation Inception Report (IR) is presented in Annex B.

Table 1: HEQs and DEQs to be answered in upcoming deliverables.

HEQ2 and its DEQs
HEQ2: To what extent has TMEA been effective in achieving expected intermediate outcomes and to what extent has TMEA programme been effective in contributing to achieving programme strategic outcomes? Did the programme bring about any unintended outcomes?
DEQ2.1 To what extent has TMEA contributed to reducing corridor trade times and increasing corridor volumes?
DEQ2.2 To what extent has TMEA contributed to increasing ease of trading across borders?
DEQ2.3 To what extent has TMEA contributed to improving business competitiveness?
DEQ2.4 Has TMEA caused any unintended outcomes? What are they and who has been affected?

HEQ3 and its DEQs
HEQ3: What is the likely impact of TMEA on trade outcomes and growth, and what factors are critical in order to ensure the sustainability of positive impacts?
Effectiveness: programme-level trade outcomes
DEQ3.1 To what extent have TMEA interventions, including those of a policy nature, led to a reduction in trade times, trade costs and trade risks?
Trade impact
DEQ3.2 What has been the impact of any achieved trade cost reductions from TMEA on trade (both intra- and extra-regional)?
DEQ3.3 How has any improved trade policy environment led to increased trade?
Economic growth impact
DEQ3.4 To what extent has any changes in trade resulting from TMEA interventions contributed to economic growth?
DEQ3.5 What factors are critical in order to ensure the sustainability of positive impacts?

HEQ4 and its DEQs
HEQ4: What is the likely impact of TMEA on poverty and gender, and what factors are critical in order to ensure the sustainability of positive impacts?
DEQ4.1 What is the nature – and, where possible, scale – of the likely impact of the overall programme and of key TMEA projects in the portfolio on the poor—direct and indirect? Who is affected by potential short- or long-term impacts, both positive and negative, how, and how is the causality working?[3]
DEQ4.2 In particular, who has benefited from reduced trade costs? How are the benefits in reduced transport time and cost being passed on to poor people through lower prices or lower price increases?

[3] It is critical to note that this will be speculative and subject to exogenous distortions. Tracing causality rigorously, this far along the results chain, is outside the scope of the evaluation.

DEQ4.3 Are complementary policies being adopted to translate the benefits of increased trade into poverty reduction?

DEQ4.4 Are measures being taken, and are they successful, in mitigating potential negative impacts on any sub-groups – in particular poor people in localised areas?

Cross-cutting issues

DEQ4.5 To what extent has the programme benefited women and girls (noting that the programme design did not purport to benefit them equally)? Have there been any negative consequences for women and girls? Has the programme had an impact on relations, including power and influence, between girls/women and boys/men? How could the programme increase benefits to women and girls within its trade focus?

DEQ4.6 What factors are critical in order to ensure the sustainability of positive impacts?

HEQ 5 and its DEQs

HEQ5: How robust and verified are the causal links and assumptions in the TOC? What does this imply for the relevance, coherence and sustainability of the programme, and what are the lessons learnt that are relevant beyond TMEA?

Programme relevance: TOC causal links and assumptions

DEQ5.1 To what extent are the causal links and assumptions underpinning the TOC evidence-based or verified? [4]

DEQ5.3 To what extent does the programme support EAC regional trade development priorities?

DEQ5.4 How have changes in policy and in the political economy in the region impacted on the programme or on its relevance?

DEQ5.5 Do TMEA interventions complement other ongoing initiatives (both government and private sector)?

Coherence and coordination

DEQ5.6 What are the strengths and weaknesses of the working model observed to date?

DEQ5.7 Is the complementarity and coordination between national and regional levels optimal throughout all programme components and activities?

DEQ5.8 To what extent does the TMEA model bring greater results than the sum of its parts? How could this be strengthened?

DEQ5.9 Is using one organisation – a not-for-profit company – the best vehicle for impact on trade, and on poverty reduction through trade? What are the strengths and weaknesses of this approach?

DEQ5.10 To what extent are the programme's governance arrangements leading to the delivery of high quality and timely outputs?

DEQ5.11 Is the operational model at donor level appropriate and efficient for delivering TMEA? What are the key enablers which need to be preserved, and what are the remaining constraints arising from donors' systems?

[4] We eliminated DEQ5.2 "Are the results framework targets and milestones relevant and realistic?" Given the late advent of this evaluation, a year after the RF was finalised, support to make targets and milestones more relevant and realistic is unhelpful. This is particularly true in light of their new Strategy 2 RF with deeply altered indicators, targets and milestones, and in light of the DFID Annual Reviews' intensive and detailed suggestions that underpin many of those changes.

DEQ5.12 Did TMEA align with country systems and agencies in an effective manner for ownership, and for impact? How could this be strengthened?
DEQ5.13 Are the focus and activities of TMEA consistent with, and additional to, those of others' development programmes in the region? To what extent has the programme facilitated improved coordination?
DEQ5.14 What sorts of approaches have been more successful in working with regional institutions in Africa?[5]
Sustainability
DEQ5.17 What benefits (both social and financial) of the programme are likely to be sustainable and would continue with or without TMEA (staffing and funding)?[6]
DEQ5.20 How are stakeholders engaged through the programme and beyond its life, and how do they take TMEA lessons learnt into account?
VFM
DEQ5.21 Is the programme providing VFM?
DEQ5.22 In which activities/components and countries does the programme achieve higher VFM than others and what are the lessons learnt for driving greater VFM across the board?

1.4 Scope

Evaluation elements along the TMEA results chain

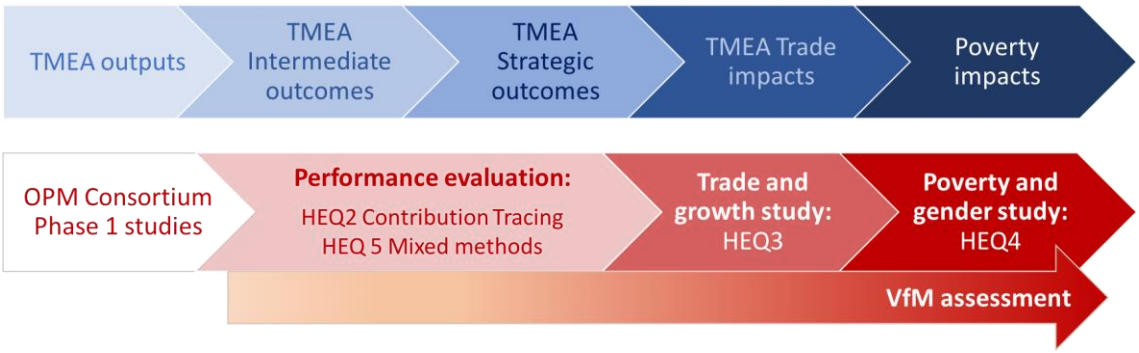
The evaluation research described in this document (as in the IR and the original TORs) is designed in stages to measure achievement and impact along the postulated results chain of the TOC shown above. The performance evaluation focuses on intermediate and strategic outcomes (building on the results from the Phase 1 studies); the trade and growth impact study looks at trade outcomes and impacts (taking into consideration any findings of impact in the performance evaluation); and the poverty and gender impact study builds on the study of trade impacts to postulate links to wider poverty effects uncovered in quantitative and

[5] Two DEQs here, sub-titled "Cross-cutting", have been eliminated. The first read: "What has the impact been on corruption across the various components, notably at border crossings?" While the evaluation team will speak with team members about how corruption might have affected their work, this DEQ could be an impact study of its own. However, TMEA did not directly undertake projects on corruption, so looking for their impacts expends resources on a tangential pursuit. The DEQ on unintended consequences will cover this issue as and when it arises. Moreover, corruption is extremely sensitive in the context, as TMEA continue to interact with institutions that would see this as criticism of a very high and offensive order.
Similarly, DEQ5.16 asked "What impact has the programme had on other issues, such as extractives and environment/climate?" which would examine issues well outside TMEA's areas of influence and focus. While the Mombasa port project worked on "green port" practices, this is the only substantial, direct TMEA activities related to environment and climate. None related to extractives. TMEA has a difficult enough job to influence the areas it is working on directly, and the evaluation to capture them, without seeking impacts in areas where they didn't intervene. "Other issues" are better covered under the HEQ2 "unintended impact" question, than devoting attention and resources the evaluation team needs for other EQs.

[6] DEQ5.18 here read "What should be the essential components of a future exit strategy in order to sustain impact?" Exit strategies were salient at project level (and covered in detail in deliverable 2D/E and its Annex 5), but not at programme level, as TMEA intended to continue operations with or without donor funding. TMEA are currently in Strategy 2 and talking about "Strategy 3" even today. The evaluation will continue to talk about sustainability in DEQ5.17 and especially 5.20, which was are more appropriate to how TMEA operated during Strategy 1, when there effectively was no exit strategy. DEQ5.19 read "What is the likelihood that individual results and overall impact will be sustained after existing donors stop funding, and will there be a lasting positive impact on the poor" which is duplicative of DEQ5.17 and the new question at DEQ4.6.

qualitative data. A visual representation of this chain of hypothesised TMEA results in parallel with the related studies is shown in Figure 3 below, in which the methods and evaluation questions to be addressed are part of each label.

Figure 1: TMEA results chain and the related evaluation studies



Source: Authors' rendering

The performance evaluation will examine pathways for a selection of TMEA components to answer DEQs 2.1, 2.2, 2.3 (effectiveness by SO) and 5.1 (on the robustness of the causal links and assumptions in the TOC). This portion can be thought of as the more in-depth evaluation work. A more traditional mixed methods design will look more broadly across TMEA interventions and results chains to answer DEQs under HEQ5 (on themes of programme relevance (5.1, 5.3, 5.4 and 5.5), coordination and coherence (5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14), and sustainability (5.17 and 5.20)) and 2.4 on unintended consequences. In fact, all teams will be tasked with looking for unintended consequences in all phases of the evaluation, as well as evidence of benefits that are more or less likely to be sustained (5.17). The VfM assessment will run alongside and beyond the performance evaluation and trade and growth study, and in terms of timing will be analysed and reported on after all phases have completed. That study will look at DEQs 5.21 and 5.22 on VfM overall and in comparative fashion.

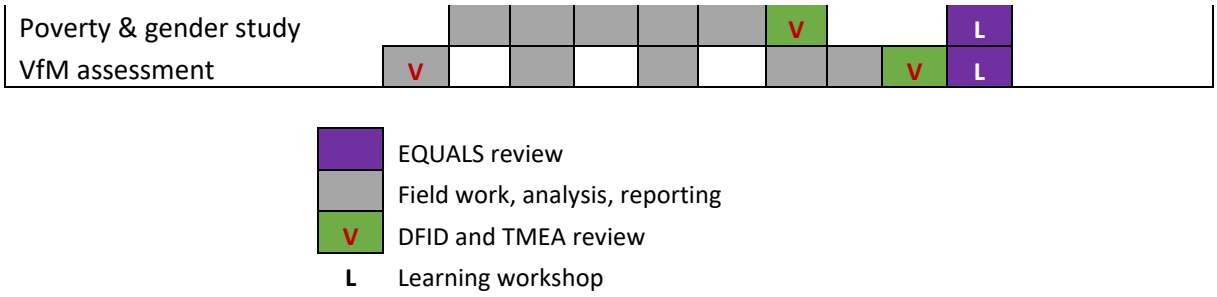
1.5 Timing

The proposed timing for the evaluation studies is detailed in Annex C, and presumes that the design, once approved by DFID, will benefit from a proposed no-cost contract extension through the end of 2019.[7] In broad terms, the evaluation research will begin once DFID notifies OPM of approval, with secondary data search and the identification of gaps. The team will propose a detailed timeline for the visits to TMEA, to avoid overlap with other external reviews (such as the upcoming DFID Annual Review, in October, 2018) and internal demands, such as board meetings and annual leave periods. A summary timeline is provided in Table 2, below:

Table 2: Summary schedule

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Performance evaluation						V	L							
Trade and growth study								V			L			

[7] This schedule will depend on timely approval from DFID on the proposed design. Please see Annex F for detail.



Fieldwork is expected to begin for the performance evaluation in December, to coincide with a VFM framework workshop. The performance evaluation will be the first to submit a draft report in March, 2019, followed by the trade and growth study in May. The poverty and gender study will begin data collection for both qualitative and quantitative components in the new year. The latter will include national datasets which are due to become available. From that point, the quantitative study is desk analysis, with no time in the field. The qualitative fieldwork will be prepared in the third full week of January, with arrival to the field at the end of the month, for four weeks. Analysis and reporting for that study, then, extends to mid-year. The VfM study, building on the results from the three studies, undertakes its reporting period in the third quarter.

Each study's draft report will go through a process of review (with DFID and TMEA, and then with EQUALS) and validation, followed by face-to-face workshops to share lessons learnt. In the case of the VfM assessment, that team will substitute a verification exercise for a final lessons learnt workshop. Their experience indicates that TMEA will benefit more from the opportunity to feed into the conclusions prior to the draft report, than from an additional learning event at the end of the period. Where possible, events will be combined to conserve resources, but in principle they follow successful delivery of each evaluation product.

Often in development evaluations, particularly those related to complex programming and those looking to measure impacts through non-experimental designs, there is a need to schedule second iterations of fieldwork – even if only remotely, by skype or telephone. This is part and parcel of the analytical process, which relies on triangulation of sources, validation by respondents and others, consideration of alternative explanations, painstaking attention to making explicit the connections between findings and conclusions, and auditable documentation of the entire process.[8] For this reason, the evaluation team have built in a full quarter of "cushion" before the end of the proposed no-cost extension, while still pursuing the earlier deadlines assiduously.

[8] Stern, Elliot, et al. 2012. Broadening the Range of Designs and Methods for Impact Evaluations. Report of a Study Commissioned by the Department for International Development. P. 70, inter alia.

2 Performance Evaluation

Within the theme of accountability, the objective of the performance evaluation lies in the key objectives of testing the TMEA TOC (assessing the causal links and the robustness of underlying assumptions), assessing the effectiveness of the TMEA programme (including both its outcomes and organizational effectiveness), and identifying lessons learnt for TMEA and beyond (including insights on enabling and constraining factors, critical actions and gaps which would be generalisable to future programmes or to other contexts.) The performance evaluation design is multi-faceted and mixed-method, to address the broad and complex nature of TMEA programming.

The performance evaluation will answer HEQ2 and HEQ5, focusing on effectiveness at outcomes levels, with a recap of the evaluation's response to HEQ1 on effectiveness at the project and output levels. The evaluation team will trace both intermediate and strategic outcomes for a selection of specific components within the three strategic objectives (SOs) in the performance evaluation, and look at sustainability and some process issues (complementarity of regional and national operations, coordination and complementarity, and approaches for working with regional institutions in East Africa, per the remaining DEQs shown in Annex B.)

The overall design for the evaluation will employ qualitative and quantitative methods to answer the evaluation questions in combination, to meet DFID standards and answer the evaluation questions comprehensively and rigorously. The complex and variegated nature of the programme presents us with several challenges. Most important is the enormous number of projects in TMEA, each with several possible results paths, which makes it impossible to examine all of them in depth and wasteful to try to do so. At the same time, the great variety of projects in the programme would make any estimate made by scaling up a random sample of results paths hopelessly imprecise. Instead we propose to purposively select results chains with the most probable impact on intermediate and strategic outcomes and thoroughly test the degree to which these can be attributed to TMEA interventions.

Many of TMEA's 200 projects will not have a sizeable impact, but some are likely to do so: and small improvements to trade processes can generate large impacts. The World Bank's Development Databank gives EAC economies' total GDP as $168 bn with imports of $36 bn, and exports of $ 26 bn. The total cost of TMEA is only $0.5bn so a project that made imports only 1.5% cheaper in time or cost savings could have a economic benefit, every year, larger than the cost of all projects in the programme's lifetime. At the same time, no TMEA project is likely to offset such gains by having substantial negative effects on trade. The impact of the whole TMEA programme is therefore, to a first approximation, equal to the sum of the impact of its highest impact projects. The issue for the evaluation is whether or not it is possible to make a strong attribution or contribution claim for these few high impact projects. However, trade and economic growth are volatile (see Table 3 below) and affected by many factors.

Table 3: Annual Growth Rates, $US values, of GDP and imports for EAC countries

	2012	2013	2014	2015	2016
GDP	9.3%	11.8%	9.2%	-2.6%	-1.4%
Imports	5.2%	4.0%	7.0%	-13.1%	-10.8%

(Source World Development Indicators)

With 200 TMEA project activities it is almost certain that some will be correlated with improvements in macroeconomic data and indeed with positive intermediate outcomes but correlation is not enough to prove causation. Nor will counterfactual designs be appropriate when we have no alternative East Africa to evaluate. Having reviewed and work-shopped a

number of study designs, the team have identified Contribution Tracing (CT) as the most suitable non-counterfactual design for examining TMEA's effectiveness and the achievement of intermediate and strategic outcomes.

CT strengthens Process Tracing (PT) – an established impact evaluation design that enables strong causal inferences to be made within a single case by 'tracing' the observable implications of causal mechanisms through a results chain – with explicit consideration of the **probative value** of the evidence for each link in the chain. Probative value is a legal term expressing the relevance of any item of evidence to prove or disprove an element of a case. It is possible to calculate the probative value of any piece of evidence to strengthen belief in any proposition as a function of three variables[9];

1. The probability of observing that piece of evidence if the proposition **is** true
2. The probability of observing that piece of evidence if the proposition **is not** true
3. The **prior** belief that the proposition is true without observing that piece of evidence

Although these variables can only be estimated subjectively[10], the shift from collecting judgements about the likely truth of propositions to separating propositions and evidence and making judgements about the likelihood of observing each piece of evidence is an effective check on bias. In particular, the constant use of the question "how likely is it that some alternative mechanism has generated this evidence?" - which turns out to be the most important determinant of probative value - is a powerful guard against the pressure on programme staff to promote only positive stories and provides a consistent way of comparing many different types of evidence.

Traditional data collection methods – interviews, focus and discussion groups, observation, and the use of secondary documents and data – will feed this analytical approach, as well as answer evaluation questions beyond those of effectiveness that will be answered by CT. Triangulation – drawing on and weighing varied sources internal and external to TMEA - will be used to minimise bias, quality assure the data and support conclusions based on the range of findings.

CT is described in more detail in this section, and a further annex is provided at Annex E on the statistical and procedural steps required to carry it out conclusively. As a theory-based method, contribution tracing requires an in-depth understanding of the programme's theory of change at corporate and component levels. Where these were not part of programme design and implementation, or where they were superseded by events, the evaluation team will need to reconstruct them to be able to undertake the analysis.

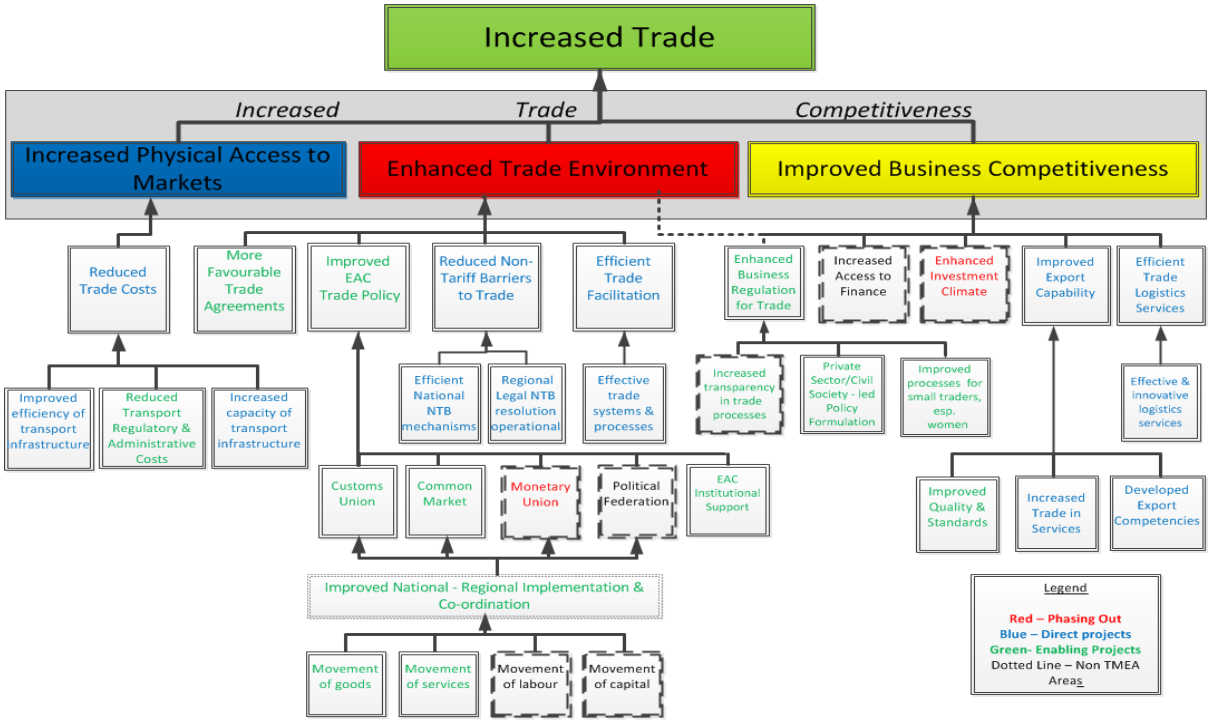
2.1 TMEA Theory of Change

The TMEA theory of change (TOC) was first articulated in 2011, and substantially updated in 2014. It is this 2014 version that the evaluation uses as a basis for following programme logic, at least at the highest levels.

[9] The formula is a direct application of the definition of probability, known as Bayes rule. See Bayes (1763) *An Essay towards solving a Problem in the Doctrine of Chances* in the Philosophical Transactions of the Royal Society of London. 53: 370–418, Befani & Stedman-Bryce have bought it into Contribution Tracing, see Befani & Stedman-Bryce (2016) *Process Tracing and Bayesian updating for impact evaluation*: Evaluation 1–19. Other recent applications have been made by OPM and by 3ie.

[10] While there are some propositions for which experimental techniques such as randomised controlled trials may provide estimates for some elements of some of the variables, such techniques always rely on untestable auxiliary assumptions chosen using the judgement of the statistician.

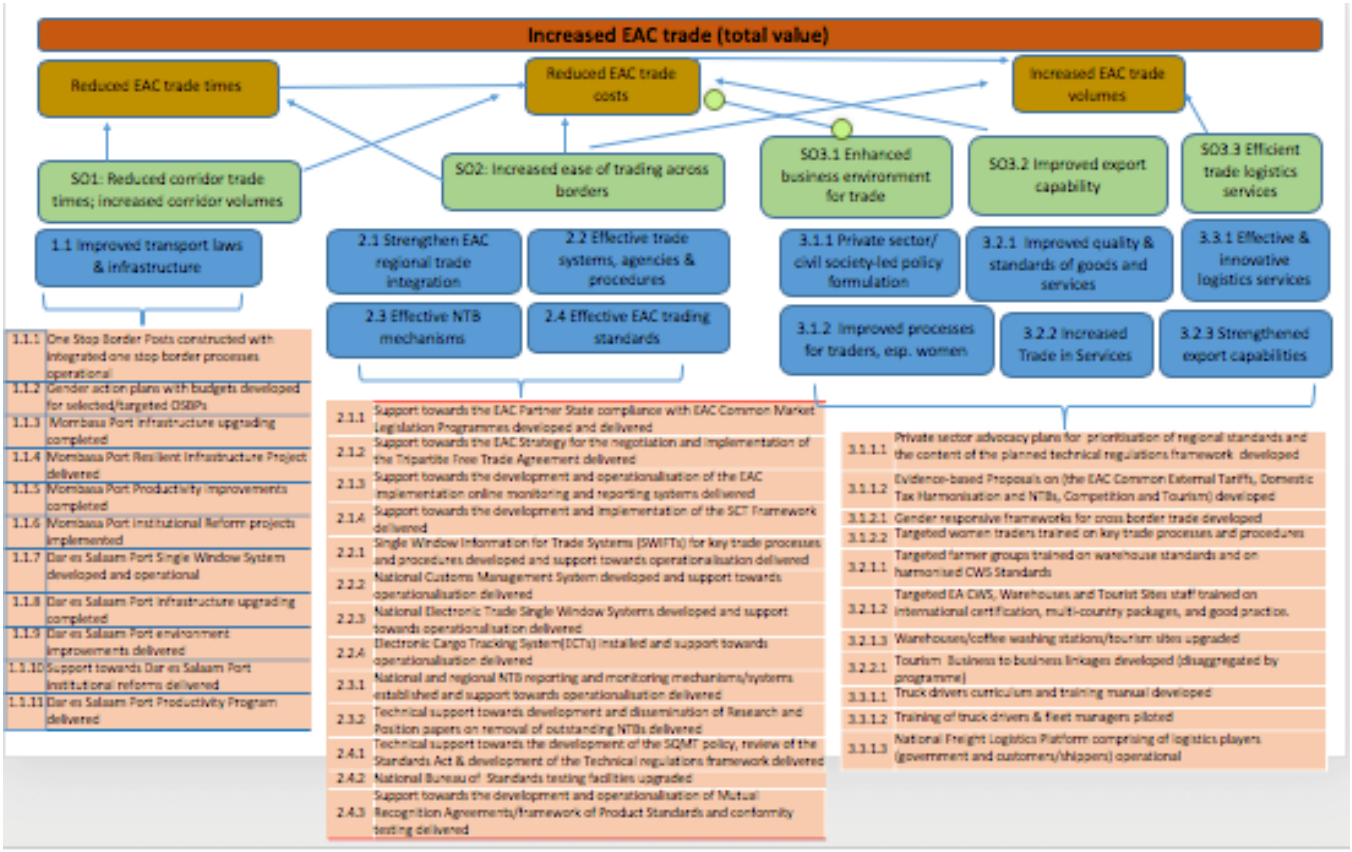
Figure 2: Trademark's Theory of Change



Source: Trademark East Africa, 2014

Three SOs describe the structure of the TOC: Increased Physical Access to Markets; Enhanced Trade Environment; and Improved Business Competitiveness. The TMEA Results Framework (RF) offers more detail in that it breaks down the components into outcomes and outputs that are in turn linked to projects; all levels are measured by indicators shown in the RF, and an intermediary output and outcome structure is shown that ties TMEA's work to the TOC's more conceptual structure. That structure is shown in Figure 3, below, where Increased EAC Trade appears as the overarching trade impact of programming, measured by three indicators on trade in orange: reduced costs, reduced time, and increased volumes. These are in turn supported (in green) by the SOs, divided into intermediate outcomes (in blue) and the programme outputs (in peach).

Figure 3: TMEA's elaborated TOC, inferred from the levels in the RF



Source: Authors' rendering, inferred from the Trademark East Africa Results Framework, 2017

It is important to note that the SOs have different names in the TMEA TOC and the TMEA RF (Figures 2 and 3). SO1 is Increased Physical Access to Markets in the TOC but operationalized as "reduced corridor trade times; increased corridor trade volumes" in the RF. SO2 is Enhanced Trade Environment in the TOC and "increased ease of trading across borders" in the RF. SO3 is Improved Business Competitiveness in the TOC and is broken into three sub-SOs in the RF: "Enhanced business environment for trade", "Improved export capability" and "Efficient trade logistics services". Though this is a bit confusing on its face, the TOC and RF titles do have an internal logic, in that their intent is parallel, but perhaps more concrete in the RF. The TOC is rather more like a graphic representation of what needs to be done to improve trade, in high-level and somewhat abstract terms around regional integration; the RF, by contrast, is what the project focused on in order to achieve a parallel array of targets.

The RF, then, is an important basis for the evaluation work. For SO1 and SO2, the language from the RF captures the key TMEA results (reduced corridor trade times, increased corridor trade volumes, and increased ease in trading across borders) and the evaluation will use the RF terms for the SOs in these two cases. SO3 is at a different level of abstraction than are SO1 and SO2 and the RF reflects that in having three sub-SOs. To avoid confusion, the evaluation will use the broader category of "improving business competitiveness" in DEQ2.3, to make that SO more parallel with the other two.

TMEA refined its component-level strategies in the form of results chains, which might be thought of as component-level TOCs; these will be consulted as a basis for comparison for the performance evaluation pathways, and refined through the evaluation process.

It is notable that, despite important cross-cutting and cross-component activities within TMEA, in which work under one component is very important for successful work in another,

these relationships are not equally explicit in the component results chains. Alongside work to reconstruct component-level results chains where they do not exist or are weaker, this cross-component element will be a subject of consultation and analysis in the performance evaluation, as part of the effort to respond to evaluation questions and test the TOC, while also examining the effects of that coordinated work on effectiveness.

2.2 Background

The previous phase of the independent evaluation undertook extensive research on the range of programming TMEA has carried out, across the range of its TOC. This included mapping the outputs – at project level, for more than 200 projects. These projects are generally carried out by TMEA's partners in government, quasi-governmental bodies like the port authorities at Mombasa and Dar es Salaam, private sector organisations (PSOs, sometimes also called Business Membership Organisations or BMOs), civil society organisations (CSOs), and other subcontracts. Projects were mapped by country and region, SO and strategic outcome, and whether they had direct effects on trade or an enabling effect.[11] Projects include activities such as capacity building, knowledge generation, advocacy and policy advice, institutional strengthening with either soft assistance or hardware; and direct service delivery. Many projects worked in more than one of these categories, and there were some projects focused explicitly on gender, while others included gender as an element of programming.

The next stage of the evaluation included a more in-depth examination of project results, using a sample of 60 projects across the three strategic outcomes. The sample was split between those 'priority' projects TMEA selected (17) and those selected purposively by the evaluation team, to cover thematically 'what TMEA typically does'[12] by matching TMEA portfolio characteristics, within a set of DFID-approved selection criteria. Forty projects were visited directly, and twenty were covered via a desk review to minimise costs; in some of the latter, phone interviews were added to supplement and clarify the data available in reports. SO2 and SO3 projects were scored against a set of common criteria around their relevance, efficiency, effectiveness and sustainability.

Results of those evaluations in earlier deliverables form the basis of the evaluation team's understanding of the programme, in particular the way the TOC and results chains were operationalised into a set of activities designed to reach programme goals. The next step in the evaluation process was to examine that operationalisation by understanding the component level results chains, or pathways. TMEA has three Strategic Objectives, which are measured by a set of indicators in the RF. The TOC posits that these objectives will be met by the combined success of eleven Programme Intermediate Outcomes (PIOs) – in blue in the Figure 2 above – which are also measured by RF indicators, and there are one or more programme outputs that feed into the PIOs. Programme outputs represent the hypothesised results of what OPM have called "sub-pathways" – sets of activities designed to lead to the PIOs.[13] Below that are projects – over 200 – clustered around these key themes, and theorised to support those programme-level outputs.

OPM's evaluation team found that "under SO1 and SO2 projects and their likely results are more comprehensively built around pathways of change (where project results at one level of a pathway of change towards increased trade can most likely contribute to results at the next

[11] OPM: Otter, Thomas and Rasulova, Saltanat. Workstream 2; Deliverable 2A. Preliminary Output Assessment. 31 October 2017
[12] Ibid, page 34.
[13] Please see the submitted but unpublished OPM document,

level in the same pathway of change), compared to SO3"[14], making SO1 and SO2 likelier to achieve higher order outcomes. Two years later, the evaluation team undertook the pathway mapping to test the theory of change. Using the TOC, the RF indicator data, and data collected in the outputs and results mapping processes, the evaluation team examined the set of projects and the degree to which the hypothesised mechanism worked to build from project outcomes to PIOs. The evaluation team completed ten draft pathways pointing to PIOs[15]; these were couched in contextual expertise on trade and queried vis-à-vis the TOC and the necessity and sufficiency of the projects TMEA selected per pathway. As a body of work they characterise the breadth of TMEA interventions in each pathway and set the stage for the performance evaluation (please see the Key Steps section below (2.4.1), both for the contribution tracing case selection and for the important question on the TMEA TOC regarding the strength of its causal links and assumptions (DEQ5.1, please see below).

It is important to note that the pathways work was carried out almost entirely without fieldwork. In late July and early August, the OPM team held introductory discussions with component and SO leads and identified some results chains documentation. But we have not refined the pathways based on those initial discussions. The OPM team need time to visit with the teams (corporate and a selection of country teams), on each component, to discuss and evaluate evidence of the steps along the pathways. At that point the OPM team will identify weaknesses where they may exist. We will use these detailed and realistic frameworks as a basis for the PE, starting from the work to date, and enhanced by any further evidence generated during the PE process.

The discussions about context in and around the pathways reflect the complexity of the environments in which Trademark works: six countries with highly differing and dynamic political economies, trade and economic contexts, and contention over regional integration. Other donors and actors – governmental as well as private sector – also work to affect trade, meaning that TMEA's results are likely to be linked very closely to these contextual factors and actors. Examining the possibly multiple causal factors in a 'package' that brought about change does not diminish TMEA's contribution, but rather sets TMEA's work in a more realistic and interdependent constellation of factors in which the team undertook their work. Very concretely, this means that the evaluation will seek to identify and substantiate TMEA's *contribution* to results, rather than *attributing* results directly and solely to the programme's actions.

As reported in the evaluation's Institutional Assessment (Deliverable 2B), TMEA staff have had to negotiate these spaces carefully in order to implement, and have adapted to changing environments throughout the implementation period. Adaptation in such environments brings an additional challenge for evaluation, in that those strategies that might have been intended in initial stages may not have been realised for reasons beyond the programme's manageable interest, and emergent strategies in response to changed environments might not be accurately included in the TOC. This, too, will be part of the evaluation team's inquiry, to understand how adaptation affected programming and results.

2.3 Scope and objectives

Examining effectiveness and contribution will involve tracing the component results chains through programme intermediate outcomes and strategic outcomes, per the TOC, considering the complexity and adaptation referenced above. The mixed methods evaluation design will seek to substantiate TMEA's claims about their contribution to results – that is, effectiveness – through collecting and analysing internal and external, primary and

[14] OPM: Otter, Thomas and Rasulova, Saltanat. Workstream 2; Deliverable 2A. Preliminary Output Assessment. 31 October 2017. p 39
[15] One of the original eleven failed to materialise.

secondary data relevant to the results chains to answer HEQ2 and its DEQs (in the table below) on TMEA's achievement of intermediate and strategic outcomes, and the remaining DEQs under HEQ5 on the links and assumptions of the TOC, and the relevance, coherence, sustainability and lessons learnt of the programme.

Table 4: HEQ2 and HEQ5 and their DEQs

HEQ2 and its DEQs
HEQ2: To what extent has TMEA been effective in achieving expected intermediate outcomes and to what extent has TMEA programme been effective in contributing to achieving programme strategic outcomes? Did the programme bring about any unintended outcomes?
DEQ2.1 To what extent has TMEA contributed to reducing corridor trade times and increasing corridor volumes?
DEQ2.2 To what extent has TMEA contributed to increasing ease of trading across borders?
DEQ2.3 To what extent has TMEA contributed to improving business competitiveness?
DEQ2.4 Has TMEA caused any unintended outcomes? What are they and who has been affected?

HEQ 5 and its DEQs
HEQ5: How robust and verified are the causal links and assumptions in the TOC? What does this imply for the relevance, coherence and sustainability of the programme, and what are the lessons learnt that are relevant beyond TMEA?
Programme relevance: TOC causal links and assumptions
DEQ5.1 To what extent are the causal links and assumptions underpinning the TOC evidence-based or verified? [16]
DEQ5.3 To what extent does the programme support EAC regional trade development priorities?
DEQ5.4 How have changes in policy and in the political economy in the region impacted on the programme or on its relevance?
DEQ5.5 Do TMEA interventions complement other ongoing initiatives (both government and private sector)?
Coherence and coordination
DEQ5.6 What are the strengths and weaknesses of the working model observed to date?
DEQ5.7 Is the complementarity and coordination between national and regional levels optimal throughout all programme components and activities?
DEQ5.8 To what extent does the TMEA model bring greater results than the sum of its parts? How could this be strengthened?

[16] We eliminated DEQ5.2 "Are the results framework targets and milestones relevant and realistic?" Given the late advent of this evaluation, a year after the RF was finalised, support to make targets and milestones more relevant and realistic is unhelpful. This is particularly true in light of their new Strategy 2 RF with deeply altered indicators, targets and milestones, and in light of the DFID Annual Reviews' intensive and detailed suggestions that underpin many of those changes.

DEQ5.9 Is using one organisation – a not-for-profit company – the best vehicle for impact on trade, and on poverty reduction through trade? What are the strengths and weaknesses of this approach?

DEQ5.10 To what extent are the programme's governance arrangements leading to the delivery of high quality and timely outputs?

DEQ5.11 Is the operational model at donor level appropriate and efficient for delivering TMEA? What are the key enablers which need to be preserved, and what are the remaining constraints arising from donors' systems?

DEQ5.12 Did TMEA align with country systems and agencies in an effective manner for ownership, and for impact? How could this be strengthened?

DEQ5.13 Are the focus and activities of TMEA consistent with, and additional to, those of others' development programmes in the region? To what extent has the programme facilitated improved coordination?

DEQ5.14 What sorts of approaches have been more successful in working with regional institutions in Africa?[17]

Sustainability

DEQ5.17 What benefits (both social and financial) of the programme are likely to be sustainable and would continue with or without TMEA (staffing and funding)?[18]

DEQ5.20 How are stakeholders engaged through the programme and beyond its life, and how do they take TMEA lessons learnt into account?

As a portfolio-type programme, TMEA have undertaken a broad variety of interventions across a range of components designed to improve trade in East Africa. By definition, such programmes are likely to have a range of levels of performance – that is, not all interventions or areas of work would be expected to have the same levels of success in achieving outcomes. This is exemplified by their changing TOC, which underwent major revision in 2013-2014, and again as the TMEA team move forward with their Strategy 2.

The performance evaluation proposes looking *deeply* at a set of pathways that have achieved their proposed outcomes to answer HEQ2, and *broadly* at the programme in its four main countries of operation to answer what remains of HEQ5. The design incorporates in-

[17] Two DEQs here, sub-titled "Cross-cutting", have been eliminated. The first read: "What has the impact been on corruption across the various components, notably at border crossings?" While the evaluation team will speak with team members about how corruption might have affected their work, this DEQ could be an impact study of its own. However, TMEA did not directly undertake projects on corruption, so looking for their impacts expends resources on a tangential pursuit. The DEQ on unintended consequences will cover this issue as and when it arises. Moreover, corruption is extremely sensitive in the context, as TMEA continue to interact with institutions that would see this as criticism of a very high and offensive order.
Similarly, DEQ5.16 asked "What impact has the programme had on other issues, such as extractives and environment/climate?" which would examine issues well outside TMEA's areas of influence and focus. While the Mombasa port project worked on "green port" practices, this is the only substantial, direct TMEA activities related to environment and climate. None related to extractives. TMEA has a difficult enough job to influence the areas it is working on directly, and the evaluation to capture them, without seeking impacts in areas where they didn't intervene. "Other issues" are better covered under the HEQ2 "unintended impact" question, than devoting attention and resources the evaluation team needs for other EQs.

[18] DEQ5.18 here read "What should be the essential components of a future exit strategy in order to sustain impact?" Exit strategies were salient at project level (and covered in detail in deliverable 2D/E and its Annex 5), but not at programme level, as TMEA intended to continue operations with or without donor funding. TMEA are currently in Strategy 2 and talking about "Strategy 3" even today. The evaluation will continue to talk about sustainability in DEQ5.17 and especially 5.20, which was are more appropriate to how TMEA operated during Strategy 1, when there effectively was no exit strategy. DEQ5.19 read "What is the likelihood that individual results and overall impact will be sustained after existing donors stop funding, and will there be a lasting positive impact on the poor" which is duplicative of DEQ5.17 and the new question at DEQ4.6.

depth Contribution Tracing (described in the following section) alongside more traditional mixed methods evaluation fieldwork around the HEQ5 themes. This design thus takes advantage of mixed methods without spending considerable resources to capture additional depth on non-performing components. These mixed methods also allow for the emergence of unqueried topics, as illustrated in DEQ2.4 on unintended outcomes, by casting a wider – but of necessity less in-depth – net around the breadth of TMEA programming.

2.3.1 Contribution Tracing

The evaluation team will use contribution tracing (CT) to substantiate TMEA results claims for a selection of key outcomes, from projects through programme outputs and PIOs to their strategic outcomes – their pathways. CT is a rigorous non-experimental approach to establishing the validity of contribution claims in impact evaluations.[19] It offers explicit criteria to guide evaluators in data collection and in measuring confidence in their findings with regard to an intervention's contribution.[20] CT uses both quantitative and qualitative data to make causal inferences without relying on a counterfactual design.[21] The systematic design and previous research using CT provide added credibility to our proposed use of the method.

CT is a theory-based approach to impact evaluation, with its own comparative advantages among non-counterfactual and non-experimental designs. It is particularly strong at reducing confirmation bias, providing more transparency and predictability to data collection efforts, and ultimately increasing the internal validity and credibility of evaluation findings.[22] CT provides guidance on what evidence to seek out, or how to assess the strength of evidence, if observed, in relation to a contribution claim. The process has the following steps:

- **Developing a testable claim.** This requires intensive discussions with the project staff to turn vague statements like, "the project has supported the improvement of trade links between country x and country y" into a more specific statement about exactly what was achieved "the project lead to a reduction in average waiting time at the border between x and y from three days to two days". This is further delineated into a recreation of the actual (rather than theorised) results chain: what the project did (reports prepared, courses held, equipment bought etc.), and the links between the project activities and the results (e.g. we produced a report which caused the government to set up a new unit which put in place a new procedure which reduced waiting times at the border).
- **Identify evidence for each link.** At the first link in the results chain – project activities – evidence of TMEA's contribution is likely abundant and irrefutable – the evidence accumulated from having planned and carried out an intervention. From the next link onward in the results chain, each link requires two bundles of evidence. First is evidence that something happened (the unit was set up, the new procedure was put in place etc), and second is evidence that whatever happened was caused by the previous link in the chain.

  This linkage evidence often depends on one of several characteristics:

[19] Befani, Barbara. (Undated) Choosing Appropriate Evaluation Methods: A Tool for Assessment and Selection. Accessed at: https://www.bond.org.uk/sites/default/files/caem_narrative_final_14oct16.pdf
[20] Aston, Tom on Wikispaces "Governance", 'drawing heavily on Befani and Stedman-Bryce (2016)'. Accessed at: http://governance.care2share.wikispaces.net/file/view/Contribution+Tracing+Summary+.pdf/615490431/Contribution+Tracing+Summary+.pdf
[21] Befani, Barbara and Mayne, John. (2014) Process Tracing and Contribution Analysis: A Combined Approach to Generative Causal Inference for Impact Evaluation. IDS Bulletin Volume 45 Number 6 November 2014 © 2014 The Authors. IDS Bulletin © 2014 Institute of Development Studies.
[22] Befani and Stedman-Bryce, 2017.

  - Timing, e.g., *"they had been talking about this for years but only did it when we provided the report showing them how"*
  - Place: *"they only introduced it in the customs posts where we were working"*
  - Language: *"everything in the regulation is lifted directly from our draft"*
  - Correspondence: *"they said in the email record/minutes that they were waiting for us to produce the recommendation before making the decision"*

  Often project staff do not realise that they have such evidence or that it is important until it is pointed out to them.
- **Iterate**. At this stage project/programme staff will sometimes realise that they don't have evidence for the claim they had wanted to make but do have evidence for another claim.
- **Collect the evidence** for each link and make judgements about the likelihood of seeing that evidence if the claim about the existence of a link (or linkage to the previous link) is true and of the likelihood[23] of seeing that same evidence if the claim is not true. Taking the standard assumption that any claim considered without evidence is as likely to be true as not these two judgements imply an estimate of the probative value of each bundle of evidence to support each claim.
- Put both the claim and the judgements about the likelihood of seeing evidence **up for challenge**.
- **Iterate** until each link is supported by evidence with high probative value.
- **Present the results chain and attached evidence** as a strongly supported claim. The calculated probative values can go in an annex.

CT uses the principles of PT combined with a branch of mathematics called Bayesian updating.[24] CT builds upon two an established social science methods PT and Contribution Analysis, both designed to make causal inferences within a single case. Process tracing builds a results chain and gathers evidence as described above and then uses four "probative tests[25]" of that evidence while Contributions Analysis stresses the importance of contesting a contribution claim with alternative explanations. The extra element brought in by CT is the insight from Bayes rule that, if you have a claim **C** that you initially think is as likely

The Probability of observing **E** if claim **C** is true ÷

[The Probability of observing **E** if claim **C** is true + The Probability of observing **E** if claim **C** is **not** true]

to be true as not, i.e. you start by believing that the likelihood that the claim is true is 0.5, and then get a bundle of evidence **E** that relates to that claim then your new belief that the evidence is true should logically be equal to:

In lay terms, we become more confident in a piece of evidence when it is laid out in a logical sequence, such as along the postulated results chain, and paired or grouped with other evidence. When evidence is also "blind" or unbiased unlike, for example, programme M&E reporting, that further strengthens the case. Bayesian updating in CT is a logic and format for laying out and backing up evidence claims along a pathway. A given piece of evidence that might or might not prove TMEA's contribution can be said to give a certainty of "50-50" – as

[23] It is not sensible to make precise subjective judgements of probabilities. Befani and Steadman-Bryce propose a rubric of seven judgements; Virtually Certain (99-100%), Very Likely (90-99%), Likely (66-90%), About as likely as not (33-66%), Unlikely (10-33%), Very Unlikely (1-10%), Exceptionally Unlikely (0-1%)

[24] Befani, Barbara, and Stedman-Bryce, Gavin. 2017. Process Tracing and Bayesian Updating for Impact Evaluation. Evaluation 2017, Vol. 23(1) 42-60. Sage Publishing, http://journals.sagepub.com/doi/pdf/10.1177/1356389016654584

[25] The four tests, called 'straw in the wind', 'hoop test', 'smoking gun' and 'doubly decisive', are described in greater detail in Annex E.

likely as not. This is called “prior confidence” in Bayesian updating; “posterior confidence” considers as well how likely we are to find that evidence.

“Probative value” or confidence in that evidence emerges from a considered review of all the evidence along the results chain, individually and in combination. By estimating the probabilities around finding one, and then additional, pieces of evidence we can raise that 50-50 level of confidence. The pieces of evidence have to follow a strict structure for that confidence level to rise: first, we must have tangible evidence of the measured outcome, from a trustworthy source usually external to the programme. Second, we need evidence that the programme contributed to or caused that outcome, and not some other cause. As these pieces of evidence are assembled along the results chain, and the theorised results at each step are backed by tangible evidence, we grow more confident that our evidence documents the ‘cause’ of (or contributor to) the ‘effect’ that has materialised.

The clear and unequivocal presentation of the pieces of evidence and the calculations of prior and posterior confidence is essential to the process. By being transparent, the strength of the contribution claim is subject to debate. Within the team this includes expert analysis and ground-truthing about alternative explanations for each bundle of evidence, to ensure that the argument constructed through the evidence base is feasible, *prima facie*. The East Africa trade expertise also helps the team demarcate different contributors – such as other donor or government projects on the same topics – that are part of the results chain. Transparency continues into the reporting period, so that the pieces of evidence and the conclusions drawn by the team can be queried by interested and knowledgeable readers and, where necessary, refined as a result.

In more statistical language, Bayesian updating is a method of statistical inference which is used to calculate posterior confidence in a contribution claim based on our prior confidence and the review of evidence. In the application of Bayesian logic to process tracing, we consider whether we have to find a given piece of empirical material (sensitivity or certainty of evidence), and if found, whether there are any plausible alternative explanations for finding this evidence (uniqueness of evidence, often referred to as Type I Error).[26],[27] A mathematical procedure tests the difference between the true positive rate, or ‘Sensitivity’, and the false positive rate, or ‘Type I Error’. The larger the difference between the Sensitivity and the Type I Error, the higher the probative value of an item of evidence in relation to a specific contribution claim.[28] Thus, the task of the evaluation is to identify evidence with the highest probative value. Annex E includes a deeper discussion of CT in practice, based on recent examples and showing exact steps to be taken.

The CT method requires a contribution claim to test: inherent in that requirement is that the evaluation design start from the results claimed and then work backwards through the results chain or pathway to substantiate the claims. Those indicators in which TMEA have shown substantial results in their RF therefore provide a natural starting point for selection of cases to study in-depth, though with the quality concerns expressed in DFID’s 2016 and 2017

[26] Taken from Beach, Derek. 2017. Process-Tracing Methods in Social Science. Accessed at: http://politics.oxfordre.com/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-176. References given include Van Evera, S. (1997). *Guide to methods for students of political science*. Ithaca, NY: Cornell University Press. Bennett, A. (2014). Appendix. In A. Bennett & J. Checkel (Eds.), *Process tracing: From metaphor to analytic tool*. Cambridge, U.K.: Cambridge University Press. Rohlfing, I. (2012). *Case studies and causal inference*. Houndmills, U.K.: Palgrave Macmillan. Beach, D., & Pedersen, R. B. (2013). *Process-tracing methods: Foundations and guidelines*. Ann Arbor: University of Michigan Press. Beach, D., & Pedersen, R. B. (2016a). *Causal case studies: Comparing, matching and tracing*. Ann Arbor: University of Michigan Press.

[27] A layperson’s read of this might be: “Here sensitivity means the probability of observing an item of evidence if the contribution claim is true. Type I Error is the probability of observing an item of evidence if the contribution claim is not true.”

[28] Pamoja UK, https://www.pamoja.uk.com/aboutct/

Annual Reviews, we will also need to validate the choices with Trademark before undertaking further research.

As noted above, the portfolio approach inherent in TMEA's programming reflects and appropriately responds to regional and national political economy, uncertain and dynamic contexts, and emerging opportunities. With its major funding, highly professional team and ability to establish relationships with government partners, TMEA was able to adapt programming to real-time dynamics, emerging champions, and opportunities to intervene where they judged these would make the most difference to trade in the EAC. For this reason, there are areas of intervention which are mature in their achievement of outcomes, and those which are not. Selecting those which TMEA asserts have made significant, measurable gains in purposive sampling allows us to attempt to trace and substantiate those claims, assess their reliability, understand the dimension and implications of those that are substantiated, and draw lessons learnt from the detailed case experiences. The CT analysis will not show what has happened across each and every intervention in, for example, SO1; instead it will show the ones where there have been important gains in reducing corridor trade times and/or increasing corridor trade volumes (DEQ2.1). CT will assess the contribution of TMEA to these gains.

Similarly with DEQ2.2, CT analysis on one or two key efforts resulting in what TMEA claims under the SO2 title "increasing ease of trading across borders" will examine the core activities, projects, outputs and outcomes that are hypothesised to have resulted in measurable ease of cross-border trading. Where this is shown to have occurred, the magnitude of that change will be queried in context and with interpretation from trade experts on the evaluation team. For DEQ2.3, on "improved business competitiveness," selected work in SO3 will be queried for its effects on competitiveness, to substantiate or refute TMEA claims of effectiveness in that area. Given the weaker pathway connection identified in the earlier evaluation work, the team will pay special attention to the scale of that change and its likely impact in the contexts in which TMEA operated.

2.4 Key Steps

Step 1 – Selecting cases

Selection of cases is crucial in light of limited resources and time. Starting from the most substantial results will focus attention on the areas of intervention that are most promising in terms of showing impact at scale that can be reliably imputed to provide return on donors' investment. The evaluation team will therefore select cases where TMEA identifies its most important results to look at the extent to which TMEA contributed to or caused those results. We will also attempt to determine the significance of their contribution, in light of other contributing factors in the context.

Selection will therefore proceed with additional document review[29] and internal consultation to answer the following questions:

[29] The recent site visit provided a wealth of documentation and data on projects and, importantly, on component strategy and results planning and monitoring. The team also got on a much more positive footing with the TMEA team members (see the discussion of Appreciative Inquiry, below) that will facilitate remote contacts to supplement documentation as necessary during Step One.

1. For which components (or results chains) do TMEA claim results, and where (regional or national level(s))? As a condition for this criterion, we would also want to see results chains where activities, outputs and outcomes were largely successfully implemented.
2. Was the (claimed) maturity and potential scale of the impact sufficient to be detected by the evaluation?
3. Does the results chain warrant investigation, in terms of scale? Components with materialized, detectable impacts that relate only to a small fraction of the scope of the issue might be disqualified here.
4. Are data likely to be accessible, both within and outside TMEA, to substantiate the contribution claim?[30]
5. Which cases will best answer each of the three SO-related DEQs?

The last question deals with the *mix* of cases, rather than just the selection of individual cases: to be successful, the evaluation must select a set of cases which are able to answer the three relevant DEQs on effectiveness by strategic objective: SO1 on reducing corridor trade times and increasing corridor volumes; SO2 on increasing ease of trading across borders, and SO3 on improving business competitiveness.

Looking across country programmes and the corporate components, we will propose a selection that includes work in each SO, to be able to answer DEQs 2.1, 2.2 and 2.3 comprehensively. For example, to answer DEQ2.1 “To what extent has TMEA reduced corridor trade times and increased corridor trade volumes?” we might select two results cited by TMEA in our early interviews: reductions in import times at Mombasa Port, and reductions in border crossing times at OSBPs. Selecting these two results comprise various TMEA efforts under SO1, including infrastructure and capacity building. They also focus on particular countries. The evaluation team would use those parameters to guide conversations with corporate and country TMEA teams, government and other partners, think tanks, and others as outlined in Steps 3 and 4 below. The same process would be undertaken at the same time with SO2 for DEQ2.2, and with SO3 for DEQ2.3. The selection will be validated with TMEA and cleared with DFID before fieldwork begins, as described in Step 2 below.

CT case selection is based on where mature outcomes have been realised, rather than sampling for some other purpose. The selection is not designed to be in some way generalisable to the rest of the SO. The CT design examines this set of cases in depth, rather than all cases more shallowly. A portfolio programme like TMEA is often not successful in all undertakings, but rather uses adaptive management to monitor and make decisions on investments based on working through different results chains that have the potential of success. As a result, CT is an appropriate choice for examining those results chains that are reported to be successful.

The result of this process, including early conversations with TMEA, review of the RF and other data and documents, and consideration of these questions, will be a prioritised list of contribution claims about TMEA programming’s potentially most impactful activities. A draft “long list” of the major project areas is found in Annex H to this document. However, it is useful to remember that the selection will be made not on projects, but on TMEA’s contribution claims from these projects.

[30] Data quality is assumed here; wherever possible, data of high quality that is external to TMEA will be necessary to support data provided by TMEA. If there are cases where TMEA have the only data available on a given component or contribution claim, data will be closely assessed for quality.

The number of outcomes/ claims that can be reliably evaluated will be constrained by time and resources. A list of possible cases will be produced with final selection of cases agreed in conversation with key stakeholders.

On its face, selecting cases based at least partially on TMEA's own assertions around their best outcomes would appear to have the potential to introduce bias in the selection. With a simpler evaluation design, that might pose a risk. But the proposed design mitigates that possibility in two key ways. First, the CT design looks at outcomes purposively, with the explicit intention of identifying confirmatory or negatory evidence on those claims. Where the team cannot find that evidence, we will return to TMEA to look for a claim lower down the results chain that we can check in a similar fashion. Our intention is, as appropriate in an independent evaluation, neutral with regard to the claims reported by TMEA. The CT process simply starts where outcomes claims are made, with a set of the most salient causal stories from across their interventions.

In the investigation of the individual cases, we will look backward from the claims to the results chains, point by point, to test whether the claim has merit, through the inputs, outputs, intermediate outcomes and strategic outcomes. There are two tests of the claims at each of these levels: whether the outcome actually occurred, and whether TMEA's claim of influencing that outcome is warranted. For both we will seek reliable data that minimise the likelihood of bias. The process continues with attention to alternative explanations for the outcomes claims, but the CT method also tests the likelihood of alternative explanations through the calculations of the probative value of the evidence. In this way, the CT method is closer to Process Tracing than Contribution Analysis. The evaluation team's knowledge of the trade space in East Africa (from team expertise as well as from fieldwork) will help us place TMEA's potential impact in context. TMEA will likely be one but not the only factor in results chains. The rigour of CT will help us isolate what came from TMEA's interventions, by its attention to whether each link in a results chain is demonstrably caused by the one prior.

The second way in which potential bias is minimised is that the evaluation team will be looking across the full TOC broadly, to answer evaluation questions under HEQ5. This allows for broad capture of strengths and weaknesses, obstacles and enabling factors, such as in looking at synergies or complementarity among components, where they might exist. It will place the CT findings in the broader context of the programme as a whole, and together with the TGIS and VfM studies detailed later in this document, provide a set of useful perspectives on whether their outcome claims are sufficient in light of the donors' significant investments. Collectively this design limits bias while allowing for thorough attention across the breadth of TMEA's ten pathways.

Step 2 – Validating cases

Possible cases must be identified and validated with Trademark through discussion, to ensure we focus our attention on the strongest cases for programme outcomes. This process began in July and August with the evaluation team's visit to the corporate office of TMEA,[31,32] from a set of interviews that approached the TMEA team from an Appreciative Inquiry (AI) stance, discussed in more detail in Step 4. This method builds on positivist psychological theory, in "seeking what is right in an organization" rather than a more traditional problem-solving approach.[33] While problem-solving methods seek to identify and root out deficits, AI

[31] Please see first draft of a "long list" of candidates, stemming from interviews at TMEA, at Annex H.
[32] Asking about team members' "proudest accomplishments" proved a positive and fruitful entrée into deeper discussions. These interviews were carried out with subcomponent leads, results team, senior leadership and senior management team.
[33] Coghlan, Anne T., Hallie Preskill, Tessie Tzavaras Catsambas. 2003. An Overview of Appreciative Inquiry in Evaluation. NEW DIRECTIONS FOR EVALUATION, no. 100, Winter 2003 © Wiley Periodicals, Inc.

methods begin with questions about the best experiences, proudest accomplishments, or strongest values in an organisation, with the goal of capitalising on those experiences and their positive psychological residue, in a longer-term process of organisational change.

In Nairobi, the evaluation team used AI as a way to open conversations with the TMEA team members. In addition to "ice-breaking", the questions about proudest accomplishments created an obvious and abrupt change in mindset at TMEA about the evaluation – a relationship which had soured somewhat due to the long delay and what was perceived as a lack of communication on OPM's part. The approach in effect changed the "relational process of inquiry" for the better,[34] within the opening questions of each interview. The approach was used deliberately for that purpose, but also to elicit frank discussions of projects and components: once respondents felt their accomplishments were appreciated in the conversation, many were openly discussing both the strengths and the limitations of what they had been able to accomplish to date.

These conversations were relatively brief (one to one-and-a-half hours), considering the extent of programming and the number of years most TMEA staffers have been working on the activities. Continuing with the language of AI and taking best advantage of the openness it appeared to create, the evaluation team will need to return to these teams at corporate level, to confirm the outcomes that emerge from the first step described above and deepen the evaluation team's understanding, following our own internal process. We will also consult with country-level leadership and component teams, to identify country-specific outcomes that have led to the TMEA results.

Step 3 – Planning for data collection

The evaluation team expects to use contribution tracing on between four and six significant outcomes or contribution claims. Each SO will be featured in at least one evaluated results chain (DEQ2.1, 2.2 and 2.3), assuming there are claims in each SO that meet the above criteria. At the same time all ten TMEA pathways will be evaluated through the performance evaluation; those results claims that are selected for CT will be studied more deeply through CT, while all ten pathways will be part of the response to performance, relevance, coordination/coherence and sustainability questions as seen in HEQ5 and its DEQs (Table 3 above). We will also seek unintended outcomes across the whole of the research effort (DEQ2.4).

We will look at the ten pathways in each site visit country, allowing for a broad (if not as deep) evaluation of each of those components to understand interpretations and uses of the corporate-level TOC or results chain, its causal links and its realised and unrealised, explicit and implicit, assumptions – which may indeed differ by country (DEQ5.1). For the four countries visited in the evaluation, we will examine the extent to which the programme supports EAC regional trade development priorities (DEQ5.3), changes in policy and political economy and their impacts on the programme (DEQ5.4), and TMEA's complementariness with other ongoing initiatives (DEQ5.5).

With regard to coherence and coordination, the evaluation will look at strengths and weaknesses of the working model to date (DEQ5.6). We will also look at synergies across TMEA components and between national and regional levels (DEQ5.7), to understand the circumstances under which TMEA has been able to bring "greater results than the sum of its parts" (DEQ5.8), and look at the governance (DEQ5.10), the constraints and enablers of the operational model at donor level (DEQ5.11), and management arrangements such as the

[34] Whitney, Diana and Amanda Trosten-Bloom. 2010. The Power of Appreciative Inquiry. Berrett-Koehler Publishers, 2nd ed.

not-for-profit company (DEQ5.9), including the strengths and weaknesses of the approach, to provide insights for future programming. This will also hold true for DEQ5.12 on alignment with country systems and agencies and DEQ5.13 on consistency with, additionality to, and improved coordination with, other development programmes in the region (DEQ5.14).

With regard to sustainability, DEQ5.17 on the sustainability of any social and financial programme benefits will be examined through the same fieldwork, along with DEQ5.20 on stakeholder engagement through the programme and beyond its life, including the use of lessons learnt.

Each of these will be undertaken by our field teams during site visits, alongside CT data collection, and this section details the methods used for both.

Prior to arriving for fieldwork, the evaluation team will consult with TMEA team members to establish stakeholder lists for consultation and, to the extent possible, establish contact and make appointments for interviews for all ten pathways. Within TMEA, the evaluation team has established good relations and reference points at the corporate level, with SO leads and their staff members working on individual pathways or components. We have also worked closely with the Results team and with the Senior Management and Senior Leadership team members most critical for the evaluation: Research and Impact Director Anthony Mveyange; Wanjiku Kimamo (newly installed head of inclusive trade); and David Stanton and Mark Priestly. Each team member interviewed has been queried using the Appreciative Inquiry method (described in the next Step) and has offered initial considerations for the most important TMEA achievements that might be evaluated using CT. Their inputs have provided background on the history of the ten pathways that will be considered in HEQ5, and interviewing other corporate component teams and country officers will advance the aims of the traditional evaluation undertaken across the TOC. We will also interview other donors and government actors whose activities may also have affected outcomes; Table 5 below shows an initial assessment of the range of possible interviewees and other sources.

These initial interviews also provided a preliminary basis for understanding the key stakeholders and interlocutors from government, private sector, civil society and other domains who will be vital (though not exclusive) sources for the CT and non-CT inquiries. We also identified a range of data and document resources through the interviews. These include:

Table 5: Illustrative list of sources

SO	Potential informants	Data and document sources
SO1	• Port authorities and partners, including the 25 agencies who signed the Port Charter and who cooperate with Green Port reform • Revenue, Customs and border/immigration authorities • Donors (African Development Bank, Japan's agency and the World Bank for past and present projects, and DFID, the European Union, European Investment Bank, and French agency for reported TMEA-leveraged funding) • National Land Commission in Kenya; advocates from civil society and the private sector. • TMEA corporate and national team	• Northern/ Central Corridor Observatory data; World Bank 2015 study on trade costs in Central and Northern corridors • EAC trade report and aggregate data on trade volumes and values; revenue administration and Customs platform data • TMEA Results Meter and OSBP data including time measurements (from entry to exit of customs area), time release study and traffic survey on border-to-border corridor time; queuing time (congestion studies); Aurecon report • Maersk "pain points" study (confidential) • Price data on storage over time • ICBT studies at central banks and national bureaus of statistics and TMEA ICBT study • Port statistics from Mombasa and Dar authorities

		• External time, volume, value and cost data from Universal Postal Union, Maersk, FEDEX, others in the region
SO2	• EAC Secretariat and national ministries supported by TMEA to work with the EAC • National line ministries and private sector actors using new ICT for Trade tools like electronic cargo tracking and single-window portals • EAC regional NTB elimination committee, National Monitoring Committees and systems users • Standards bureaus and relevant private sector associations • TMEA corporate and national team	• Overseas Development Institute studies on NTB costs in the region; EABC business climate research on NTB effects on trade; the Timebound Matrix of NTBs; East Africa Trade Hub (EATH - USAID) for data on their NTB work and E-ping system • TMEA-gathered feedback on testing systems access, records on SME training; lab leadership; drafted policies; EATH on standards harmonisation collaboration with TMEA • Data on changes due to single customs territory and customs union protocol • National data on time differences in using ICT for Trade initiatives (https://www.youtube.com/watch?v=p8yH4e-Aafk)
SO3	• Private sector and civil society advocates supported by TMEA, and relevant government counterparts • Informal cross-border traders, customs and immigration at border; trader organisations; Joint Border Committees; simplified trade regime actors • Logistics industry actors: freight forwarders, shippers, truckers; trainees; TMEA team at corporate and national levels • Export capability value chain members (farmers, intermediaries, buyers); standards bureaus	• National informal cross-border trade surveys (reported by TMEA to be housed in Central Banks and Bureaus of Statistics in programme countries) and TMEA in-house study on ICBT for Data (2016 and 2017); price, volume, value, income • Logistics cost data; GULU logistics hub and Rwanda facility reports from TMEA; PARs for S2 projects for information on lessons learnt from S1 • Policies and research reports/white papers from advocacy campaigns • Data on SME exports from export capability work, including from intermediary organisations' other projects in the region • TMEA gender and safeguards policies • TMEA Uganda staples and EAC tourism project PARs, data and final reports; export capability evaluation report

The evaluation research for both CT and non-CT analyses will be carried out using standard data collection methods during site visits – interviews, discussion groups, observation – and in desk review of results chains and data, evaluation and other reports, internal and external correspondence and documents, corridor and other external data, among others. These methods will provide the basis for CT analysis in answering the HEQ2 questions, and for more traditional triangulation to answer the remaining HEQ5 questions listed above. Illustrative stakeholders for the evaluation questions are included in the Evaluation Matrix at Annex A. The schedule allows time for team members who are in Nairobi but also at port and OSBP site visits, a proposed visit to Arusha with the EAC Secretariat, and country office visits to four countries.

2.5 Sources and methods

Step 4 – CT interviews

When the team interviews TMEA and other interlocutors for those results chains that have been selected for CT, a particular method has been developed to ensure the necessary range of data is collected, in line with the particular needs of the approach. The Appreciative Inquiry method, adjusted to suit CT purposes, will elicit TMEA team members' contribution stories in great detail. These stories are drawn out in narrative form to start, allowing respondents to tell the story in their own way.

Then, for clarity needed for CT, the interviewer probes first for specifics on the concrete activities reported in the story – whether that is infrastructure work, capacity development, systems support, or a combination of several activities – and then for specific pieces of evidence to substantiate the respondent's claim about the activities. There are two evidence points for each step in the chain. The first is to substantiate the outcome itself, and the second is to connect the outcome with TMEA's contribution. If the outcome is reduced time for trade in the Northern Corridor, for example, sources for such substantiation would be government or other data that show such a change, or results from the TGIS enterprise surveys on changes in the trade times for certain industries. Connecting the outcome with TMEA might be a combination of email trails, contracts, documents produced, meeting attendance sheets and minutes – particularly at key decision points – and other "digital dossier" evidence. This type of evidence, when it exists, is highly unlikely to be present if the activity in question did not happen – thereby providing a strong evidence point around the contribution claim.

The interview continues to explore ever higher levels of the results chain with the same process: story, specificity, evidence, and more evidence. In this way the interviewer hears as well about obstacles and unintended consequences – useful in other ways for the evaluation – while compiling the necessary information to detail and substantiate the contribution claim. This process may be iterative, as necessary, through in-person or electronic means.

As the contribution claim is traced, unbiased data may be more difficult to identify for higher order outcomes. This is a challenge and risk of the CT method, but is not substantially different from other methods, used in countries were data collection is variable and/or political. In such cases, the team will need to return to the respondents from whom the contribution claim originated to identify an adjusted contribution claim, and pursue additional avenues for substantiation. CT may be able to substantiate a lower-level contribution claim, while expert judgement and analysis of different data streams can still provide confidence about conclusions at the highest levels of TMEA's results framework. OPM staff have used CT in previous evaluations and understand its strengths and limitations; these staff will be available for support during the CT process to ensure we take best advantage of the method in the field, in analysis, and in any necessary iterative work to address data issues.

16.5% reduction in trade times

TMEA have disseminated one impressive and concrete finding: a 16.5% reduction in trade times. The calculation of this figure comes from TMEA's Results Meter, where times are calculated for nodes – ports and OSBPs – where TMEA's concerted efforts across various programme components were to aggregate their greatest benefits.

The evaluation will examine this claim closely in the evaluation. The 16.5% figure and its components will be part of the CT sample. We will analyse the construction of the formula, how it rules out alternative explanations, and the decision to report on time reduction for parts of corridors (rather than the entire corridor) for inclusion in the calculation.

OPM understands the centrality of this TMEA claim and DFID's inquiries as to its merits, and will dedicate the necessary scrutiny and appraisal of its components in order to evaluate its merit.

Steps 4 and 5 may not be simply sequential, but rather parallel and iterative, as necessary. The CT interviews will provide important information to understand what evidence or data we may need to seek out to substantiate or refute the causal claims. At the same time, interviews with external stakeholders may raise important questions that require returning to TMEA team members for additional information.

Step 5 – Data collection

In addition to the CT data collection method proposed above, the evaluation team will also use its in-country team members to scope out stakeholders or others with knowledge of TMEA's activities both inside and external to TMEA, who may have divergent perspectives

and experiences. The latter include other donors and development actors,[35] watchdog groups and others in civil society, industry organizations, academics working on trade, and others. As is to be expected in development evaluation, some respondents will be guarded, others will miss appointments, and still others will offer only testimonials about TMEA. Our experienced team will work reflectively to manage these kinds of difficulties in the field, seek additional sources, and take best advantage of opportunities for unscheduled discussions.

As we will be undertaking this process for the ten TMEA pathways, we will also ask for and actively seek out different interpretations and experiences – unintended consequences (DEQ2.4), outside perspectives, and marginalised voices. That might mean dockworkers at a port, traders at an OSBP who do not belong to a TMEA-supported women's organisation, and industries who didn't receive advocacy support from TMEA. While there is no way to guarantee we will cover all those affected by TMEA (as not even all those affected by TMEA will know that this is the case), we will use our local networks and teams to seek out this range of experiences through the sectoral and national/local knowledge of our team, and through paying close attention in fieldwork to actors that emerge in other interviews, site visits, and the like.

Interviews with certain external stakeholders will also be used to substantiate or refute contribution claims, by beginning the interviews in a slightly different way than most evaluation interviews begin: without referencing TMEA. This will not always be possible, such as when TMEA introduces the evaluation team to a TMEA partner, but where we have identified respondents independently, we have this opportunity. Before we introduce the datum that we are researching about TMEA, we might fruitfully ask about outcomes themselves, and let these respondents tell us their thoughts, experiences and evidence about changes and to what they attribute these changes.[36] These are sometimes called bellwether interviews, and they will be used in the performance evaluation and the Poverty and Gender Impact Study as well. Bellwether interviews will be used in both CT and non-CT fieldwork, where the evaluation team is not naturally going to be assumed to be evaluating TMEA (e.g., when we reach out independently to think tanks, other donors, etc.)

Instruments and guides for the fieldwork will be geared towards both operational and strategic questions, where appropriate, in order to look at both CT results chains within pathways, and the explicit and implicit logic of the pathways themselves for HEQ5. Findings in this vein will allow the team to examine the TOC in concrete terms, and from different perspectives, including explicitly considering other possible causes or contributions to the TMEA outcomes claims. Looking in retrospect, the team will be able to explore these questions in light of the full implementation period and a year since its conclusions – almost what would be called an ex-post evaluation – allowing for insights on the causal links and assumptions (DEQ5.1) and the way these were affected by events on the ground.

Findings from the full CT process on a sample of components will allow for more in-depth response on those particular pathways, because these are likely to be mature and to have higher-order outcomes that can be measured. Other pathways, notably the logistics framework component, are not as advanced in terms of the proposed TOC. Still, querying the team members – old and new – who have watched the process develop from design to implementation to monitoring and adaptation, will help to understand the evolution of their component design, their assumptions about context and political economy, and the obstacles

[35] Including USAID's East Africa Trade Hub, German cooperation work with the EAC, World Bank and Japanese International Cooperation Agency work on infrastructure at ports and OSBPs, inter alia.

[36] This is similar to the Qualitative Interview Protocol (QUIP) method, in which interview teams themselves do not know about the evaluand, and as such cannot ask respondents about it: instead, respondents are asked to describe changes in their lives and report their own theories about who or what caused any changes. In the Contribution Tracing language, evidence sought this way would have high sensitivity, and lower than usual Type I Error. Copestake, J. 2015. Qualitative Impact Protocol: Guidelines for Use. DFID, Economic and Social Research Council, University of Bath. http://www.bath.ac.uk/cds/projects-activities/assessing-rural-transformations/documents/complete-quip-guidelines.pdf

they have overcome or not. The work to map the TMEA pathways to date, and deepening that work during field work, will include reviewing country strategies and component-level results chains; speaking widely to actors internal and external to TMEA, including beneficiaries, to ask about the design and implementation of the design; asking knowledgeable actors about context and exogenous factors; and interviewing industry actors (individuals and business membership organisations), will give a broader perspective on those topics as well. By examining all ten TMEA pathways through traditional mixed methods we will have a thorough response to DEQ5.1, including validating TMEA results claims, which will be augmented by the in-depth interviews and data reviews carried out for the CT fieldwork and analysis.

In answering DEQ5.1 we will follow each pathway from output levels (building on the project-level pathway information we have already compiled and analysed) to trace the degree to which the intermediate and strategic outcomes[37] have been reached, the factors and assumptions that supported and inhibited those achievements, the quality and reliability of data from TMEA on those achievements, and the extent to which TMEA can be said to have contributed to them. We will assess if there are assumptions or elements of the results chains that could be strengthened, particularly in light of the trade expertise on our team. This is an iterative evaluative process that involves data collection and analysis while we work in the field and through the analytical period. We will examine the sector and TMEA's place in it – a significant place, given funding levels and ways they may have leveraged their influence – and interrogate what we read in results chains and strategy documents, and what we hear from TMEA team members and partners about planned component logic, assumptions made, actual inhibiting and enabling factors, and results.

In SO1, the same process should help to understand how the political economy of Tanzania's trade sector impinged, for example, on the avenues TMEA could pursue in reform at Dar Port, or, in SO2, the degree to which changing and asymmetric political interests shaped regional integration priorities around which TMEA could intervene with the East African Community (EAC).

Site visits to study CT and all ten pathways in TMEA country offices will also include attention to national and regional complementarity and coordination, taking into account the political nature of integration and the distinctive perspectives, challenges and focus areas that will have emerged for each country (DEQ5.7). This is clear at the outset with the ways TMEA's regional regulatory support to the EAC was designed to help national authorities to pass and implement legislation relating to regional integration, non-tariff barriers, standards, common immigration and customs procedures, and private sector advocacy. Our team will inquire into each of the ten pathways during field work and analysis with respect to complementarity and coordination. While there is a tendency for programme partners in an evaluation to offer positive "testimony" on abstract concepts like these, the evaluation team will work to plumb the how and why behind any TMEA complementarity and coordination with national, regional and other partners, including weaknesses and strengths.

The same set of evaluation interviews and document review will serve to look for evidence around programme relevance (DEQs 5.3, 5.4 and 5.5). For DEQ5.3, interviews will focus on Arusha at the EAC Secretariat and in-country at the ministries responsible for regional integration and accession steps, where TMEA have worked with these bodies. DEQ5.4 is a wider question that has to do with the context around TMEA. In interviews with EAC and other government partners, TMEA themselves, and private sector and civil society partners, we will include questions on policies and political economy changes that have impacted on the programme or its relevance. DEQ5.5 will be investigated through interviews with government and private sector actors working on trade in the region, who we began to

[37] These layers are so named in the TMEA RF, and lead to the level of strategic objective.

access in August of this year. These will provide a fruitful entrée to examine complementarity with other initiatives and our experienced team will probe on these issues to ensure we understand the range of related initiatives and interview their sponsors, whether government or private sector.

As mentioned above, one key area of exploring the TOC during fieldwork will be to examine the ways TMEA have worked across components to achieve coherence and coordination (DEQs 5.6 to 5.14). Some of these have already emerged in initial consultations with the team members at Corporate level in July and August, 2018, in which the team heard how multiple results chains (like Increased Efficiency and Capacity of Trade Infrastructure, ICT for Trade, Civil Society and Private Sector-led Policy Formulation, and Logistics) work in concert on different aspects of trade bottlenecks and opportunities, to reach shared goals on reducing trade times and trade costs. The evaluation will interview TMEA and government counterparts in each of the ten pathways as part of the non-CT fieldwork, as well as other relevant beneficiaries which differ by pathway (please see the “Informants” column in Table 5 above for illustrative list per SO). We will explicitly look for ways to strengthen how programming can be strengthened in the area of coherence and coordination, to answer the set of related questions:

> DEQ5.6 What are the strengths and weaknesses of the working model observed to date? As a cross-cutting question, this will be part of interview guides with TMEA, stakeholder/partner, private sector, other donor and civil society interiews.
>
> DEQ5.7 Is the complementarity and coordination between national and regional levels optimal throughout all programme components and activities? This question also gets at TMEA’s cross-cutting ability to meet the goals of its matrix management system, by which thematic areas are implemented in a coherent (though not necessarily identical) way across countries and in its regional relationships and activities. This, too, will be probed across the wide range of interviews, to capture both areas for improvement and examples of where coherence and coordination were successful.
>
> DEQ5.8 To what extent does the TMEA model bring greater results than the sum of its parts? How could this be strengthened? Answering this question will synthesise data from across the performance evaluation effort, and take best advantage of the analytical skills and sectoral expertise of the team. As the evaluation progresses we will check in with the team to ensure the kinds of information needed to answer this question are being collected successfully across the range of stakeholders.
>
> DEQ5.9 Is using one organisation – a not-for-profit company – the best vehicle for impact on trade and on poverty reduction through trade? What are the strengths and weaknesses of this approach? Building on the institutional assessment carried out under deliverable 2B of the evaluation, the answer to this question will look at the evolution of the organisation through internal interviews, from the time of the Institutional Assessment to the end of Strategy 1. The goal will be to capture ways in which the vehicle worked or did not, including any strengths and weaknesses.
>
> DEQ5.10 To what extent are the programme’s governance arrangements leading to the delivery of high quality and timely outputs? Another synthesis question, the answer will rely on further data from the performance evaluation interviews, combined with the team's assembled expertise on the ways the governance arrangements have enabled and inhibited achievements and delivery.

Certain of TMEA’s efforts have engaged deeply with African regional institutions such as the EAC, and will have important lessons about which approaches work best (DEQ5.14) under which conditions. Adaptive and supportive, relationship-based approaches that flexibly respond to region-led initiatives were mentioned in August 2018 as vital to TMEA outcomes.

Providing long-term technical assistance, institutional and individual capacity building, and having the relationships necessary to convene stakeholder groups were some of the strategies broadly defined in these meetings. To more narrowly capture their processes, obstacles and successes, the evaluation will follow this line of inquiry closely especially where regional institutional work was paramount in SO2: with the EAC (e.g., EAC- and ministry-focused support, work on non-tariff barriers and harmonisation of standards, and ICT initiatives.) The East Africa Business Council work done under SO3 will be another area of focused attention for this DEQ. Deeper inquiry into how these TMEA teams were able to take on board regional priorities, while maintaining focus on TMEA goals, will yield detailed information to analyse in triangulated fashion, to answer this evaluation question.

While coherence and coordination are not portrayed in the programme TOC, mapping the way these components work together will likely provide valuable lessons learnt on what was successful and what was less so, for future programming in this sector.

Evaluating the programme benefits that are most likely to be sustained with or without TMEA support (DEQ5.17) and stakeholder engagement and lessons learning (DEQ5.20) will start from discussions with TMEA component teams. Their impressions about stakeholders (individuals and institutions) that have demonstrated greater uptake of capacity and priorities will point the evaluation team towards examples of potential ongoing benefits. The evaluation team will explore these during site visits and the range of interviews scheduled across the evaluation data collection, as illustrated in Table 5, above, in order to have a wide range of perspectives on which to base conclusions and any recommendations. This includes interviews of country- and regional-level government and other partners such as CSOs and PSOs with which TMEA have worked. Though not all projects whose sustainability was sought will be contacted,[38] the evaluation team's commitment to cover all ten of TMEA's pathways means that we will follow up on TMEA's recommendations and pursue our own in the set of interviews and site visits discussed and detailed here (including Table 5 above). This will also make it more likely that the team will be able to detect and document ways in which TMEA's interventions and their benefits were not sustained, why, and how this could be strengthened.

Step 6 – Analysis

The evaluation findings – raw data, "facts", opinions, experiences, perspectives, segments of documents or other sources – are all triangulated: with CT, this happens within a framework of testing the probative value of pieces of evidence, alone and in concert, around a contribution claim, and undertaking the Bayesian updating of prior probabilities in consequence. This use of Bayes' theorem arrays objectively stronger and weaker pieces of evidence around a contribution claim and aggregates these, in order to determine the confidence we can have in the evidence and ultimately in the contribution claim. These methods are explained in detail in Annex E.

For DEQ2.4 on unintended consequences and HEQ5 questions on the TOC, complementarity, results "greater than the sum of their parts", regional institutions and sustainability, the team will review data from interviews and site visits, as well as related internal and external data for each pathway, in light of both evaluation findings and contextual, political economic, and trade factors that may have affected implementation and results. As noted in the previous section, examining the strength of TMEA's TOC is iterative, in that analysis and fieldwork will feed each other. Our previous fieldwork and evaluations, readings of component results chains and strategy documents will inform our understanding

[38] Or re-contacted, as in the sample of projects selected in evaluation deliverables 2C, 2D, and 2E, where sustainability was also discussed; however, these data from the previous interviews and desk reviews will be used as a basis for follow-up on all ten pathways.

of the sector and TMEA's place in it, which becomes more refined with upcoming in-depth interviews with TMEA team members and partners (national and regional/corporate) about what they planned to do, how they assumed it would play out, what happened in implementation that supported or contradicted those plans and assumptions, and the ultimate results from Strategy 1 to date. This will result in a set of pathway analyses that will reside in evaluation annexes with key lessons emerging as part of the main body of that report. Unintended outcomes are a key area of inquiry for this process, which involves speaking with beneficiaries at national and regional/corporate levels as well as other external sources that have no immediate stake in the evaluation or in TMEA – across all ten pathways.

Discussion and debate among the team and, where necessary, additional expertise brought in for this purpose, are essential to the evaluation. In this way the decisions initially made about the probative value of evidence are tested and, where available, additional information and interpretations can be brought to light. Retaining sufficient time in the calendar for this process is critical for ensuring the strength of evaluative thinking and the way it is expressed in the draft report.

The team draws its conclusions through this process, and extensively documents their relationship to the findings from which they are drawn. The draft report may not contain all those details in its main body, but they will be annexed and referenced. These steps provide the "paper trail" that can be put out for comment, and the stronger this trail, the more unassailable the conclusions. Where recommendations are warranted, these will be put forward alongside lessons learnt for future programming – whether that is TMEA's own programming, or elsewhere in the sector.

The extent to which the impact results of an evaluation of such a complex, variegated programme as TMEA are generalisable is not high: there is simply too much specificity around the particular contextual issues and dynamics to warrant "application" in another context. However, the clarity sought by the discussions around evidence and probabilities does support detailed storytelling in the report, such that readers from other "similar" programmes elsewhere can decide what, where and when the lessons might be helpful for their own cases.

2.6 Changes to the approach

The performance evaluation design put forward in the IR was proposed as a summative evaluation only of the ports and OSBPs, as the IR timeline planned for the effectiveness study on intermediate and strategic outcomes as part of an earlier deliverable. As that level of analysis was not possible given the unexpected and compounded challenges discussed in the introduction to this report, it is being taken up again in this phase of the evaluation, specifically in the performance evaluation.

This has the effect of stretching out the period in which outcomes and impacts may have matured, which may indeed be helpful in the detection of impacts. Still, the underlying proposed analysis comes from the same school of non-counterfactual, non-experimental evaluation designs:

- While Process Tracing (PT) was proposed at inception, Contribution Tracing (CT) – a method that builds precisely on the logic of PT – is now considered a stronger candidate method to substantiate TMEA's contribution claims.
- One of the elements of the IR design was an exercise to map outcomes according to categories (advocacy and policy advice, knowledge generation and studies, institutional strengthening and training, technical and or financial cooperation, and provision of infrastructure and / or direct services to final users (e.g. SWIFT)) and layers (regional,

national and local). In closing the first phase of the evaluation, without the Team Leader who had designed that exercise, the new Team Leader attempted to follow his logic but found it impossible to do so without new data collection – particularly as the majority of projects had finished in the year's time since the data had been collected. TMEA viewed the resulting draft "pathway" documents as invalid as they were so out of date.

- The categories proposed in the IR, while still valid to describe the closed projects, are nonetheless not useful analytically in the manner proposed. There are no formulas for how these categories would determine or predict success, no "ideal mix" to postulate for lessons learnt. While it may be that the previous Team Leader had other plans for those categories and layers, unfortunately his intentions were not captured. However, we feel our present design is focused on the necessary details to generate lessons learnt, and will draw upon the categories and layers as needed in describing our findings.
- That new data collection is currently underway (during the recent July-August visit to TMEA by several evaluation team members, and continuing into the performance evaluation data collection scheduled for Q4 2018). Given that Strategy 1 projects were completed since the original datasets were compiled, this allows the estimation of outcomes achievement and TMEA contribution to continue through intermediate outcomes levels and to strategic outcomes as well. This may well be a preferable way to view the pathways, since the strategy and design behind them did not "stop" at the intermediate outcomes level, as designed in the IR.
- Similarly, the extended period for data collection and analysis on the "full" pathways through their strategic outcomes allows for a stronger analysis of complementarity across TMEA component areas, which was designed in the IR to be done with projects that were not yet completed. This may give stronger evidence about synergies across component and support as well the validation and refinement of hypothesized TOC linkages.

2.7 Timing

Per the more detailed timeline presented in Annex C, the performance evaluation will be undertaken following DFID approval of the new design contained in this document. The evaluation team will begin preparatory work on identifying and accessing datasets in September, and making plans for fieldwork during October (while the DFID Annual Review team is visiting TMEA). Our fieldwork, then, will begin in the first week of November and last between five and six weeks, to visit four country offices and projects, and the corporate office as well. Analysis and report writing will last during January and February.

2.8 Hypothetical responses to the evaluation questions

Performance evaluation reporting will include an executive summary in which major conclusions and recommendations are expressed for a wide audience; in the main body of the text there will be more nuanced discussion of mitigating and intervening factors, and a deeper discussion of evidence and sources. The following represents a possible statement the performance evaluation may be able to make for a pathway, in the form of a "contribution story" – the most important aspects related concisely. This is of course completely fictitious: none of Section 2.8 represents any data collection or analysis to date.

Conclusions from CT

The evaluation found that in four of five full results chains or pathways, selected on the basis of their achieved outcomes, strong evidence substantiated the achievement of the outcomes and of TMEA's substantial contribution.[39]

Table 6: Illustrative CT conclusion for an SO1 contribution claim

Contribution claim: TMEA reduced import times by at Mombasa Port by XX%

Inputs towards this outcome included infrastructure projects at the port and significant support to reform of procedures and regulations. The evaluation found that dwell times fell by X%, clearance procedures time by X%, and departure time by Z%. TMEA-supported infrastructure and procedural and capacity building improvements account for around half of these time differences, as shown in the full description of this case study in Chapter XX.

The time savings aligned with the TMEA Results Meter, but importantly were also corroborated by the Northern Corridor Observatory and Maersk shipping data over the seven years of implementation, as well as an independent logistics survey carried out by the EABC in coordination with the Chamber of Commerce of Great Britain in Kenya that allowed for comparison between the wharves where TMEA worked and other wharves.

TMEA contribution to this outcome was substantiated through their overwhelming digital evidence of support to the infrastructure projects (contracts, emails, progress reports, inter alia) and to multi-level government confirmation of the capacity building and procedural support, which was not a focus of other donor efforts. Newspaper reports and government speeches from past years showed that similar reforms had often been proposed but had not been implemented until TMEA. Other infrastructure work also played a role, particularly JICA's support to the second container terminal, completed in 2018 when times dropped further. Other regulatory efforts were not found to have contributed substantially, as TMEA's large presence in port work was taken as a deterrent to similar efforts from other donors that might have duplicated efforts.

The body text might then go on to describe the set of sources at different steps in the TOC, from inputs to (project) outputs and outcomes, and how this aggregated (if it did) with other projects to reach programme level outputs and outcomes, explicitly comparing actual performance and achievement with the detailed results chain/TOC for each step. Data quality and breadth, differences by country and alternative causal paths would be set out for each of the pathways studied, including the "fifth" one in this hypothetical example, in which substantiation for the claim was not found.

[39] Narrative contribution stories and the systematic examination of evidence will be available in the body of the report and its annexes.

Another example, for DEQ2.2, might look like this:

Table 7: Illustrative CT conclusion for an SO2 contribution claim

Contribution claim: TMEA reduced processing times for export through ICT for Trade
TMEA's work in ICT for Trade efforts (Single Windows, Electronic Cargo Tracking, national customs systems) reduced processing times for export for some industries. Greater reductions were found where there were greater baseline demands on industry, such as the tea industry where the 8 days at baseline were reduced to 1.2 days through a combination of these efforts. Notably, variance between industries in the government demands for paperwork has decreased, meaning there are fewer outliers like the flower industry, which faced almost eleven days in processing before TMEA began, now down to 2 days – essential for the perishable produce. There remain differences per country that illuminate some of the institutional barriers TMEA faced in implementing these new systems consistently across the EAC countries. In Tanzania, while several single windows were introduced which reduced paperwork for the A, B and C industries, several other industries were awaiting support (some of which TMEA is scheduled to provide in Strategy 2). Two agencies in Tanzania, the YYY and ZZZ, were less willing or able to reduce their demands on exporters, limiting the extent of the gains there. In this way, for Tanzania the average time across exporters dropped by D% but the variance remained high. Kenya, Rwanda and Uganda all had better and more consistent results, as shown in detailed tables in the report text. Both average overall time and the average variance reduced in all three countries.

And for DEQ2.3, a third example:

Table 8: Illustrative CT conclusion for an SO3 contribution claim

Contribution claim: TMEA increased export capability in coffee, tea and staples in Rwanda and Uganda
TMEA's work in export capability strengthening supported coffee growers in two zones in Rwanda. Exports of coffee to European Union and other markets from the cooperatives where TMEA worked went from a baseline of XX tons in 2015 to YY tons per year in 2017, with an expected continued growth of Z% for 2018, according to official national sources, cooperative records, and buyers' data. Tea exports increased at a slower but also steady rate, from AA tons before the project to BB tons in 2017, and C% expected exports for 2018. The Government of Rwanda revenue data was provided by the lead officer of the export bureau, AAA BBB, who confirmed there were no other projects operating with those cooperatives. The coffee and tea projects benefited from the single window and national customs systems interventions from TMEA in terms of time to export, which supported the increase and reduced costs to the intermediary organisation, Traidlinks. Working in Uganda, TMEA supported export capability in processing and standards harmonisation, primarily with maize. Supported farmers reported $XX in sales to the intermediary organisation that TMEA brought to work with them, up from $YY before the project began. Cooperative data supported this finding.

These types of answers, in both brief and more elaborated forms, would comprise the response to DEQs 2.1, 2.2 and 2.3, with separate answers for each of the CT examples in the sample. DEQ2.4, on the other hand, is a synthesis question from among the case study work undertaken in the CT and other evaluation fieldwork. That question will be answered more like the questions under HEQ5, which are covered in the following section.

Conclusions from traditional evaluation methods

DEQ5.1 on the evidence base and verification of the TOC causal links and assumptions

This question will bring together data from the CT explorations of a sample of pathways, along with the findings and conclusions from all ten pathways that are to be explored in interviews and site visits, compared to the TMEA results chains by pathway. Where this latter information is absent, the evaluation team will reconstruct results chains and assumptions to the extent that TMEA staff and, perhaps, other stakeholders can express the design intentions under which they worked. Our systematic comparison of planned versus actual results chains will highlight areas of strengths and areas that could be improved for Strategy 2 planning. In those results chains where higher level results were not achieved during Strategy 1, we will attempt to assess if there are assumptions or elements of the results

chains that could be strengthened. This will be presented in brief form in the report and fully in an annex.

DEQ5.7 on complementarity and coordination between national and regional levels throughout all programme components and activities, and

DEQ5.8 on TMEA bringing greater results than the sum of its parts

These two questions are interrelated in that the complementarity and coordination achieved by different components and levels are the points at which their results might actually show evidence of results that are greater than the sum of their parts. Interviews and site visits, alongside the efforts to parse the sub-TOC results chains, will identify qualitative outcomes such as:

- where efforts have converged and supported one another
- where TMEA's reputation and convening power have facilitated access for the programme
- where TMEA's clout in regional trade have leveraged national and international support

The evaluation team will also look for missed opportunities for complementary work that might have furthered this aim, in the course of evaluation fieldwork. Conclusions would therefore focus on those places where TMEA took best advantage of complementarities and coordination, and evidence of where that could be strengthened for Strategy 2.

DEQ5.14 on approaches for working successfully with regional institutions in Africa

Conclusions drawn to answer this question will focus on these efforts among the components working with the EAC Secretariat, EA Business Council, and other such bodies, in order to learn from their experiences – positive and negative – to reach the TMEA goals with those institutions. We will therefore discuss how and where those relationships worked best, under what conditions, and with what ends.

DEQ5.17 on social and financial benefits from TMEA that are likely to continue post TMEA

This question will similarly emerge from our fieldwork across the evaluation, looking for evidence of ongoing efforts where TMEA projects have ended, in order to identify those benefits that may continue after the programme. These might be within grassroots or civil society organisations that have had strong outcomes and gone on to garner funding; private sector organisations that have been able to use their voice on integration issues; government partners that have carried on efforts like the Green Port initiative in the wake of TMEA support; and other such results.

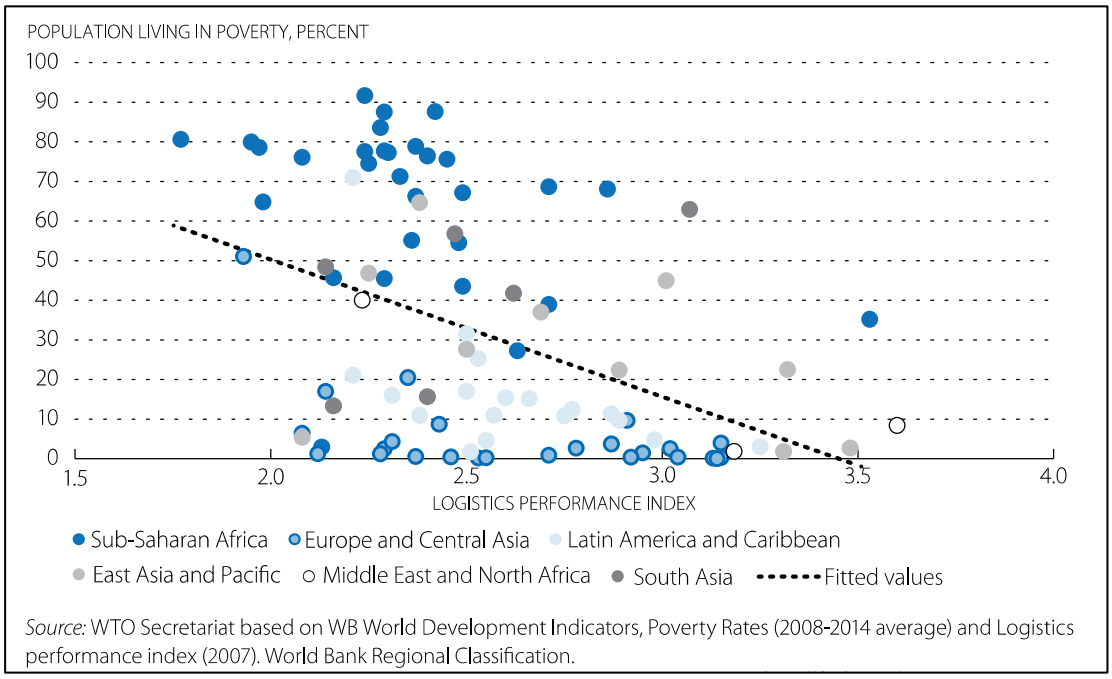
3 Trade and Growth Impact Study

The objective of the Trade and Growth Impact Study (TGIS) is to analyse and to measure, as comprehensively as possible, the *impact* and *sustainability* effects that regional integration programmes might have had on: (1) regional trade, growth, and poverty; and (2) the various stakeholders, in particular on men and women separately, poor and vulnerable groups, as well as traders and consumers. Under this design note, we are focusing on the wider trade and growth economic benefits arising as a result of the TMEA intervention.

The premise of the TGIS is underpinned by a rich body of research which has analysed the impact of Aid for Trade programmes. According to the latest Aid for Trade Report, "poor connectivity is one of the factors keeping people in poverty"[40]. A map has been drawn which relates the incidence of poverty to physical and digital connectivity. It suggests that lack of connectivity limits the ability to move out of poverty. As such, improving soft and hard infrastructure for trade removes a binding constraint for poverty reduction.

It has been observed that regions with lower logistics performance index (LPI) scores have higher incidence of poverty than those with higher LPI scores, as shown in the figure below.[41]

Figure 4: Population living in poverty, compared to LPI

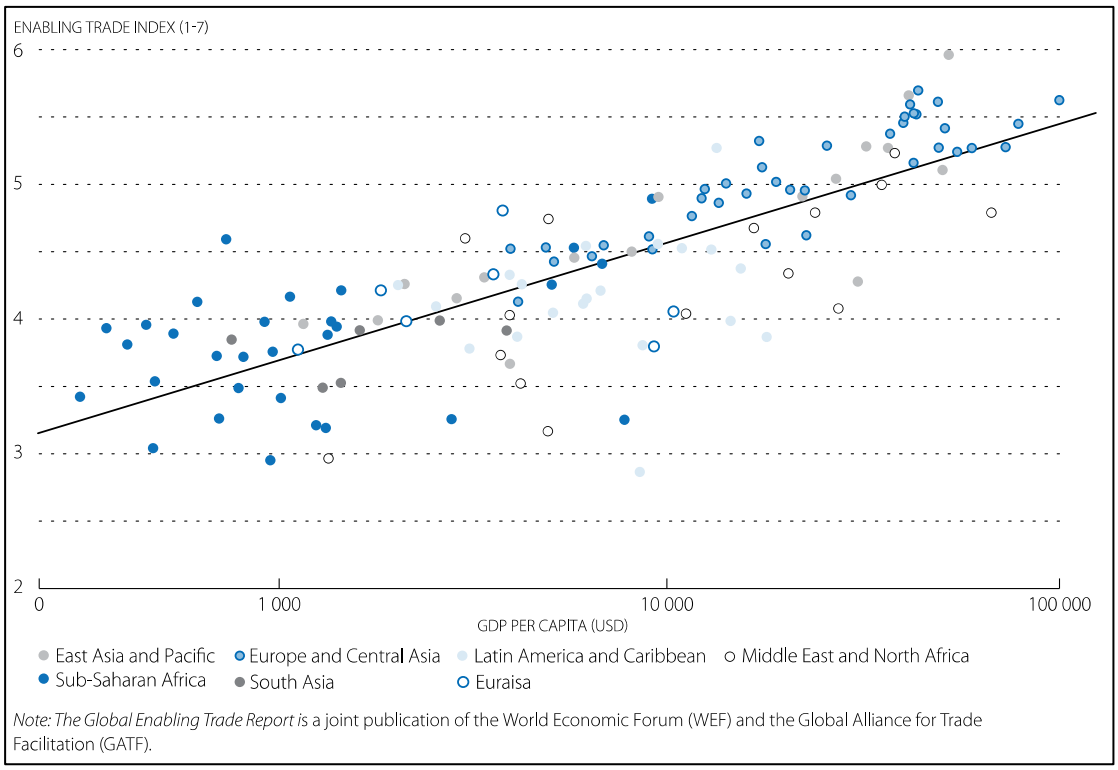


Source: OECD and WTO (2017). Aid for Trade At a Glance, 2017.

Similarly, comparing the Enabling Trade Index, collected by the World Economic Forum, with per capita income, also suggests that an improved trade environment is associated with higher per capita incomes, though the direction of causality is unclear. (see figure below).

[40] OECD-WTO (2017) Aid for Trade Review 2017. OECD-WTO
[41] Ibid, p. 328

Figure 5: GDP per capita, compared to Enabling Trade Index



Source: GATF-WEF (2016), The Global Enabling Trade Report 2016.

Streamlining customs processes is believed to have contributed to reducing trade costs and increasing revenues in developing countries. As the Aid for Trade Review 2017 indicates:

> *enabling automation and reducing the friction in cross-border trade is essential to lower costs and connect producers to markets and value chains. [..] A case story submitted by Trademark East Africa describes how the establishment of a one-stop border post (OSBP) connecting Kenya and Uganda led to an increase in revenue collected of around USD 5.5 million, reduced the average time it takes to cross the border by 80%, boosted cross-border trade for small traders and improved the working conditions for staff and transporters. The Busia OSBP warehousing facilities, for instance, have lowered storage costs for small traders as they wait to clear taxes. Transport costs have also been reduced, allowing several small traders whose goods are being transported to a particular destination to consolidate goods and hire one truck driver. The border post also caters to the needs of the physically challenged, as well as women with children.*

The evaluation questions that are to be answered by the TGIS are aligned to those in the original IR, and are illustrated in the table overleaf.

Table 9: HEQ3 and its DEQs

HEQ3 and its DEQs
HEQ3: What is the likely impact of TMEA on trade outcomes and growth, and what factors are critical in order to ensure the sustainability of positive impacts?
Effectiveness: programme-level trade outcomes
DEQ3.1 To what extent have TMEA interventions, including those of a policy nature, led to a reduction in trade times, trade costs and trade risks?
Trade impact
DEQ3.2 What has been the impact of any achieved trade cost reductions from TMEA on trade (both intra- and extra-regional)?
DEQ3.3 How has any improved trade policy environment led to increased trade?
Economic growth impact
DEQ3.4 To what extent has any changes in trade resulting from TMEA interventions contributed to economic growth?
DEQ3.5 What factors are critical in order to ensure the sustainability of positive impacts?

This study builds on the findings from the performance evaluation, as the teams will be working closely together as outcomes emerge from the CT described in the last chapter. Where TMEA outcomes are traceable and could lead to changes in trade overall, these will be particular areas of analysis for the TGIS, with respect to the following design. This is particularly likely should the CT confirm strong outcomes from interventions at Mombasa or Dar Port, the OSBPs, strengthening regional integration ICT for Trade, standards and harmonisation, elimination of NTBs, and export capability – all candidate pathways in the long list of pathways to be considered for in-depth analysis using CT.

While the questions and overall approach differ little from the IR, after careful consideration, we propose to narrow the focus and magnify our understanding of the economic impact of interventions by adopting a sector-based approach that focuses in on two value chains, the findings of which can then be subsequently encoded into a larger macroeconomic study. Combined with this will be an enterprise survey carried out with actors on the two value chains, which is of primary importance for confirming the modelling work and also enriching it. The TGIS proposes to focus much of the effort on considering the following issues, which may triangulate, complete and challenge our results:[42]

- **The extent to which TMEA interventions lead to a reduction in trade times, trade costs and trade risks**. The team can measure the drivers and magnitude of effects to reduce these three variables, and use secondary research to investigate the reasons behind this, as well as the pathways (such as market failures, distortions, second best and pareto optimal considerations, etc.) (DEQ3.1)
    - The evaluation conclusions produced under HEQ2 will provide pathway-specific answers to this question and detail on TMEA's contributions to particular pathways in

[42] This extensive range of tools to analyse and interpret dynamic economic conditions and effects are, in many cases, dependent upon data availability and quality. While we may not have access to all the necessary data of a necessary standard, the set of proposed analyses will allow us to compensate, even if not every one of these analyses is undertaken.

terms of time and cost.[43] The study team conceives of risk as an outflow of these factors, plus policy changes that might reduce risk for investors, and we will discuss these reductions in risk where they are identified.[44]

- However, at the sector level, we will go into greater depth to see how and where the entire value chain of a sector has been impacted (and through which channels) with a partial equilibrium approach, as explained below in detail in section 3.1. For example, we may find that changes in trade flows have occurred through better access to finance as a result of a better business environment, or it may have occurred through the reduction in inventory, or through fewer informal payments at the border. The purpose of this investigation is to be able to model how TMEA changed the policy and trade environment and how that change led to changes in the cost, risk or time dimensions. We will use this information to estimate parameters for the relationships.

- **The impact of achieved reductions in trade frictions on trade flows**. The team can measure the influence of such reductions on allocative efficiency, terms of trade, use of capital and labour, competition, and effects of trade on productivity. Measuring the magnitude of these effects on investment and productivity would be much more difficult, but still possible using enterprise results, and referring to input-output analysis and a computable general equilibrium (CGE) model. (DEQ3.2 and 3.3)
  - The end result of the study is expected to be able to state what percentage change has occurred in trade flows as a result of a reduction in trade costs.[45] For example, the team is confident that it will be able to estimate that reducing customs clearance time by x days has led to a y% increase in imports and z% increase in exports.[46] This will be relatively accurate at the sector level, as the team will have richer and more detailed data, with better estimates on the effects of NTBs on trade flows, and on the price and supply elasticities (from enterprise surveys). At the macro level, various assumptions (backed by the literature) will be necessary, which will reduce the robustness of results.
- **What interventions have the greatest impact on trade flows relative to the cost of the intervention** (i.e. what has been the propensity of each dollar spent in raising trade flows)? The team will use primary and secondary research to collect this information, to be able to evaluate TMEA's prioritisation and sequencing of interventions, in order to inform for Strategy 2. It will also consider what factors, exogenous to the TMEA interventions, might influence the results. (DEQ3.2 and 3.3)
  - The enterprise survey results from the two value chains will be indicative of the value and ranking of different interventions along each value chain. This may yield insights as to how interventions are changing competitiveness. For example, reducing

[43] The information on interventions, pathways and outcomes will be collected as part of the performance evaluation, including details of intervention activities, budget spent, geographic locations of impact of those activities (local, national or regional), outcomes indicators (e.g., reduced time to trade, harmonised standards, and others) and other potential influencing factors.

[44] The literature, including recent World Bank work, identifies risks as the biggest factor in creating costs. Increased risk means having to build up inventories (with high storage costs especially for perishables), pay for insurance, and increase lead times. We can triangulate findings with insurance and warehousing costs (e.g., Maersk data). Measuring risks requires the variance in times that we have from time release surveys. It is the variance in those times, rather than the average times, that is of interest the study and, in fact, to the business community: it is the wider variance that equates to greater uncertainty and risk.

[45] From the PE, those trade time reductions that are substantiated can be converted into cost saved for purposes of this analysis, by calculating the ad valorem costs of reducing given barriers such as reduced documentation needed for export. Ad valorem expenses will be captured through questionnaires with companies (the enterprise surveys) and by regressing flows against these requirements to pinpoint the impact on trade flows. As a secondary plan for this conversion from time saved to cost saved, the World Bank estimate the volume of trade on average per day.

[46] Please see hypothetical responses to other evaluation questions in the final section of the chapter.

customs inspections through a risk-based management system may benefit imported inputs into the industry more than exports. Changes in the policy environment may affect the quality of domestic supplied raw materials, and be creating growth in upstream industries in the supply chain. The impact of a TMEA intervention on the global production network within and outside East Africa is important in order to calculate the benefits accruing to the sector in question. The answer is thereby disaggregated by different TMEA interventions, at least for those that affect the selected VCs.

- This work supports as well the answers to DEQ3.1 on TMEA interventions' effects on reductions in times, costs and risks, and rank the reductions in any of these against one another.
- As a secondary step, the team plans to compare the cost of interventions (e.g., standards harmonisation, logistics improvements, customs clearance times, etc.) against the impact, yielding a better understanding of the trade-offs and returns on investment of different policy levers. Having a thorough understanding of how the industry is structured and competes will ensure a better appreciation of the returns of interventions.
- Partial equilibrium analysis (on the VC) will calculate surpluses generated, and some welfare gains (through gains in efficiency). Through consultations and enterprise level data, we will also obtain some information on the allocation of resources and changes in productivity; however, we believe the CGE work proposed in the following section will delve into these areas with greater confidence (notwithstanding the limitations of CGEs).

- The **linkages between trade and economic growth**. Pathways to growth will be examined. While these have been well documented in the literature in general, recent research provides new insights into localised growth, as well as geography-specific conditions that explain differences in growth accounting. A mix of gravity equations (explained in detail in the following section) will be used. We may also consider using proximity control methods. (DEQ3.4)
  - The enterprise survey results will shed light on the impact of the policy environment changes on firm-level growth. The econometric analysis will also be able to capture the firm level's supply elasticity (turnover growth) to changes in trade costs. While limited in terms of detailed information, TMEA surveys of cross border traders have some information of interest on prices, profits and types of products engaged in cross-border trade (formally and informally). The CGE model already has quite explicit linkages between changes in policy environment and trade and growth, something which can be used to provide simulations of how incremental changes in policies lead to growth. Owing to the more detailed sector information which will be captured in the study, it should be possible to have more disaggregated effects captured in the CGE (using a country CGE model attached to GTAP – described in detail below) in order to have a more refined analysis of the different effects at play and their impact on trade and economic growth. If the value of data is sufficient, we will use econometric equations to analyse the drivers of regional value chain growth[47,48].

[47] Taglioni, D. & Winkler, D. (2016). Making Global Value Chains work for Development. World Bank
[48] CGE is based on GTAP and the equations and relationships already exist for East Africa (except South Sudan and Burundi). Then it is matter of introducing shocks only. For the econometric analysis we start the modelling from nothing and include the necessary data piece by piece.

- The CGE model will be designed to capture the growth effects of increased trade flows triggered by TMEA's work specifically, that is, when we model increased trade flows due to reductions in policy frictions in the CGE model, to correspond to estimates of increased trade due to TMEA's policy environment reform work. This will mean applying what we learn in the two value chains about potential economic costs removed and efficiency gained as a result of TMEA's interventions, to the economy as a whole in the CGE model.
- Estimating TMEA's total impact on trade – that is, an economy-wide assessment – requires the use of aggregated information (as we cannot study all value chains). This can introduce inaccuracy, though it is feasible to make assumptions of some of the other VCs and calculate impact on those.

- **The degree of innovation, improvement in quality, and transfer of technology** that can take place through the changes in the trade environment. The team will consider how interventions can expand existing trade (intensive growth), as well as diversify into new products and markets (extensive growth). (DEQ3.2 and contributing to sectoral understanding of overall effects for 3.4)
  - The enterprise survey results will be indicative of the innovation, changes in production methods and processes, and improved inputs that have arisen from any changes in the policy environment. The level of productivity changes can also be quantified, provided that enterprises are willing to provide labour and capital input levels and their production levels. Improvements in quality, export survival rates and competitiveness benchmarking of products in the selected value chain will be made against similar countries[49] using international trade data. The level of sophistication of products can be determined using tested methodologies such as *PRODY*, which calculates the weighted average per-capita income level associated with products, and *EXPY,* which is a measure of the productivity level associated with a country's specialization pattern[50]. Tracking changes in these two indicators will be used to determine changes in the degree of sophistication of exports.
- **The distributional effects of economic growth** (for the sector, geographical region and potentially by size of operators/income groups). While the literature is relatively rich on the distributional effects of trade, the team will focus on the VC players, as well as employing micro-macro sim modelling techniques on top of the CGE modelling work carried out by the team, subject to data availability. (DEQ3.4)
  - The enterprise survey results will provide segmented data by enterprise size (employees and turnover), enabling the evaluation to test how companies of different sizes are impacted by the changes in policy. The team can also estimate changes in inequality between firms.
- Consider the **sustainability of the intervention on economic growth**, particularly with regard to short-term competitive effects and the sustainability of outcomes given the macroeconomic and policy environment existing in East Africa. (DEQ3.5)
  - The study will consider other factors that could determine whether a sector can continue expanding in the same way, through a mix of qualitative information through enterprise surveys, and consideration of the macroeconomic, environmental and social conditions. Important indicators to be considered include exchange rate effects,

[49] We define countries as being similar based on the level of sophistication of their economies, and use the economic complexity index as a measure of this.
[50] Hausmann, R., Hwang, J., Rodrik, D. (2007). What you export matters. *Journal of Economic Growth*, 12(1). Springer

subsidies and fiscal policy instruments, environmental conditions (CO2 emissions and pollutant industries), labour cost considerations and labour standards.

The TGIS team is planning to:

- Re-align the scope of the work from "economy-wide impacts" to "sector wide effects". The findings at the sector level will then be introduced into a CGE model to estimate the wider macro-economic gains from the sector-level changes.
- focus on two *entire value chains*. These will be chosen for a set of TMEA-related characteristics: the VCs should have a regional dimension, as well as links to international markets, and be expected to have been impacted by TMEA. The value chain actors should use trade routes that have been transformed as a result of TMEA interventions. As different expected trade costs are associated with perishable and non-perishable goods[51], the sample will include one VC in each of these categories.
- delve into the constraints and challenges along the two value chains, from inputs to processing to transportation and storage, to exports, in order to estimate some of the *quantifiable estimates of trade frictions* in *ad valorem* terms for the selected value chains. This will make use of partial equilibrium modelling at each stage of the value chain.
- Sector-wide effects will be estimated from the evolution of the two VCs, and by extrapolating to other sectors, for use in the CGE (see below), which would be less able to pick up localised intervention areas but still indicative of the direction and order of magnitude of the changes brought about by TMEA.
- identify the obstacles that TMEA interventions have removed, either through influence or through direct contribution to change.

Box 1: Which value chains?

The choice of the value chains on which to focus will be made at the start of study. However, it should be a value chain that will have been impacted by the interventions by TMEA, and could encapsulate **long chains of value addition** (for example, from dairy to meat, to skins and hides, to leather goods; or cotton, to yarn, to fabrics, to clothing), **heavily traded commodities** (such as grains -maize, pulses, etc) or those with **high value addition** who depend strongly on regulatory convergence and harmonisation of standards (e.g. pharma products).

An important focus on the evaluation is to address the quantification of growth occurring through TMEA interventions, and this focus will also be made on the issue of *causality*. It will be important to determine whether outcomes that were achieved can be attributed to the TMEA programme, or if TMEA's contribution can be isolated and quantified. This assessment will cover not only intermediate but also strategic outcomes of the programme as well as unintended outcomes, including negatives ones.

While TMEA covered countries have experienced trade expansion over the last five years, this has often not been at the benefit of diversification of markets or products and usually entails low levels of value addition[52]. A mix of different approaches have recently been developed to identify ways in which expansion of trade can take place. The two most prominent methodologies are proposed by International Trade Centre, underpinned by the work of Decreux and Spies[53], and of MIT Media Lab Macro Connections, underpinned by the

[51] Vanzetti, D., Peters, R. & C. Knebel (2016). Sand in the wheels: non-tariff measures and regional integration in SADC. *UNCTAD Policy Issues in International Trade and Commodities, Research Study Series no. 71*

[52] Statistics on trade in value addition, as opposed to gross trade flows, are woefully inadequate in the region to make an accurate assessment. In the case of South Africa, the expert estimates that the domestic value of gross exports has remained near constant around 40-45% since 2000 (author calculations based on OECD, *Trade in Value Added* database). In the case of EAC countries, one can assume far lower values.

[53] Decreux, Y. & Spies, J. (2015). *Spotting Products with an Export Potential. An ITC assessment to support Export Promotion Activities in 64 Developing Countries*. ITC Report. Geneva

work pioneered by Hidalgo and others[54]. The operationalisation of their approaches has been used to identify opportunities to intensify export promotion at the margin (intensive margin) and to expand or diversify exports in product clusters (extensive margin). Both are *ex ante* approaches, and the application of such methodologies can be practically applied to shed some light on the potential for both intensifying and diversifying exports[55], as well as moving up the value chain. We will use those approaches to triangulate the findings we obtain through enterprise surveys.

The TGIS team will also try to determine whether sourcing decisions have changed as a result of TMEA interventions. We will look to obtain such insights through industry surveys and analysis of the two value chains. We must also understand other factors which affect the decision to source regionally. A study researching sourcing decisions of firms, using a detailed transaction-level dataset that can filter out many confounding influences, found that preference utilisation induces sorting among exporters on the basis of size and intermediates sourcing[56]. At the firm level, the study found that preference utilization correlates positively with firm size but negatively with the breadth of input sourcing, suggesting that rules of origin (ROO) constrain the benefits of tariff preference margins[57]. A recent study shows the potentially distorting effects of ROO[58]. Another approach which categorises the restrictiveness of ROO in the form of an index could also be employed to provide some explanation of the sourcing decisions of firms (whether regional or extra-regional)[59].

3.1 Trade costs and impact on trade flows

Beyond the well-established costs of domestic trade, there are many factors which account for costs incurred in international trade. These costs include the transport costs and communication costs, tariffs measures and non-tariff measures (which include regulatory requirements and non-mandatory requirements), exchange rate risk and search costs. Inadequate infrastructure, limited supply capacity and remoteness lead to some countries facing higher trade costs or trade 'frictions'[60]. These frictions that impede international trade flows can be broken down into natural (geographical and exogenous) costs and unnatural (endogenous or policy-induced) costs.

[54] Hidalgo, C.A., Klinger, B., Barabási, A.-L. & R. Hausmann (2007). *The Product Space Conditions the Development of Nations*. in Science. 317(5837); Hidalgo, C. A. & Klinger, B. (2007). *The Structure of the Product Space and the Evolution of Comparative Advantage*. CID working Paper No. 146. Harvard University. April; and Hidalgo, C. A., and Hausmann, R. (2009). *The building blocks of economic complexity*. Proceedings of the National Academy of Sciences of the United States of America. 106(26); Hausmann, R. Hidalgo, C. A., Bustos, S., Coscia, M., Simoes, A. & Yildirim, M. A. (2014). The Atlas of Economic Complexity: Mapping paths to prosperity. MIT Press.

[55] Fortunato, P., Razo, C., & Vrolijk. K. (2015). *Operationalizing the Product Space: A Road Map to Export Diversification*. UNCTAD Discussion Paper No 215. Geneva. March; Decreux, Y. & Spies, J. (2016). *Export Potential Assessments. A methodology to identify export opportunities for developing countries.* ITC Draft. Geneva. December

[56] Cadot, O., Graziano, A., Harris, J. & Volpe, C. (2014). *Do rules of origin constrain export growth? Firm-level evidence from Colombia*. Inter-American Development Bank

[57] The relative preferential margin that a country grants to a given country is the difference –in tariff percentage points – that a determined basket of goods enjoys when imported from the given country relative to being imported from any other. See Hoekman, B. & Nicita, A. (2008). *Trade Policy, Trade Costs, and Developing Country Trade*. World Bank Policy Research Working Paper Series, 4797.

[58] Conconi, P., Garcia-Santana, M., Puccio, L. & Venturini, R. (2017). *From final goods to inputs: the protectionist effect of rules of origin*. American Economic Review. 108(8). December

[59] See for example Estevadeordal, A., & Suominem, K. (2006). *Mapping and measuring rules of origin around the world*. O. Cadot, A. Estevadeordal, A. Suwa-Eisenmann & Verdier, T. (eds.) The origin of goods - Rules of Origin in Regional Trade Agreements. Oxford University Press.

[60] WTO (2015) *Aid for trade at a glance*, OECD/WTO

Bergstrand & Egger (2011)[61] define natural trade costs as, "those costs incurred largely – though not exclusively – by geography"[62]. In bilateral trade, the measurable geographical distance would be classified as a natural trade cost. In contrast, unnatural or "artificial" trade costs refer to impeding costs that occur in the absence of natural costs[63]. These man-made impediments to international trade are mainly attributable to the trade policy environment provided by governments. The interventions of TMEA aim principally to resolve the “artificial trade costs”. A combination of these trade frictions can lead to a high degree of barriers to trade and can render exports uncompetitive, by affecting the comparative advantages of countries.

There are principally three types of trade frictions which feature in the exporters’ price to export, as well as in the import demand function. These are:

- Monetary costs associated with the transaction;
- Time for the transaction to reach its destination;
- Risk associated with the transaction.

The trade environment varies greatly between EAC countries in which TMEA operates, with many layers of complexity across regions, within countries and between countries. This poses a challenge in identifying the effects of interventions, but also could jeopardise the impact of second-best solutions, which may create yet more distortions. The markets in East Africa face many market failures and distortions. The size of the informal economy is large and informal trade also takes place across borders, particularly in weaker states.

Recent research on wider economic benefits associated with hard infrastructure investments[64] yields some interesting insights for a proposed methodological approach for examining the potential wider economic impact arising from trade facilitation or border management measures. In particular, research most frequently”

> *focuses on “economic welfare" as the category of final outcomes and “population and assets" and "trade and productivity" as intermediate outcomes. The study finds that a “transport corridor has potential impacts across multiple outcome variables (economic welfare, social inclusion, equity, environmental quality, resilience). In some cases [...] the corridor boosts both incomes and job creation—thereby leading to synergies, producing beneficial effects for both economic welfare and social inclusion. However, [...] for a given outcome, the impacts across different geographic areas, segments of the population, economic sectors, and the like could vary significantly.*

The majority of models on the wider economic benefits of trade corridors are underpinned by economic geography, which rely on reduced-form estimation, which themselves rely on a difference-in-difference (DID) estimator in which the impacts of, for instance, treated subnational regions are evaluated against those of a set of comparison regions before and after the occurrence of the transport infrastructure investment. Meanwhile, around one fifths of papers that analyse the wider economic benefits use a structural model focused on a specific mechanism for triggering impact, which is normally related to internal trade. Finally, one tenth of research papers surveyed use a Computable General Equilibrium (CGE) model.

[61] Bergstrand, J. H. & Egger, P. (2011). *Gravity Equations and Economic Frictions in the World Economy: A Survey*, in Daniel Bernhofen, Rod Falvery, David Greenaway and Udo Kreickemeier (eds.), Palgrave Handbook of International Trade, New York, NY: Palgrave Macmillan, 2011.
[62] Gravity Equations and Economic Frictions in the World Economy by Jeffrey H. Bergstrand and Peter Egger
[63] Ibid
[64] Roberts, M. *et al* (2018). Transport Corridors and their Wider Economic Benefits: A critical review of the literature. In *Policy Research Working Paper* 8302. World Bank. January. http://documents.worldbank.org/curated/en/667501516199287820/text/WPS8302.txt

Econometric analysis will be used primarily to underpin the ex post analysis of the TGIS. The econometric analysis will be based on gravity equations to shed light on the elasticities of different parameters. Gravity equations are a standard tool for modelling bilateral trade flows, which are regressed on a host of explanatory variables such as market size, distances, common languages, common borders and a range of trade frictions. CGE is popular for exploring the impact of trade reforms on growth, as it takes into account the interlinkages within an economy and therefore captures the pass-through effects of one sector's expansion or contraction on other sectors of the economy. The limitations of CGE models are that, *inter alia*, (1) they rely too heavily on dated structures of the economy; (2) the data is aggregated and suffers from aggregation bias; (3) the assumptions underlying the GTAP model may not be applicable to a region with large informal cross-border and internal trade, and the distortions will be much larger than would be warranted under perfect competition models; (4) the CGE will not show in a transparent way the pass-through effects of interventions; and (5) CGE data sets are too aggregated and thus cancel out many of the distributional effects taking place at disaggregated levels. Nevertheless, we will still use CGE for wider economic benefits, as it is the most helpful for understanding he interlinkages within the economy and analysis the knock-on impacts of a value chain expansion on the rest of the economy.

The most common tools and mechanisms used to disentangle such impacts are presented in the table below. These tools will underpin the methodology for the TGIS.

Table 10: Distinct methods for impact studies to answer different questions

Computable General Equilibrium	Partial Equilibrium
Modern economies are highly integrated, with changes in one single market having consequences for, potentially, all other markets. A variety of feedback effects come into play. General equilibrium models address all these requirements. In the area of trade, the Global Trade Analysis Project (GTAP) is the modern workhorse model. It is able to answer an array of macro-economic questions such as: • How does a certain trade or investment policy instrument affect real GDP? • What happens to a country's trade balance and its terms of trade? • How is the labour market affected? • Do consumers benefit? • Which industries are affected and how? The standard GTAP model is a static, multiregional, multi-sector, computable general equilibrium (CGE) model that assumes perfect competition and constant returns to scale.[65] Bilateral trade is handled via the so-called Armington assumption that	The partial equilibrium (PE) framework is a useful modelling tool since it demands a minimal amount of data and is relatively easy to understand and use. Such analysis yields a clear picture with respect to the direct effects of a specific trade or investment agreement on the most affected market participants. The PE model attempts to find the set of values of endogenous variables which satisfy an equilibrium condition. A non-linear system of equations is also possible under the PE framework. In both systems, it is possible to solve and obtain the equilibria points and find the equilibrium level of price and quantity.[66] A variety of models exist, such as GSIM, TRIST, ATPSM and SMART. The SMART (Software for Market Analysis and Restrictions on Trade) model is an analytical framework embedded into WITS (World Integrated Trade Solutions), a trade database and software suite provided jointly by the World Bank and the United Nations Conference on Trade and Development (UNCTAD).[67] The SMART

[65] A useful introduction to the use of GTAP can be found in Burfisher, M. (2011) Introduction to Computable General Equilibrium Models. Cambridge University Press, and Hertel, T. W. and Tsigas, M. E. (1997). Structure of GTAP. in *Hertel Thomas W. (ed.) Global Trade Analysis: Modelling and Applications*. Cambridge University Press

[66] See Chiang, A.C. & K. Wainwright (2005) Fundamental methods of mathematical economics, McGraw-Hill Press, 4th Edition

[67] Other often used models are the ATPSM (richer for simulations on the agricultural sectors), TradeSim (easily adapted to different considerations) and TRIST (helpful since it can incorporate real customs revenues as opposed to the theoretical ones in SMART) models.

differentiates imports by source. Input-output tables reflect the links between sectors. We will use the latest GTAP V10 (2018) edition, which includes I-O tables up to 2014 and trade flows up to 2017. GTAP is ideally suited for the analysis of changes in trade conditions, which are likely to have inter-sectoral effects. The input-output tables capture the indirect inter-sectoral effects, while the bilateral trade flows capture the linkages between countries. In this study, we plan to obtain the macro impacts regarding how the changes to the sectors have wider effects across different sectors using a CGE approach.	model is able to address micro-economic questions such as: • How will imports of a certain product be affected by a particular trade agreement? • How will certain export markets be affected by a change in trade rules? • How much trade at the detailed product level will be created from reducing trade barriers? One the major short-comings of PE is that it fails to take into account the indirect effects of trade on macro and sustainability variables. An advantage of the PE over CGE is that we can produce more detailed analysis (the more macro the analysis, the less reliable are the results, so it is good we have a more focused look at impact and then use a more general approach with lots of assumptions for the CGE).
Econometric Models	
Econometrics can also be used to establish the explanatory power of certain variables, such as the implementation of a trade agreement. In regression analysis, the aim is to establish whether the variation in one variable can be explained in terms of the variation in one or more independent variables. Econometric analysis is one of the main approaches for the analysis of trade policies and trade or investment agreements. The analyses can be *ex post*, to evaluate existing trade or investment agreements, or can be used to forecast developments. There are a number of established approaches and estimation methods available, such as Gravity Models[68] and Synthetic Control Methods (SCM).[69]	

3.2 Scope and objectives

The TGIS will focus on the achievements made by the TMEA programme under Strategy 1, which was completed in June 2017. The TGIS will provide recommendations for further enhancing impact under Strategy 2, including recommendations for strengthening the pass-through effects of interventions at the value chain/sector level. It will also provide valuable information for the Impact Model that TMEA is currently elaborating under Strategy 2.

Accordingly, the specific objectives of the TGIS are:

- To provide a complete assessment of the impact of TMEA under Strategy 1;
- To provide recommendations to enhance the trade and growth linkages during Strategy 2;
- To provide recommendations for maximising trade and growth in similar future programmes.

It is to be noted that the outputs produced from the TGIS should be valuable in verifying the pathways, elasticities and quantification of parameters in the Impact Model being developed

[68] See Tinbergen, J. (1962). Shaping the world economy: suggestions for an international economic policy. The Twentieth Century Fund: New York, and Piermartini, R. & Yotov, Y. V. (2016). Estimating trade policy effects with structural gravity. WTO Working Papers. ERSD-2016-10, amongst many others.
[69] See Wagner, J. (ed) (2016). Microeconometrics of International Trade, Vol. 52. World Scientific

by TMEA. As such, the outcomes from the study may be used to compare and refine the findings of the model construct of the Impact Model.

3.3 Key steps

We are planning a five-stage approach to undertake the Surveys, Econometric, CGE and qualitative analysis. The stages are not necessarily linear and will be interactive, although they will begin in that order, with feedback mechanisms occurring as information is obtained and analysis is carried out.

Step 1 – Refine and finalise the methodology

While the framework and tools to be used are presented in this document, the evaluation team will need to workshop the detailed approach, define clearly the data requirements and prepare the logistical arrangements for data collection. The team will also produce a high-level literature survey, and a robust elaboration of the economic modelling that will be done.

Step 2 – Data Collection

The TGIS team will use the performance evaluation data to inform on the impact of reduced trade costs through increased efficiency of transport infrastructure, and increased capacity of transport infrastructure, including OSBPs and ports. This will include intervention details and budget spent, geographic locations of impacts uncovered, indicators on the TMEA outcomes, and other potential influencing factors within the EAC context.[70] This information would be taken by the TGIS team to quantify the economic value of the outcome indicators and to delve further in the influencing factors within or outside the TMEA scope. Some qualitative assessment (enterprise responses) of the significance of the intervention would be gathered.

The quantification will then be used to estimate the ad valorem equivalent barriers that were removed through the TMEA intervention. The choice of sectors that will be more deeply examined will also depend on the relevance of the TMEA activities to those sectors. Such detailed work could only be done for the interventions that relate to the business and trade environment of the two value chains. Conducting these in-depth value chain studies on the prices and changes in business costs linked to TMEA interventions will serve as proxies for the wider economy.

The team will make use of existing (SITA 2014 – Burundi and South Sudan; SITA 2013 Uganda, Tanzania and Kenya; and SITA 2011 Rwanda) enterprise surveys as and where those align with the sectors chosen for the TGIS. The team will also undertake enterprise surveys that expand on that data in the two selected value chains, across the four countries; we will design this work to be agile and very responsive to the needs of the TGIS, and will collect data tied to those needs until reaching saturation for the two sectors under study. This will help us to better understand the environment in which TMEA operated, the structure of their production and sourcing requirement, destination markets, prices, etc. These will involve anonymous responses to questionnaires covering key issues on time and cost, productivity, labour, inventory and turnover, and other themes, concordant with the lines of inquiry presented in the introductory section of this chapter. Given that in East Africa there is some secrecy around some of these issues (primarily because of non-payment of taxes) it can be difficult to ensure that business respondents will be candid about their experiences.

[70] These might include other trade agreements and preferential market access arrangements (EPA, AGAO, etc.), global demand and supply shifts, other donor activities and sensitivities of other exogenous factors to estimate TMEA's residual effects; per phone discussion between the author of this chapter, Paul Baker, and DFID representatives.

However, the evaluation team brings strong real-world experience to this undertaking on how to recruit respondents, gain rapport professionally including through industry associations and other gatekeepers, sequence questionnaires in a way that motivates further confidence, and ensure confidentiality in all dealings with respondents. These steps will help us ensure we gather the needed information while protecting our sources.

The next key step will quantify the trade costs. We have a number of approaches which can be used for quantifying the *ad valorem* equivalent of trade costs. We can use shadow pricing methods, use gravity equations, and regress combined trade restrictiveness indices, such as those produced by UNCTAD, World Bank and others. The effective rates of protection across a value chain were successfully calculated for the leather value chain in Uganda and applied to identify the costs for industry's competitiveness[71]. A useful approach with respect to quantifying costs is the multidimensional approach to indexing non-tariff measures, which is also an approach we propose[72]. This has been successfully introduced into a gravity equation in order to calculate estimated trade costs and subsequently introduced into CGE models to measure the trade inducing effects arising from regulatory convergence[73]. This is particularly relevant to any work on the pharmaceutical value chain or agri-value chains that have significant technical and voluntary standards attached to them.

The team will consider the expected outcomes from the data by considering the commitments made by countries in the WTO Trade Facilitation Agreement (TFA). This would be indicative of the degree of commitment for improving trade facilitation conditions in their country. Thereafter, the team proposes to evaluate what was submitted under category listings. Since the principal focus of the TFA is to reduce the time it takes to cross borders, one can estimate the correlates of time in customs. The Doing Business Indicator (DBI) database is collected bi-yearly from freight forwarders on the time and cost for importing or exporting 20-foot full containers[74]. While still helpful, DBI does not provide the full picture of trade costs, while other indicators, such as those used by Maersk in their survey, FEDEX or the Universal Postal Union (UPU), provide the full transportation times and costs from point of departure to delivery, and can be used to augment the DBI findings. We have a host of other data sources on which to capture data, which are presented in Section 3 "Sources and Methods").

Step 3 – Measuring Impacts of TMEA on Value Chain Growth

Two measurable outcome variables of interest to monitor are time in customs and export volumes and their characteristics. Evidence suggests that trade facilitation expands both existing exports (intensive margin effect) and creates new trade flows (extensive margin

[71] Shepherd, B., De Melo, J. & Sen, R. (2017). Reform of the EAC Common External Tariff. Evidence from Trade Costs. International Growth Centre. November.
[72] Cadot O, Asprilla A, Gourdon J, Knebel C and Peters R (2015). Deep Regional Integration and Non-tariff Measures: A Methodology for Data Analysis. UNCTAD/ITCD/TAB/71. United Nations publication. Geneva. This approach uses data on regulations in different countries combined with the existence of different costs associated with various types of NTMs, and a calculation of how these costs translate into different sectors and to the household level. Models are assembled to predict how much something should cost, given the various NTMs and product and transport costs; when the cost is actually greater than predicted, the researchers examine why, and who ultimately pays those additional costs and who benefits from them. The multidimensional approach further evaluates the impact on household welfare.
[73] UNCTAD (2017). Non-Tariff Measures in Mercosur: Deepening Regional Integration and Looking Beyond. Geneva; Vanzetti, D., Knebel, C. & Peters, R. (2018). Non-Tariff Measures and Regional Integration in ASEAN. *Contributed paper at the Twenty First Annual Conference on Global Economic Analysis*, Cartagena: Colombia, June 13-15th.
[74] Halward-Driemeier, Mary and Lant Pritchett (2015). How Business is Done in the Developing World: Deals vs. Rules. In *Journal of Economic Perspectives,* 29(3), 21-40.

effect)[75]. Reduced time in transit is the second source of reduction in trade costs to be expected from implementing the TFA, since, according to logistics professionals, time savings in customs is the preferred summary indicator of the private sector trade costs associated with clearing goods at the border[76]. A third associated implication for trade is the reduction of uncertainty or risk arising from changes in the transparency and predictability of border agencies.

Each of these factors – time in customs and export values, time in transit, and the reduction of risk or uncertainty – will be explored in the CT studies of key TMEA pathways described in Chapter 2 of this design. Building closely on this work will be the value chain mapping undertaken in the TGIS, in that the issues will be ground-truthed within the two value chains at the level of individual enterprises in the survey.

The value chain mapping proposed for the TGIS has been extensively covered in recent studies, on which our approach would rely, especially with regards to the network of trade nodes that the value chain is integrated within[77], and detail the inter-sectoral, as well as intra-sectoral, linkages that can be improved as a result of removing trade barriers or policy and regulatory environment barriers. The team will use partial equilibrium models to construct the linkages between each segment of the value chain, per the description of partial equilibrium in the previous section. Partial equilibrium analysis (on the VC) will calculate surpluses generated, and some welfare gains (through gains in efficiency). Through consultations and enterprise level data, we will also obtain some information on the allocation of resources and changes in productivity; however, we believe the CGE work proposed in the following section will delve into these areas with greater confidence (notwithstanding the limitations of CGEs).

A recent impact study on infrastructure on growth unpacks infrastructure distinguishing among different types, such as physical and regulatory infrastructure, and analyses the pass-through effects of cost reductions to consumers and producers[78]. The approach used showed relatively robust results on impacts, by focusing on determinants of efficient logistics services as one essential element for firms' productivity, for developing and upgrading value chains and to guarantee the pass-through of the benefits of investments in hard infrastructure throughout the value chain.

Step 4 – Measuring Wider Impacts of TMEA on Trade and Economic Growth

Under this step, the TGIS team will carry out an analysis in order to observe the wider economic benefits from trade facilitation. The CGE analysis will in particular be helpful in observing expected direction of effects and possible impact on social inclusion and exclusion. Since impacts are expected to vary widely according to income groups, the model should assist in proposing policy option levers for not only maximising the benefits but spreading the gains more evenly.

[75] de Melo, J. & Wagner, L. (2016). Aid for Trade and the Trade Facilitation Agreement: What they can do for LDCs. In *Ferdi Working Paper* P153. May

[76] de Melo, J. & Wagner, L. (2016). How the Trade Facilitation Agreement can Help Reduce Trade Costs for LDCs. ICTSD/WEF. January

[77] Taglioni, D. & Winkler, D. (2016). Making Global Value Chains Work for Development. World Bank; Cusolita, A. P. Safadi, R. & Taglioni, D. (2016). Inclusive Global Value Chains: Policy options for Small and Medium Enterprises and Low-Income Countries. OECD-World Bank.

[78] Jouanjean, M-A., Te Welde, D. W. Balchin, N., Calabrese, L. & Lemma, A. (2016). Regional infrastructure for trade facilitation Impact on growth and poverty reduction. ODI Report.

The direction and magnitude of these impacts will be assessed using the Global Trade Analysis Project (GTAP), which has built the world's leading CGE model.[79] Through the use of a general equilibrium model, it is possible to capture the interactions in the whole economy by linking all the sectors through input-output tables and by linking all countries through trade flows. GTAP is a well-documented, multi-regional, multi-sector model that assumes perfect competition, constant returns to scale and imperfect substitution between foreign and domestic goods, and between imports from different sources.[80] In this analysis, the latest version of GTAP will be used (version 10).[81] The GTAP 2014 model version will be used to examine the effect of introducing shocks from 2014 to 2017 and model the change in growth; this will be compared to actual changes in growth, and the role of exogenous factors will be considered (including what other donors are doing along the value chains) to tease out what is directly related to TMEA, resulting in a final estimate of growth generated by TMEA. The GTAP database has 121 countries representing 98% of world GDP and 92% of world population, and 65 sectors. The full model cannot be solved with Burundi and South Sudan, so both countries and sectors must be aggregated. The analysis will look at trade and growth specifically (and individually) for Kenya, Tanzania, Uganda and Rwanda, as well as overall. This will involve considering input-output tables with about 56 sector aggregates.

The imperfect substitution feature of GTAP makes it well-suited for examining changes in tariff and non-tariff barriers, of which the econometric results in Step 3 will be able to feed into the gains in terms of efficiency (in ad valorem equivalents). It is also possible to make a reasonable estimate as to their likely effects on industry prices and production, consumption and trade.

Step 5 – Verification and Feedback Loops

This step consists of identifying a group of key informants and examining case studies to bring insights into the modelling work of Steps 3 and 4, as well as verifying assumptions and parameters used. Case studies and consultations will help in identifying, *inter alia*, (i) how characteristics of project size and specific interventions can interact with characteristics of local settings to affect the size and nature of economic development impacts; (ii) the lags associated with economic development impacts occurring over time; (iii) the political economy dimensions of border management, trade facilitation measures and other trade interventions from TMEA; and (iv) the wider context behind the border measures which may hinder outcome indicators at the border.

In this sense, qualitative methods, such as consultation and multi-criteria analysis, are particularly important, as they favour non-monetary resources and draw on a diversity of stakeholder knowledge input[82]. The key features of our approach include, first, the ability to carry out stakeholder consultations and, second, the use of a wide range of tools to facilitate stakeholder consultations and engagement, such as digital tools (online questionnaire-based surveys and the use of telephone/skype interviews).

The outcomes of the discussions and review of case studies may inform and modify the analysis carried out in steps 3 and 4.

[79] See Hertel, T.W. 1997 (Ed.), "Global Trade Analysis: Modeling and Applications", *Cambridge University Press*; and Burfisher, M. E. 2011, "Introduction to General Equilibrium Models", *Cambridge University Press*.
[80] For more information on GTAP, see: https://www.gtap.agecon.purdue.edu/
[81] Aguiar, A., Narayanan, B., and Robert McDougall 2016, "An Overview of the GTAP 9 Data Base", *Journal of Global Economic Analysis* vol. 1, no. 1, June, pp. 181-208. Available from: https://jgea.org/resources/jgea/ojs/index.php/jgea/article/view/23
[82] OECD (2010). Guidance on Sustainability Impact Assessments. OECD.

3.4 Sources and methods

The following documentary sources will be used for evidence on programme interventions and results:

- TMEA programme activity reports and data;
- TMEA documents (strategy, framework, reports, evaluations), audits, and due diligence assessments;
- Baseline surveys existing within TMEA or other donor programmes for the VC selected;
- Other key donor documents intervening on the value chain (USAID, DFID, European Commission and German cooperation activities);
- Deliverables 2C, 2D and 2E (Effectiveness and outcome-level evaluations, by SO), 3A (Consolidated formative evaluation of ports and OSBPs), and 6B (Interim evaluation synthesis report) from the evaluation's first phase, and the performance evaluation discussed in this document (Deliverable 3B) which draw on TMEA's results framework, evaluations, and monitoring data;
- National data sets: country input-output tables, national accounts statistics, price statistics, industry statistics, association statistics;
- Regional data sets: Northern Corridor Transport Observatory; EAC Secretariat surveys on NTMs; and
- Secondary data from studies: Maersk trade costs; Overseas Development Institute (ODI) trucking studies; International Growth Centre (IGC) impact studies; International Trade Centre (ITC) value chain roadmaps.

In addition to those above, Table 5 presents the international datasets that will be consulted.

Table 11: Potential sources of data for the assignment

Data	Sources
Trade values	• United Nations Statistics Division Comtrade • ITC Trade Map www.trademap.org
Tariffs	• ITC Market Access Map www.macmap.org • World Bank World Integrated Trade Solution (WITS) • WTO Integrated Trade Intelligence Portal (I-TIP)
Price Elasticities	• GTAP (Hertel et al., 2004) • https://www.gtap.agecon.purdue.edu/resources/download/2931.pdf
Import Elasticities	• Kee, H.L., A. Nicita & Olarreaga, M. (2009). *Estimating Trade Restrictiveness Indices*. The Economic Journal, 119 • Ghodsi, M., Grubler, J. & Stehrer, R. (2016). *Import Demand Elasticities Revisited*. The Vienna Institute for International Economic Studies, 132. November • Tokarick, S. (2010). *A Method for Calculating Export Supply and Import Demand Elasticities*. IMF Staff Working Papers. WP/10/180 July
Non-tariff measures	• United Nations Conference on Trade and Development (UNCTAD) Trade Analysis Information System http://trains.unctad.org/

	• UNCTAD Non-Tariff Measures (NTM) hub http://unctad.org/en/Pages/DITC/Trade-Analysis/Non-Tariff-Measures.aspx
Trade Costs	• World Bank-United Nations Economic and Social Commission for Asia and the Pacific Trade Cost Database https://www.unescap.org/resources/escap-world-bank-trade-cost-database
Distances	• Centre d'Études Prospectives d'Informations internationales (CEPII) GeoDist www.cepii.fr/CEPII/fr/bdd_modele/presentation.asp?id=6
GDP per capita	• International Monetary Fund (IMF) World Economic Outlook • https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/index.aspx • World Bank World Development Indicators • databank.worldbank.org/data/reports.aspx?source=World-Development-Indicators
Population	• World Bank World Development Indicators • databank.worldbank.org/data/reports.aspx?source=World-Development-Indicators
Trade unit values	• CEPII Trade Unit Values www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=2
Port throughputs	• UNCTAD Liner Shipping Connectivity Index and Port Throughput statistics • http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=13321
Business Environment	• World Bank Logistics Performance Index lpi.worldbank.org/ • World Bank Doing Business Indicators www.doingbusiness.org • World Bank Governance Indicators https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators

Document review will be supplemented by interviews with key stakeholders in the designated VC, in DFID, TMEA and other key agencies and stakeholders working along the VC. The interviews will focus on the key drivers of impact during Strategy 1, constraints and trade costs, other donor interventions, and other extenuating factors affecting the VC.

3.5 Changes to the approach

While there are no significant deviations to the approach proposed in the inception report, the current TGIS approach has been refined to be more targeted and measurable. The sectoral approach to look closely into two value chains proposed here will be able to yield more valuable insights into how TMEA interventions have triggered changes, through which channels, and how have the gains been distributed across a sector. While the proposed methodology loses some of the macro approach proposed in the inception report, we have retained the CGE modelling so as to obtain some of the higher-level impacts resulting from change in that sector, with the same result variables as proposed in the Inception Report. We will collect more detailed sector data for two sectors and no data for other sectors, rather employing data from the GTAP. We can therefore measure the wider economic benefits arising from the sector's change, which have been brought about by TMEA's intervention in

areas that have impacted that sector. The tools used in the evaluation will not substantially differ from those proposed in the inception report, namely econometrics (gravity equations in particular for the estimation of AVEs), partial and general equilibrium modelling, and other dynamic economic analysis.

It is important to note the following:

- While we would have **richer, more relevant and more precise data** at the sector level, we would not capture the larger macro-economic gains arising from TMEA. A larger, more comprehensive "macro" approach would have (1) either entailed a number of assumptions and weaker results, particularly with respect to measuring the contribution of TMEA at a large scale; and (2) required substantially larger resources for data collection and a longer time scale.
- The team will rely more heavily on collecting **enterprise level data**, particularly with respect to inputs, intermediary products, exports and non-tariff information. The team will aim to quantify the effects of barriers that were removed by TMEA, which is aligned to the thinking proposed in the IR.
- We will exploit the richer data available under TMEA's efforts at compiling **road and transport data** including those of the Northern Corridor Transport Observatory, and where possible, enterprise and transporters' data.
- We will **avoid duplication with the Impact Model**, an ex-ante model which is being elaborated by TMEA, while at the same time finding ways that our findings may improve the reliability and realism of the Impact Model.

3.6 Timing

Data on outcomes and impact will reflect achievements over the period of TMEA's Strategy 1, starting in 2010 and ending in June 2017, as assessed by the evaluation team. The performance evaluation's findings, and particularly at the outcome level, will be valuable inputs into this analysis. As such, it is proposed that the study begin mid-November and end after five months (one month being lost due to end-of-year holidays). This time will be necessary to carry out the data collection, modelling and testing and verification of underlying assumptions and parameters of the model, as well as carrying out the CGE analysis.

3.7 Hypothetical responses to the evaluation questions

The TGIS proposes to answer the evaluation questions with the following types of responses. Phrases in italics are fully fictional, chosen simply to illustrate how answers are likely to read. Where limitations or caveats are necessary to ensure that readers interpret the results appropriately, these will be clearly provided, in any summary form of results as well as in more in-depth descriptions of them.

DEQ3.1 (on TMEA interventions leading to reduced trade times, costs, and risks)

TMEA interventions around mutual recognition of standards in the pharmaceutical sector have led to $$xx reduction in compliance costs, representing x% of price. TMEA intervention (in conjunction with USAID efforts – in case we cannot disentangle the impact of each) in conformity assessment procedures in East Africa lead to an x% drop in costs for enterprises in the sector. TMEA intervention in creating a single window reduced the number of documents by 3, representing a $xx reduction in costs related to border compliance, representing x% of price, a yy days reduction in time to compile the necessary documentation and a zz% reduction in risk (measured in standard deviation of time divided by the arithmetic mean). TMEA investment in port infrastructure improved access to

refrigerated warehousing at more affordable cost, resulting in a x_a% drop in costs for importers and x_b drop in cost for importers, reduced waste at the port by w% leading to a cost reduction of x_a% for importers and x_b for importers, a reduction in risk by zz% (waste as percentage of total port throughput). TMEA investment in border clearance time led to x_a% drop in costs for importers and x_b drop in cost for importers, reduction of y_a days for importers and y_b days for exporters, and a drop in risk of z% (standard deviation of days divided by the arithmetic mean). The metrics will be gathered for the different stages of the value chain and for those areas where TMEA is thought to have influenced the conditions to trade.

DEQ3.2 (on impact of any achieved trade cost reductions from TMEA)

These follow on the findings in DEQ3.1. *Reducing customs clearance time by x days has led to a y% increase in imports and z% increase in exports.* This will be relatively accurate at the sector level, as the team will have richer and more detailed data, with better estimates on the effects of NTBs on trade flows, and on the price and supply elasticities (from enterprise surveys). At the macro level, various assumptions (backed by the literature) will be necessary, which will reduce the robustness of results. We will provide results for each country (except Burundi and South Sudan), as well as for the two sectors, and for the whole economy.

DEQ3.3 (on improved trade policy environment leading to increased trade)

The answers to this DEQ will flow from the findings in DEQ3.2 where the interventions studied are those that affected policy most acutely. Policies where this is likeliest to have happened include those related to non-tariff barriers, ICT for trade, integration and harmonisation of standards, and border post procedures. Using CGE modelling, we can test the impact of the different policy levers to obtain insights such as these. *An x% reduction in regulatory divergence has led to a y% increase in trade. An x% reduction in TBTs has led to a y% increase in trade. Adopting customs measures in line with the WTO TFA has led to a y% increase in trade.*

DEQ3.4 (on trade changes contributing to economic growth)

Answers to this question will emerge from the partial equilibrium analysis at the sector level economic growth, and from the use of CGE modelling for macro-level economic growth. For example, *an x% reduction in regulatory divergence has led to a y% increase in trade, but also to a z% increase in investment and a w% increase in GDP. Adopting customs measures in line with the WTO TFA has led to a x% increase in trade, and a y% increase in GDP. Adopting community level standards has led to x% growth in trade, and y% increase in GDP.* Like with questions above, this will be connected to TMEA contributions identified in the performance evaluation as well as to context such as other donors' efforts, according to the insights gained in field work.

DEQ3.5 (on critical factors to ensure sustainability of positive impacts)

As responses to this question require synthesis of a set of findings and analysis of their relative importance and ability to be sustained, these responses will be narrative in nature, drawing upon strong enterprise survey findings and the economic results picked up in the modelling.

4 Poverty and Gender Impact Study[83]

The Poverty and Gender Impact Study (PGIS) report will be produced in second and third quarter of 2019, using the design proposed and approved in the Inception Report in 2016. The timeline will allow for national datasets to be released and included in the analysis. The study will have two components, quantitative and qualitative, the results from which will be triangulated during the analysis phase.

Trademark's own results framework or theory of change reaches the level of trade and economic growth impacts that are to be measured in the TGIS, and no further. However, there is a hypothesis that TMEA's work on trade would, eventually, affect the economy in such a way as to improve the lot of poor people, particularly those working in sectors affected by international trade. In this design document these are called the "long chain" poverty effects.

If this long chain is to materialise, the trade impacts must be substantiated before any poverty gains can be postulated. For this reason, the trade impacts under study in the TGIS in the last chapter will be important inputs to the PGIS process: where impacts are more substantial, whether in a value chain or along a corridor or emerging from a localised intervention such as an OSBP, this information will be conveyed to the PGIS team for consideration as they review quantitative and qualitative data around poverty and gender to draw their conclusions, in an end of the results chain characterised by exogeneity (external factors that may help or hinder changes in poverty, for good or ill, or both) and a multidimensional, multigenerational set of challenges around poverty. Notwithstanding those very real challenges to detecting and isolating poverty impacts, understanding if and how trade impacts occurred will support the PGIS team.

The literature catalogues primary research carried out over the years on how such a relationship would work, but provides little definitive evidence of such a connection between growth in trade and reduction in poverty. There are significant debates, in fact, about that link, including regarding the direction of change. The PGIS will not be able to resolve the issue or conclude definitively about TMEA's effect on poverty, though our efforts are in line with the literature in the hopes of adding to the evidence base and informing future efforts. The PGIS will involve a mixed methods design that uses secondary quantitative data from national household surveys and other sources, and primary data collection in areas nearer to and farther from the trade corridors, in an effort to triangulate any long-chain effects that might be identified, and to give poorer and wealthier people an opportunity to voice their understandings of the sources of any changes they themselves have identified.

At the same time, TMEA made efforts to affect people living in poverty directly in Strategy 1, notably in the Women in Trade activities under SO3, and also in physical areas around the infrastructure projects undertaken in SO1, where reductions in wait times affected the livelihoods of some communities. Such direct efforts will also be a focus of the PGIS, in that the team will examine qualitatively the effects on beneficiaries of those efforts with site visits, focus groups, and participatory methods. The following sections describe these different evaluative components and how they will answer the evaluation questions from the Inception Report.

[83] The design for this study has not changed greatly since inception. Portions of this section have been included from the Inception Report.

Background

As a point of departure, the independent evaluation team carried out a Preliminary Poverty Assessment (PPA) which started in February 2016 and a report was submitted in June 2016. The purpose was to give a first indication of how TMEA-induced changes in trade might affect poverty in the countries where TMEA operates, as well as to provide an initial assessment of how TMEA has approached assessing and improving its impact on poverty reduction.

The PPA drew upon household and enterprise survey data to simulate the potential impact of trade-related changes in prices, wages, employment and public expenditure on poverty. The causal pathways assumed in the quantitative work were explored in more depth through a set of interviews with key stakeholders in affected communities and a small number of focus group discussions (FGDs).

In addition, the PPA drew on information collected from interviews with TMEA programme staff and TMEA documents to provide a preliminary assessment of TMEA's efforts to maximise the poverty impact of its work. It used the findings from the field visits to Mombasa port and Taveta-Holili OSBP to provide a preliminary assessment of potential impact of these major SO1 projects at an early stage. The quantitative and qualitative analyses were synthesised and integrated into one report.

Two lessons learned from the PPA will be explicitly integrated into the PGIS. First, in the PPA our team selected only poorer groups of men and women for focus groups, to understand system-wide changes. However, in choosing the poor there is a likelihood of speaking to those for whom things have not gone well, whose perceptions are by definition more negative. They may also be unrepresentative perception of how the local economy is faring. Therefore, in this round of research we will speak with wealthier and poorer groups of people. Second, in the PPA we only had participants from a single livelihood group in each FGD to understand the system-wide changes, which gave us a partial understanding of the local economy. In this round of research we will expand to interview a more diverse set of actors in the labor market during this round of research.

The current study

The two facets of research have the following approaches, essentially unchanged since the IR. The quantitative research is desk-based, using datasets from national panel surveys. The qualitative research is primarily field-based. Both build heavily on the literature and research done on the links between poverty and trade.

Qualitative and quantitative research in these two facets will run in tandem over several weeks, in order to capitalise on potential synergies. This means that the two parts of the study team will be in communication around their findings in real time. One way this might work is that the quantitative team may discover wage trends among household heads working in tradeable sectors; to understand the trends better, they would ask the qualitative team to direct adjusted questions to certain types of respondents, to inform the quantitative work. Alternatively, the qualitative field team may find, for example, unexpected parallels in perceptions of prices of consumables, between households on and far from the trade corridor. They would then point the quantitative team towards the price figures available in the household and enterprise survey data, to test whether their findings were widespread. At the same time, the qualitative team would direct further inquiry towards possible explanations for the unexpected findings among exogenous factors, such as evidence of informal imports, high yields owing to fertiliser inputs from a development programme, or other explanation.

As a whole, the study is geared to ensure detailed and triangulated responses to the evaluation questions, which are shown in the next section. It is for this reason that the study teams will consistently communicate around their findings, and support one another to unpick explanations for them, as part of the analytical process.

4.1 Scope and objectives

This study will answer HEQ4 and its DEQs as shown in the following table:

Table 12: HEQ4 and its DEQs

HEQ4 and its DEQs
HEQ4: What is the likely impact of TMEA on poverty and gender, and what factors are critical in order to ensure the sustainability of positive impacts?
DEQ4.1 What is the nature – and, where possible, scale – of the likely impact of the overall programme and of key TMEA projects in the portfolio on the poor—direct and indirect? Who is affected by potential short- or long-term impacts, both positive and negative, how, and how is the causality working?[84]
DEQ4.2 In particular, who has benefited from reduced trade costs? How are the benefits in reduced transport time and cost being passed on to poor people through lower prices or lower price increases?
DEQ4.3 Are complementary policies being adopted to translate the benefits of increased trade into poverty reduction?
DEQ4.4 Are measures being taken, and are they successful, in mitigating potential negative impacts on any sub-groups – in particular poor people in localised areas?
Cross-cutting issues
DEQ4.5 To what extent has the programme benefited women and girls (noting that the programme design did not purport to benefit them equally)? Have there been any negative consequences for women and girls? Has the programme had an impact on relations, including power and influence, between girls/women and boys/men? How could the programme increase benefits to women and girls within its trade focus?
DEQ4.6 What factors are critical in order to ensure the sustainability of positive impacts?

Impact on gender is a key focus of this study, and will be mainstreamed throughout the questions and data collection.

The quantitative component:

The PGIS begins from the premise that TMEA, oriented towards trade benefits that would be detected in the performance evaluation and TGIS, may have long-chain indirect effects on poverty and gender, but that no counterfactual design is possible because there is no adequate comparator group. This constraint gave rise to a design based on related literature and the links the literature posits between increased trade and poverty reduction.

[84] It is critical to note that this will be speculative and subject to exogenous distortions. Tracing causality rigorously, this far along the results chain, is outside the scope of the evaluation.

The PPA allowed the evaluation team to test and refine the design for the PGIS. The refined design described in this chapter is built on the hypotheses identified in the PPA report:

1) poverty will decrease faster closer to the trade corridor
2) poverty should improve faster in tradeable sectors. If possible, households will also be divided according to skill levels and sources of income (e.g. sales, wages, etc.).
3) poverty will decrease faster in households that produce / consume more tradeable goods

The PGIS will examine the actual, ex-post changes that have taken place in each country over the life of TMEA (using datasets as close to the start and end of TMEA's Strategy 1 as possible) by comparing poverty indicators at the two points in time. These data will be disaggregated as proposed in the following detailed sections. The design will also take into account other changes in the economy (e.g. economic growth) that may have improved the situation across all sectors.

TMEA works to increase trade through increasing trade efficiency. The literature around trade and poverty theorises that more open trade would lead to convergence towards one price – the world price – for commodities that poor people and others purchase. The link is not uniform nor simple, as detailed in the literature review in the PPA[85]; whether households are involved in tradeable or non-tradeable sectors, whether they are net producers or net consumers, whether they are on the trade corridor or far from it, and other contextual factors influence whether trade openness alleviates poverty. The literature suggests three key channels through which changes in trade can affect poverty: through changes in prices, in wages or employment, and in government expenditures that support poor people. Prices are the most direct channel, while wages/employment and pro-poor government spending are more indirect.

The quantitative design suggested by the evaluation team makes use of national household survey datasets from the treated countries at two points in time (please see Table 13 below for detail) to attempt to track these conditions and changes in them over time. First, the evaluation team identifies households based on the sector in which they're employed:

1. Tradeable – such as fuel and commodities
2. Non-tradeable – such as service providers
3. Hybrid – unclear or mixed sectors (this category is not part of the analysis; rather, these households are removed from analysis.)

The design further identifies households by their proximity to trade corridors. This was done in the PPA using GIS data in the national household survey datasets For this, too, there are three groups:

1. On the trade corridor
2. Adjacent to the trade corridor (this category is not part of the analysis; rather, these households are removed from analysis, providing a clearer distinction between nearness to the trade corridor and remoteness from the benefits it is theorised to provide.)
3. Remote from the trade corridor

These disaggregations allow the quantitative evaluation to discern if, as theorised, households in tradeable sectors and those on the trade corridor have better poverty outcomes than those in non-tradeable sectors and those far from the trade corridor. The chief analytical tool will be a differences-in-differences analysis comparing change over time based on these differences. Where necessary, regressions will be employed – as they were in the PPA – or decomposition

[85] McCulloch, Neil, et al, 2017. Pp. 3-5.

by income sources or sectors, to see which ones are most associated with poverty reduction. However, these techniques are not in themselves central to the design. The strength of the design comes from its strong basis in theory, as described in this chapter.

Wherever possible we will assess if there have been differential effects on men and women with disaggregated data and whether separate effects on socially and economically marginalised groups can be identified. Contextual inputs from the performance evaluation and TGIS will also inform the analysis, in a process of elimination of looking at the hypothesised channels and exogenous factors that could explain changes in poverty identified in the household survey data. If there are reductions in poverty, the quantitative analysis will be able to relate:

- Whether poverty has reduced more for households closer to or further from the trade corridor
- Whether poverty has reduced more for households in tradeable sectors
- Whether poverty has reduced more for female-headed or male-headed households

While the analysis will not establish with certainty whether any effects on poverty are due to TMEA's interventions, we will be able to say whether what has happened is what we would have expected based on the theories. In decomposing these findings about poverty we will look at the hypothesised channels of producer and consumer prices, employment and wages, and government expenditures, while also taking into account important exogenous factors that may have also contributed to effects.

There are limitations to the methodology proposed. As noted in the TORs, and detailed in Annex D, precisely measuring TMEA's impact on regional poverty as a unitary programme is not possible. Whilst the proposed approach will be able to identify changes in poverty – and association with changes that trade reforms may induce – it will not be able to connect these directly with TMEA's activities.

Qualitative: The qualitative component of the research will include begin with desk review of existing programme documentation and strategies on poverty and gender, and speaking with TMEA country and HQ staff about how these were employed for strategic and decision-making purposes. How gender mainstreaming tools, the gender analysis of Mombasa Port, social impact assessments and the Gender Policy have been used will be one subject of these interviews. Where applicable, the PGIS team will interview country office staff about any country-specific gender action plans and their outcomes, if any.

The PGIS will build on the evaluation's review of a sample of projects (Deliverables 2C, 2D and 2E on results) that shows how gender and poverty were assessed at TMEA's internal Project Appraisal Report stage, where there are poverty- and gender-sensitive indicators (and where these do not exist), and how gender and poverty outcomes are reported, where this is happening.

The qualitative fieldwork on the long-chain poverty impact is designed to identify potential causal pathways through which changes in trade may have affected poverty. The fieldwork will consist of direct interviews, focus groups and participatory methods with poorer and wealthier people along the transport corridors. While it is unlikely that respondents will link changes in their economic circumstances to TMEA projects in a direct way, their perspectives on why their economic lives have changed proved to be very astute in the PPA.

On the other hand, the team will also conduct interviews with those respondents affected by TMEA's direct activities will be able to reveal direct localised impacts; as important as any such

impact would surely be to those affected, such as women involved in cross-border trade, these would not be generalisable to the broader population.

While the PPA conducted research in Kenya and its borders with other EAC countries, the PGIS will take a regional approach. Taking into account the different levels of intensity in TMEA's work across the region and some security concerns (South Sudan and Burundi) we propose to collect primary data in Kenya, Uganda, Tanzania and Rwanda. We suggest concentrating on SO1 projects given their centrality in the Strategy 1 budget and SO3 projects which work directly with local people.[86] Both have localised, direct impacts on poverty and gender; long-chain effects are theorised to have emerged as a result of the magnitude of TMEA programming as a whole. We will provide poverty, trade and economic profiles for each of the countries that will be visited which will be an opportunity to triangulate findings from the qualitative research to what is reported at the macro-level.

- SO1: Revisit sites (Mombasa port, Taveta/Holili OSBP, Busia OSBP, and Mirama Hills/Kagitumba) visited in the PPA to compare changes which may have been influenced by TMEA interventions, and to visit Dar Port given critical political economy challenges there.[87] We would also like to conduct research with women and men further away from the trade corridors (at 50km or more away) to see if they have experienced any changes in prices, wages/employment and public services and ask them the reasons for this. This will be with those in the trade sector and others who could have been indirectly affected by shifts in prices, wages, employment and public services. This is testing the ToC assumption that reduced transport costs lead to reduced poverty rates for men and women, and we will query people from a range of livelihood groups. We will visit the same communities that we went to as part of the PPA and we will attempt to speak with the same community members and key informants that we interviewed in 2016 (since we have their names) but we cannot guarantee that they will be available when the research is taking place. There is also a strong possibility that there has been staff turnover.
- SO2: we do not propose to do any work directly on these interventions but we will ask SO2-related questions while collecting data on SO1 and SO3 interventions where relevant. For example, asking small-scale women traders about their experiences with barriers to trade, their response to such barriers, and any changes in those barriers that helped or hindered their own lives. Another example would be to ask about certification of goods, where TMEA has worked to facilitate this process for small traders: what effects, if any, were there on clearance time, their costs, and the prices of their goods at market.
- SO3: Understanding TMEA's broader work on poverty and gender will require looking closely at the Women and Trade programme which is a flagship USD5m programme on poverty and gender that was expected to reach 25,000 women. We propose to look into the work carried out with cross-border traders, urban traders, women in processing and women in export. This would test the TMEA ToC assumption that working with these women in these sectors leads to improved business competitiveness.

[86] As SO2 interventions were at procedural levels, they were less focused on gender themes.

[87] In the PPA research took place Mombasa port, Taveta/Holili OSBP, Busia OSBP, and Mirama Hills/Kagitumba took place but for the purposes of the PPA report only findings from Mombasa port and Taveta/Holili were analysed and written about. This is because DFID were interested in gaining a rapid understanding of poverty and gender dynamics from TMEA interventions. For the PGIS we will use the findings from all sites visited in the PPA (those reported and not) to understand changes over time.

4.2 Key steps

Step 1 – Constructing poverty profiles

The first step of quantitative work is constructing updated detailed poverty profiles for the countries that will be studied in depth. These are likely to be Kenya, Uganda and Rwanda, and possibly South Sudan, where suitable household survey data of reasonable quality are available (please see Table 13 below on the details of this availability). This was completed as part of the PPA exercise but will be reviewed prior to embarking on the quantitative work for the current study. These profiles show the distribution of poverty by region and by each sector of economic activity.

The PGIS team will use data comparable to those used in the PPA, wherever possible from later waves of the same national household surveys in each country. In an ideal situation, datasets from each country would frame TMEA interventions – before and after – and include the same measures of interest, measured in the same way, with the same level of quality. Ideally new data would be available at predictable intervals as well. However, each country makes its own decisions about data collection and release, and are quite different in terms of the quality and availability of data. For example, though Tanzania was included in the PPA with national panel survey data from 2012 reported in 2013, the country did not carry out the survey in the intervening years. On the other hand, South Sudan has expanded their High Frequency Survey that is now representative for all but the most conflict-affected states in the country, but earlier data are from unrepresentative pilots. The data expected to be available are as follows in Table 13:

Table 13: Datasets used in the PPA and expected for the PGIS

Country and dataset	**Used in the PPA**	**Likely to be used in the PGIS**	**Notes**
Uganda National Panel Survey	UNPS 2011/2012	UNHS 2016/2017	UNHS data are also available for 2009-10 so we plan to use that for the baseline instead of the UNPS used in 2016.
Tanzania National Panel Survey	TZNPS 2012/2013	TNPS 2014/15	The Statistics Bureau has not collected data to update this dataset
Kenya Integrated Household Budget Survey	KIBHS 2005/2006	KIBHS 2015/2016	Data for some modules have been released except the expenditures data. All data are expected to be available at the end of 2018.
Rwanda Integrated Household Living Conditions Survey[88]	Not covered in the PPA	2017/2018 EICV5	EICV5 is ongoing and data are expected to be released in December 2018.
South Sudan High Frequency Survey	Not covered in the PPA	2017	
Burundi	Not covered in the PPA	---	No data available

[88] Rwanda's poverty statistics have been questioned by international researchers who assert that price data discrepancies and the use of a new formula for the household food basket erroneously show that poverty decreased in 2014 data. Ansoms, An, et al, 2016. Statistics versus livelihoods: questioning Rwanda's pathway out of poverty, in Review of African Political Economy, 2017, VOL. 44, NO. 151, 47–65. https://doi.org/10.1080/03056244.2016.1214119.

Source: Assembled from open sources and Bureaus of Statistics

These datasets are likely to be relevant for estimating poverty trends in general terms, particularly where data are available from two points in time.[89] In the PPA, the datasets that were used included information on prices, wages/employment (including ways to separate by tradeable versus non-tradeable sectors), and use of government services. Datasets also included the sex of household head and household members and geocoordinates, or the means to estimate them (please see following section on how these data were used in the PPA). The panel surveys will include such data in this latest round as well, allowing for the proposed analyses. The data will be analysed based on these categories and comparisons made between the earlier and later datasets, by gender, by tradeable and non-tradeable sectors of the household head's employment, and by whether the household is on or far from the trade corridor.

As was done in the PPA, the analysis begins from a strong and straightforward design – including the design work of preparing the data for the geographic comparison – to make the comparisons over time and between the key categories of on and remote from the trade corridor, tradeable and non-tradeable sectors of employment of the household head, and sex of the household head. In addition to being agreed upon at the time of the Inception Report, this design also proved useful in the PPA, and the OPM team remains confident in the approach.

A brief description of the changes in prices, employment, wages and public expenditure in each country over the period since the PPA will be combined with a short account of the macroeconomic and trade performance for each country to enable a narrative account of the ways in which trade may have influenced poverty in each country. The TGIS conducted just prior will also have estimates of these changes, if any, to feed into the PGIS. The PGIS will provide an indication of the extent to which identified changes in poverty are consistent with those trade-influenced intermediate factors (prices, employment, wages and public expenditure) which TMEA has sought to affect.

Step 2 – Disaggregating the changes in poverty in each country

The PGIS begins from the premise that TMEA, oriented towards trade benefits that would be detected in the performance evaluation and TGIS, may have long-chain indirect effects on poverty and gender, but that no counterfactual design is possible because there is no adequate comparator group. This constraint gave rise to a design based on related literature and the links the literature posits between increased trade and poverty reduction.

The PPA allowed the evaluation team to test and refine the design for the PGIS. The refined design described in this chapter is built on the hypotheses identified in the PPA report:

1) poverty will decrease faster closer to the trade corridor
2) poverty should improve faster in tradeable sectors. If possible, households will also be divided according to skill levels and sources of income (e.g. sales, wages, etc.).
3) poverty will decrease faster in households that produce / consume more tradeable goods

[89] Kenya, Rwanda and Uganda should have data from two points in time. Tanzania will not, as they have not carried out another measurement since the national panel survey data from 2012/2013. South Sudan's high frequency survey data has data from both points in time, but the earlier data were collected as part of a pilot and the samples during the pilot are not representative.

The PGIS will examine the actual, ex-post changes that have taken place in each country over the life of TMEA (using datasets as close to the start and end of TMEA's Strategy 1 as possible) by comparing poverty indicators at the two points in time. These data will be disaggregated as proposed in the following detailed sections. The design will also take into account other changes in the economy (e.g. economic growth) that may have improved the situation across all sectors.

TMEA works to increase trade through increasing trade efficiency. The literature around trade and poverty theorises that more open trade would lead to convergence towards one price – the world price – for commodities that poor people and others purchase. The link is not uniform nor simple, as detailed in the literature review in the PPA[90]; whether households are involved in tradeable or non-tradeable sectors, whether they are net producers or net consumers, whether they are on the trade corridor or far from it, and other contextual factors influence whether trade openness alleviates poverty. The literature suggests three key channels through which changes in trade can affect poverty: through changes in prices, in wages or employment, and in government expenditures that support poor people. Prices are the most direct channel, while wages/employment and pro-poor government spending are more indirect.

The quantitative design suggested by the evaluation team makes use of national household survey datasets from the treated countries at two points in time (please see Table 13 above for detail) to attempt to track these conditions and changes in them over time. First, the evaluation team identifies households based on the sector in which they're employed:

1. Tradeable – such as fuel and commodities
2. Non-tradeable – such as service providers
3. Hybrid – unclear or mixed sectors (this category is not part of the analysis; rather, these households are removed from analysis.)

The design further identifies households by their proximity to trade corridors. This was done in the PPA using GIS data in the national household survey datasets For this, too, there are three groups:

1. On the trade corridor
2. Adjacent to the trade corridor (this category is not part of the analysis; rather, these households are removed from analysis, providing a clearer distinction between nearness to the trade corridor and remoteness from the benefits it is theorised to provide.)
3. Remote from the trade corridor

These two delineations allow the quantitative evaluation to discern if, as theorised, households in tradeable sectors and those on the trade corridor have better poverty outcomes than those in non-tradeable sectors and those far from the trade corridor.

The analysis will be carried out using the Foster-Greere-Thorbeck (FGT) poverty index for poverty incidence (P0) and depth of poverty (poverty gap ratio - P1), as the outcome variables, calculated based on real household consumption per adult equivalent. At a minimum, in order to answer the research questions, the results will be disaggregated by sector of employment of the household head (tradeable versus non-tradeable sectors), and distance from the trade corridor (that is, on the corridor versus more than fifty kilometres from the corridor). Depending on data availability and sample size, we may disaggregate further by relevant socio-economic characteristics, such as education level, ethnicity, or disability status. In this way we will tease

[90] McCulloch, Neil, et al, 2017. Pp. 3-5.

out factors contributing to poverty reductions and to what extent these were due to changes in prices, employment and expenditure, and look at alternative hypotheses such as donor or government efforts to construct roads, among others.

The specific techniques to be used in each case will be determined on a case-by-case basis, depending on quality and structure of the data. Our first preference would be to use a difference-in-differences ("diff-in-diff") technique, comparing changes in poverty between treatment groups (who are exposed to trade) and control groups (who are not exposed to trade). However, since we are using secondary data, we will have to be flexible to adapt our estimation techniques depending on the challenges we encounter in each country's datasets. Even when diff-in-diff type methods are used, this will not be comparable to the standards of a diff-in-diff structured as an RCT, since the underlying data was not designed to answer our research questions.

Because this is a contribution analysis, as opposed to an attribution analysis or RCT, the results obtained from the analysis of the outcome variable (poverty) will only be indicative of possible underlying relations between trade and poverty. In order to firm up our findings, and increase our confidence that changes in poverty are indeed due to changes in trade conditions, we will therefore need to study each of the channels through which trade is hypothesised to affect poverty outcomes, as well as looking at possible alternative factors that may have affected poverty during this period (e.g. climate shocks or political changes).

The three channels we will be looking at are derived from trade theory:

- Changes in prices: downwards convergence of prices of tradeable goods towards world prices would positively affect net consumers of those goods, but may negatively affect net producers.
- Changes in employment: increase trade as a result of larger export markets may open up employment opportunities in tradeable sectors, but uncompetitive sectors could also be negatively affected.
- Changes in public spending: increased public revenue as a result of increased trade and economic activity could enable increased spending on social sectors that tend to benefit poverty reduction.

In the first instance, this analysis will be a descriptive analysis, where we use descriptive statistics to describe how each of these variables has changed for each of the groups of interests. This will give us an initial indication of what may be driving changes in poverty. In the PPA the OPM team used a micro-simulation of future outcomes to predict what changes might occur; as the team will now be using actual data, the micro-simulation is replaced with the diff-in-diff design showing disaggregated descriptive tables to highlight any important changes. This contribution analysis will start by examining outcomes to see if they look like we would expect: that is, that poverty is decreasing faster closer to trade corridors and in households where the household head works in a tradeable sector. Then we look at the three theorized channels to see if any of those are consistent with the theory, and which one or ones explains the change in outcome. Finally, we also look at other factors that might have affected the outcome, such as drought, political instability, infrastructure development, and others, to eliminate other possible explanations.

We will then decide on a case-by-case basis whether and what additional analysis may be appropriate to answer the research questions, depending on the initial findings and data conditions. Additional techniques may include poverty decompositions and regression analysis, for instance, controlling for income and household composition. We will here examine which factors have contributed to generating the observed outcomes, for example regressing changes

in poverty on changes in prices and employment. It is important to note that this last step may or may not be possible, given data quality. The previous analyses may also make additional analysis irrelevant, where we have already found well-substantiated evidence to answer the evaluation questions.

The public spending channel is the most indirect, where associations are least likely to be readily evident. However, building on those changes to trade and economic growth identified in the TGIS, particularly in tradeable sectors, the team will look for associated increases in spending on social sectors. We will also examine whether social spending has increased more in groups where poverty has decreased more, per the household-level analysis described above.

The analysis carried out at baseline suggests that it should be possible to carry out this analysis and to disaggregate by the relevant criteria in all countries. We are confident the datasets will permit the disaggregations or granularity as proposed here – by households' status vis-à-vis the corridor, by tradeable versus non-tradeable sector of the household heads' employment, and by sex.

The chief analytical tool will be a differences-in-differences analysis comparing change over time based on these differences. Where necessary, regressions will be employed – as they were in the PPA – or decomposition by income sources or sectors, to see which ones are most associated with poverty reduction. However, these techniques are not in themselves central to the design, and in fact bring in assumptions and limitations of their own. The strength of the design comes from its strong basis in theory, as described in this chapter.

Wherever possible we will assess if there have been differential effects on households headed by men and and by women with disaggregated data and whether separate effects on socially and economically marginalised groups can be identified. Contextual inputs from the performance evaluation and TGIS will also inform the analysis, in a process of elimination of looking at the hypothesised channels and exogenous factors that could explain changes in poverty identified in the household survey data. If there are reductions in poverty, the quantitative analysis will relate:

- Whether poverty has reduced more for households either on or far from the trade corridor
- Whether poverty has reduced more for households in tradeable sectors
- Whether poverty has reduced more for female-headed or male-headed households

While the analysis will not establish with certainty whether any effects on poverty are due to TMEA's interventions, we will be able to say whether what has happened is what we would have expected based on the theories. In decomposing these findings about poverty we will look at the hypothesised channels of producer and consumer prices, employment and wages, and government expenditures, while also taking into account important exogenous factors that may have also contributed to effects.

The analysis of the market price data in the PPA will be deepened for each country in the PGIS by gathering the latest round of enterprise or price survey data nearest to 2018[91]. Market price data that is applicable for the more rural areas along the trade corridors is likely the most difficult

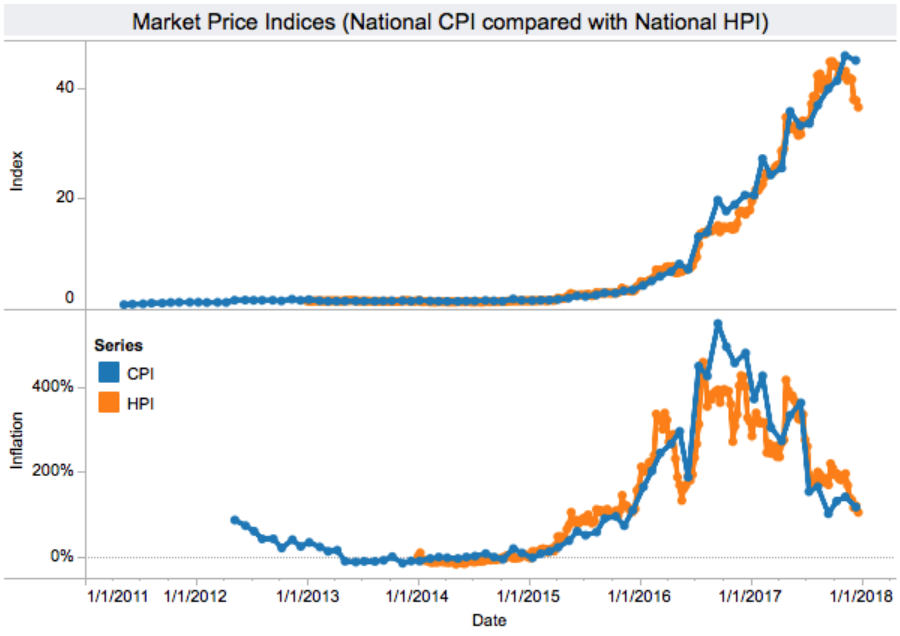
[91] Enterprise survey data might also be used in this analysis, subject to some limitations. Enterprise surveys available for the PGIS will include the DFID-funded SITA battery in 2014 and the enterprise surveys of two value chains proposed by the TGIS. The former is earlier than the 2016 PPA and as such probably too dated to be helpful; the latter will support the evaluation but is on a smaller section of the economy.

to source.[92] However, the evaluation team is currently seeking these data through established channels with National Bureaus of Statistics, international donors and academic or "think tank" sources like Intracen and the Food and Agriculture Organisation. As "national" data on prices are often overly urban in sourcing, there is national and international effort to improve price data quality for the populations living in poverty (e.g., the African Development Bank's Open Data for Africa initiative and World Bank efforts) particularly in rural areas, whether by collecting disaggregated data or calculating a likely factor of the difference between rural and urban consumer prices.

Prices are the most immediate and direct route by which trade is hypothesised to affect the lives of people living in poverty. Changes in trade may have both positive and negative effects on food prices, and households may be affected either positively (lower costs of consumption) or negatively (higher costs of household consumption) or both, when the same households are also producers of agricultural products for sale in the market. In such cases, increases in trade may depress the prices the households get for their produce at market, while also paying less in consumption costs. Or, greater prices they earn for their agricultural output may be offset by higher prices for their own consumption. Each of these scenarios is also affected by the "mix" of goods produced and consumed by households, as well as the goods that are involved in any increase of trade.

Data on these trends will be tabled and/or graphed by country to show changes over time, similar to the following graph from South Sudan's Pulse study. The OPM team will seek data that is sufficiently disaggregated to look at geographic location (on trade corridors and far from them) as well as examining the categories of tradeable and nontradeable goods comparatively.

Figure 6: Market Price Index trends, compared to inflation; South Sudan



[92] Price data in Africa suffers from at least one element of what the World Bank calls the Consumer Price Index bias. See Dabalen, Andrew, et al, 2016. Some data are available on trading prices and intermediary markets because of efforts like the Consultative Group for International Agricultural Research's FoodNet and on market prices via the Food and Agriculture Organisation's Price Tool, though for East Africa the only data available are wholesale prices at major markets. Donor value chains projects may be one source for retail prices in the areas under study.

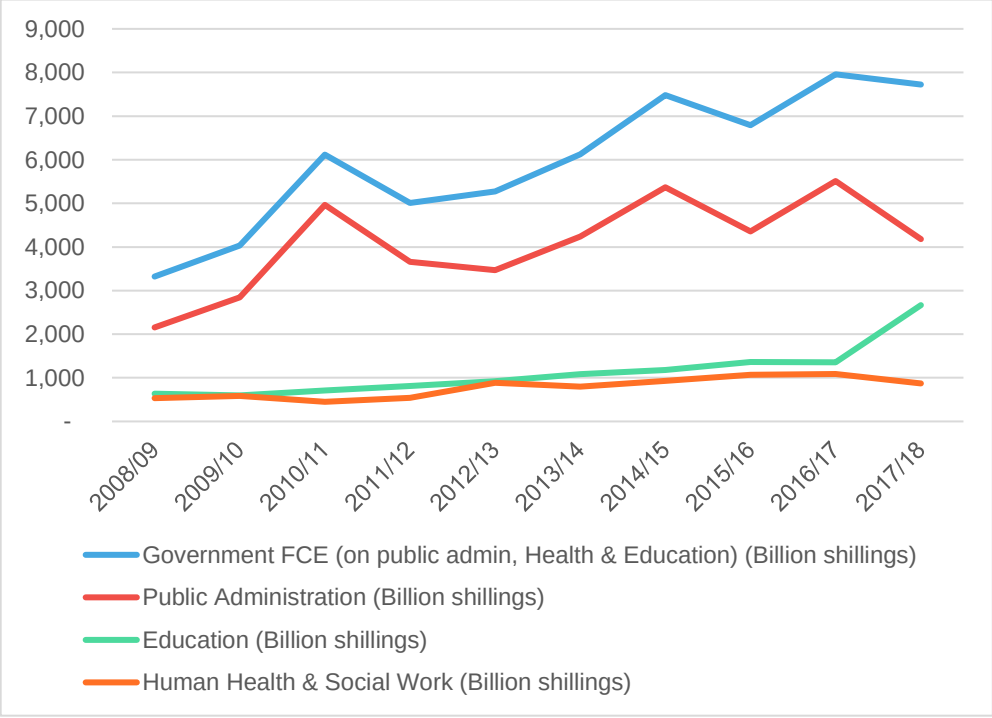
Source: http://www.thepulseofsouthsudan.com/data/

Price pass-through is a key element of this analysis, in that prices at highly aggregated levels in which international trade occurs may change but effects on poverty are not seen as a result. This can be because the cost savings of increased trade are not "passed through" to retail market prices, meaning that the benefit is captured up-stream. The TGIS will also look at this question, providing a useful input for the PGIS, but the PGIS team itself will look at this issue in qualitative research by asking knowledgeable local actors about price changes, including households, and comparing their responses to data on wholesale prices – which, coincidentally, are more readily available for our study countries.

An additional set of analyses will be around pro-poor government expenditure. The literature hypothesises that another channel for potential trade effects on poverty may come about because the economy is growing, which expands the tax base generally and through revenues collected on imports. The increase in income can then be used for pro-poor spending, particularly on education and health.

The TGIS data on economic growth will inform this line of inquiry, as will the reviews of key policy changes in both the TGIS and PGIS. Data on broad categories of government spending are often available, such as the Uganda data recently provided to the OPM team, as shown in the table below.

Figure 7: Ugandan government spending, 2008 - 2018



Source: Uganda Bureau of Statistics, provided to the authors through DFID

As can be seen in the example of data above, the categories are indeed broad and only general trends are available on which to base quantitative analyses, alongside figures on increases in trade from the TGIS, if these have occurred. Also, data are often more readily available on budgets, rather than on actual expenditures, and these often differ.

However, in interviews, the desk review and policy review that are part of the performance evaluation, the TGIS and the PGIS, the evaluation team will seek additional perspectives and more detailed data on the degree to which pro-poor spending (often coupled with particular policies) might have increased in the study countries. We will use all means available, such as DFID, OPM, and partner and peer relationships with line and finance ministries in the study countries, to gather detailed data on the change in pro-poor government expenditures over the life of TMEA's Strategy 1. TMEA's own ministry connections will also provide avenues that the evaluation team will pursue to access such data for these analyses. The evaluation team includes the necessary expertise to disentangle government expenditure data around functional and thematic areas such as health, education, and social services, where pro-poor spending is likeliest to occur. Most of the study countries have increased the use of social transfers in the same time period, for example, which could have important effects on poverty across categories to be studied in the PGIS.

4.3 Sources and methods

Step 4 – Explaining poverty changes

Whilst the quantitative data will show what has changed, it is important to understand why these changes have taken place. A set of stakeholder interviews and FGDs will ask poorer and wealthier people what has changed for them and will learn about their understanding of the causal pathways through which these changes have come about. Qualitative and quantitative research are planned during one shared time frame, so that each can supplement their findings with the other. The quantitative team may ask the qualitative team in-country to adapt questions, or the field team findings may launch varied queries of the quantitative data.

This will help in understanding the extent to which the observed poverty changes for both men and women have been driven by changes in prices, wages, employment or public expenditure, the three main pathways described in the literature on the link between trade and poverty.[93] This will complement the simulations conducted in the PPA to show how prices, wages, employment and public expenditure actually changed; to what extent this, in turn influenced poverty in each site; and whether any observed changes can be linked to changes in trade and hence the TMEA programme. Reduced costs of trade in the TMEA ToC under SO1 do not necessarily lead to decreased prices, increased wages, increased employment levels and enhanced public services, and this strand of work will test this assumption.

The questions in the FGDs will take a similar pattern as to that of the PPA. Broadly, the first question will ask how prices, wages, employment levels, public services etc. have changed since 2016 (when the PPA took place), and secondly the reasons for this change will be queried. It could be that changes in poverty are due to factors that are exogenous to trade (such as climate change or security issues) or factors closely related to trade (such as the cost of shipping). If there are any trade-related reasons these will be followed up to glean more information. We will take a semi-structured approach to the FGDs and follow up on any answers that are relevant to answering the evaluation questions.

This qualitative work to reveal the pathways through which trade may be affecting the poor will be done by conducting FGDs with poorer and wealthier men and women in four countries

[93] McCulloch, Neil, L. Alan Winters and Xavier Cirera. (2001) Trade Liberalization and Poverty: a Handbook. Centre for Economic Policy Research.

(Kenya, Uganda, Rwanda, Tanzania), both in areas likely to be affected by trade reforms (trade corridors[94]) as well as those less likely to be strongly affected, generally farther away from such corridors. Such facilitated discussions often bring to light new, previously neglected pathways of impact, or change our understanding of existing pathways, thereby adding to the evidence base around them.

Issues of gender differentials in outcomes or benefits and corruption will also be explored in these discussions. We will attempt to involve the poorest people in each location, as well as people from wealthier groups. We will take a structured approach to the sampling, meeting initially with umbrella or representative groups and other CSOs to help understand the general context and identify and secure the participation of different types of poor men and women.

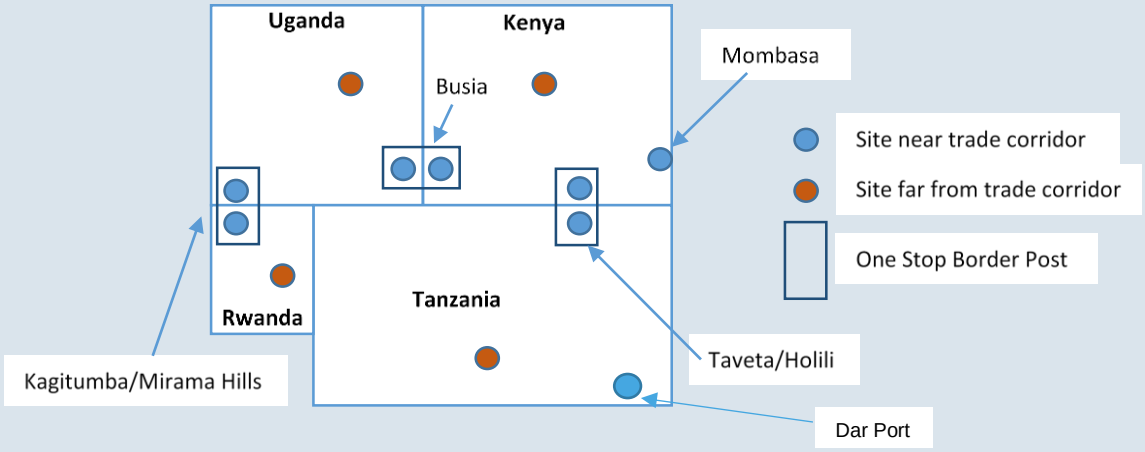
The FGDs are intended to be a way of understanding the changes experienced by poorer and wealthier households and of exploring the causal pathways that have given rise to the changes experienced. We will explore the three main causal pathways identified in the literature: i.e. prices, wages/employment and public expenditure and any other unanticipated pathways.

The study will conduct FGDs (6-10 people each; see box below for sampling) in the first quarter of 2019. This will allow us to ask retrospective questions about changes over a parallel period of time as that covered by the quantitative data, to better align the insights about causality from the FGDs with the aggregate changes observed in the nationally representative surveys.

[94] The literature supports the working assumption that the benefits of trade tend to be stronger nearer to the trade corridor.

Box 2: Selection of locations for qualitative work

For the exploration of pathways through which poverty has changed, we originally proposed to undertake 24 FGDs (6 six countries x near/far from the trade corridor x men/women). We propose to carry out FGDs in four countries (Kenya, Uganda, Tanzania, Rwanda), near corridors (around OSBPs and ports) and in places greater than 50 km from these. This design will maximise VFM, by combining the 'near trade corridor' visits with visits to the three OSBPs and Mombasa port. FGDs will be held with groups of men and women from different economic levels (please see the text for selection plans) to understand how changes in prices, wages, employment and public spending might have affected their lives. FGDs will be homogenous by gender and socio-economic group insofar: we will have FGDs with "poorer men" and "poorer women" and "wealthier men" and "wealthier women". Interviews with select leaders as described in the text will also be included in site visits to triangulate the opinions expressed in the FGDs in which we explore the channels of potential changes in poverty.[95] The diagram provides a simple schematic of the nine selected locations.



The below table illustrates our sampling frame for the "pathway" FGDs, showing how we will utilize homogenous FGDs according to gender and socio-economic group, to understand the changes in prices, wages/employment and public services. These respondents will not necessarily be in the trade sector. This shows that we will conduct approximately 28 "pathway" FGDs.

Table 14: Sites and FGDs by gender and wealth category

	Women		Men	
	Wealthier	Poorer	Wealthier	Poorer
Mombasa port	X	X	X	X
Dar port	X	X	X	X
Taveta		X		X
Holili	X		X	
Busia (Kenya)		X		X
Busia (Uganda)	X		X	

[95] These figures are not intended as strict sample sizes. The ranges offered reflect the reality of research in situ: numbers of days may change, availability of key respondents may vary, and FGDs may be richer in one site than another – such as where there are groups of people for whom household economies have changed significantly. Overall numbers of FGDs may be more useful at 15 than 25, depending on candor, attendance and content; our intentions are to saturate key categories.

Kagitumba		X		X
Mirama Hills	X		X	
50km from Taveta-Holili OSBP in Kenya		X		X
50km from Taveta-Holili OSBP in Tanzania	X		X	
50km from Kagitumba-Holili border in Rwanda		X		X
50km from Kagitumba-Holili border in Uganda	X		X	

The FGDs will be complemented with additional interviews with key stakeholders in the vicinity, to put the changes reports reported by the FGDs into a broader context. These stakeholders will include associations of farmers, traders and others, civil society organisations supporting poor people in the area, local authorities, and private sector associations as available. Our most important interviews will be with border or port officials and staff, senior national and local level government ministers, and women's cross border trade association leaders. Revenue authorities, village leaders and elders and civil society leaders may be important "bellwether" respondents who can speak to the larger scale causes behind changes in poverty.

Questions to these informants will depend on their role and responsibility, but will touch on their views on how local men and women, boys and girls, have been affected in terms of changes in poverty (through prices, wages/employment, and public services) and the perceived sources of those changes. In the PPA, the OPM team found that respondents were willing and able to speak in concrete terms about these changes and their provenance, with insights about the magnitude and the endurance of the changes and the effects on their families and communities. We will therefore continue in that vein for the PGIS.

To the extent applicable for given informants, we will also about their experiences with TMEA. We will ask about those who have been directly impacted (i.e. who are working in the trade sector), and those who are indirectly impacted (e.g. those who may have been relocated due to road expansion projects). The evaluation team will have an interview guide which will contain general questions but field researchers will be trained to probe and clarify when necessary, and steer discussions on topics about which respondents feel most able and comfortable to speak.

Our focus in these encounters will be identifying people in trade and those who do not work in trade, and through a concerted effort with local organisation leaders, we will ask to speak with those most affected by changes – positive and negative – to ensure we are canvassing the range of experiences.

We will also provide economic, trade and poverty profiles using existing secondary data (academic and grey literature, as well as statistics reported on the World Bank Open Data website). This is similar to what the evaluation team did during the PPA, and will be an opportunity to use more recent data and information to update the PPA analysis, where newer data are available. Information will be on employment and GDP trends, as well as trade and poverty- and gender-related data. Where the literature and data suggest changing trends in poverty in the study countries, we will include this in our analysis.

Step 5 - Assessing local (micro-level) poverty impacts of TMEA interventions

With regard to the direct TMEA interventions, a greater proportion of the qualitative data will come from women small-scale cross-border traders given that OSBP construction has formed a large part of SO1 investment and it is cross-border traders who are mostly targeted in the

women in trade programme. These include women and men who are directly in the trade sector, and those that could be affected indirectly. We would also speak with the TMEA-supported Joint Border Committees, including the women members reported by TMEA, and the trade information desk at Busia border to help women traders access and use the Simplified Trade Regime that TMEA supported. The Women and Trade efforts in several countries and regionally are therefore a specific focus of the qualitative research for micro-level impacts. (Please see Box 3.)

We would like to disproportionately speak with as many traders as possible with disabilities (female or male) to ask if the OSBP has affected their lives, and if so, how. We would also speak with family members of traders to see whether there are spillover effects from shifts in women's work in the trade sector (questions on unpaid work, access to healthcare and education, intra-household decision making, changes in household productive and non-productive assets, consumption and expenditure patterns, etc.) For ethical reasons, we would only speak with household members who are eighteen years of age or older. In each location, we will sample a different socio-economic group from the pathway FGDs, as can be seen in the table below, to ensure a mix of methods and respondent types.

Table 15: Participatory methods and their respondent types

		Interview	Stories of change	Walking ethnography	Mapping exercise	Family group interview
Mombasa port	Poorer woman (indirect)	X	X	X		
	Wealthier woman (indirect)	X	X	X		
Dar port	Poorer woman (indirect)	X	X	X		
	Wealthier woman (indirect)	X	X	X		
Taveta	Wealthier woman (direct)	X	X		X	
	Wealthier woman (direct)			X		X
Holili	Poorer woman (direct)	X	X		X	
	Poorer woman (direct)			X		X
Busia (Kenya)	Wealthier woman (direct)	X	X		X	
	Wealthier woman (direct)			X		X
Busia (Uganda)	Poorer woman (direct)	X	X		X	
	Poorer woman (direct)			X		X
Kagitumba	Wealthier woman (direct)	X	X		X	
	Wealthier woman (direct)			X		X
Mirama Hills	Poorer woman (direct)	X	X		X	
	Poorer woman (direct)			X		X
In as many locations as possible	Trader who lives with a disability (male or female, direct)	X	X	X or	X	

The participatory methods mentioned in the above table will be important to ensure we hear from respondents not only what we ask to hear, but what they want to tell us – this would include mapping daily journeys before and after the advent or reconstruction of an OSBP; capturing stories of change experienced as a result of TMEA interventions from different types of respondents, and accompanying traders as they cross the border in walking ethnographies. For each site, we will endeavour to carry out two-four stories of change specifically around TMEA direct interventions. As such, we may hear cases of "graduating from" poverty among these women and men, the causes of which (whether or not trade-related) would be of interest to the long-chain research. We would also seek two walking ethnographies per site and one mapping exercise in OSBP locations, with which we would ask questions about their experiences with crossing the border for market days, quantities and qualities they carry, changes over time, bribes or other payments they feel are illegitimate, and the size and use of their earnings.

These three participatory methods are complementary in that they allow the research team to be flexible in how they reach out to respondents, develop rapport, and elicit commentary that may be very positive, or less so, about TMEA interventions, from different stories. Where OSBPs have expedited border crossings, walking ethnography allows the respondent to demonstrate that rather than offer a "testimonial". In cases where community members have been displaced or actors inconvenienced, drawing maps may be a more neutral and yet more concrete way to answer sensitive questions about changes that may not benefit all equally. These support the overall research effort because our adept field teams can call on a variety of tools to reach respondents and hear their stories.

Box 3: Women and Trade (WAT)

TMEA's TOC calls for impact level changes in which "women traders increase their incomes and improve livelihoods". Building on the performance evaluation, we will research changes in income and livelihoods, causal pathways in the TOC, and enabling or inhibiting factors for groups of women targeted under SO3. We will ask why women use formal (or informal) channels; if impediments to their trade have alleviated and how; which policies and processes have helped women know their rights; spillover effects on families and communities; and how and when women's voices are heard. We will be sensitive to any backlash on women resulting from the changes, and look at how TMEA engaged with men to secure buy-in and support.

WAT comprises nine projects. We will research a broad range of experiences – those of women cross-border traders (WCBTs), urban traders, women in processing and women in export, in four countries. We have selected sites near SO1 interventions to build up a fuller picture of key sites. Projects of interest include the following, including how they link with the TOC:

- Empowering Women in Trade: Export Growth for Export-Ready Firms [USD500,000] Nairobi, Kigali and Kampala. TOC: *Developed export competencies leading to improved export capability.*
- Uganda Women in Trade: Improving Business Competitiveness [USD500,000] Urban traders in Kampala; light processors in Kabale (Katuna), and Kapchorwa (Suam), near TMEA OSBPs. *TOC: improved business competitiveness*.
- Consolidating Gains of WCBTs in the EAC Economic Integration Process [Regional]. Busia, Taveta and Katuna. *TOC: improved cross-border processes for small traders, especially women, leading to enhanced business regulations for trade.*

We will hold FGDs to understand experiences and tease out similarities and differences. Where possible FGD participants will come from similar sectors e.g. SMEs in tourism or in apparel, WCBTs of foodstuffs, or other sectors. We will hold meetings with TMEA staff who are working in these projects about the sampling frame, and the evaluation team will select participants for FGDs.

Complementary to these interviews, we will also conduct key informant interviews but also homogenous focus group discussions and/or participant observation, such as at market days near OSBPs, if the opportunity arises. Discussions will centre on the micro-impacts of TMEA

interventions, but also to triangulate opinions from the "pathway" FGDs on changes to prices, wages/employment and public service provision. Respondents are likely to include:

- *Border and port officials and staff*
- *Government ministers*
- *Border committees*
- *Revenue Authority*
- *Eastern African Sub-regional Support Initiative for the Advancement of Women (EASSI) and other women in trade networks*
- *Women in Informal Cross Border Trade associations*
- *Local government officials, Village Chiefs, elders and religious leaders*
- *Truckers*[96]
- Bureau of Standards
- Highways Agencies
- Hotel and restaurant owners, and female market sellers
- Clearing and forwarding agents and the International Freight and Warehousing Association
- Local people and business owners resettled due to road construction or port expansion
- *Boda-boda* drivers
- Police
- Fisherfolk
- CSOs working with communities affected by the interventions

Note: The respondents in italics are the "must see" respondents, assuming they are present and available in each of the sampled locations. The respondents who are not in italics are the "nice to haves" that will be interviewed if there is sufficient time.

The PPA delivered in June 2016 provides some concrete preliminary evidence about the likely direct local poverty and gender impacts of two of TMEA's major initiatives (Mombasa Port and Taveta/Holili OSBP). This was done by interviewing a wide range of stakeholders around Mombasa Port and Taveta/Holili OSBP, including: port/OSBP officials, local government officials, port workers, shipping associations, labour unions, traders outside the port area/cross-border traders near OSBPs, local fisherfolk, construction workers, truck drivers, and CSOs working with local communities affected by the interventions (e.g. those displaced by the port, or those potentially benefitting from increased trade across OSBPs). The aim was to construct a rich picture of the localised impact of the intervention on poor groups in the vicinity, including gaining a good understanding of how it has affected men and women and other sub-groups distinctly (DEQ4.3 and 4.5). We discussed with TMEA and implementing partner staff the extent to which complementary and compensatory policies were adopted to maximise the benefits or minimise the harm to poor communities from the interventions (DEQ4.4). At this stage in the study, we will return to those sites to see if that materialised, and if so, how.

Step 6 - Poverty reduction policy assessment

It is often necessary for complementary policies to be put in place to ensure that negative impacts of trade reform are mitigated and to maximise the benefits experienced by the poor from such reforms. The evaluation team will be looking at evidence about whether TMEA interventions have influenced adoption of policies that are linked to poverty reduction for women and men. For example, boosting productivity and stimulating growth may require not only a

[96] We would ask truckers whether transport costs have fallen or not, and what has been driving these decreases in transport costs. Truckers may know where reduced transport costs (see ToC, SO1), have been passed onto to others or have been captured by trucking company owners.

conducive trading environment, but also better roads, reliable power, a reasonable level of education, and a healthy workforce. It may require construction of complementary infrastructure or active labour market policies to include poor and marginalised groups. Measures to tackle the multiple deprivations indicated by Multidimensional Poverty Indices can be important for ensuring that poor households benefit from trade reforms. Questions that could be asked include (a) have the negative impacts of trade reforms been mitigated against? and (b) have the benefits of TMEA interventions on poor people and on women been maximised? How?

The team will access information regarding policies – including changes in policies – through legal and sector policy strategy documents and interviews with TMEA and partners or stakeholders knowledgeable of policy changes in the study countries (for responding to DEQ4.3). The TGIS will also be looking at policy change, and will therefore inform the PGIS team about their findings, and share related documentation.

The proposed approach of policy interventions will be reviewed in comparison with the nature and scope of changes in poverty that are theoretically linked to changes in trade. OPM has identified at least two international recommended frameworks for the assessment of social policies, the ISPA tool for social policies[97] (designed jointly from a pool of development partners, among them UKAID) and the UNESCO analytical framework for inclusive policy design.[98] Both tools propose a set of analytical approaches, concepts and judgement criteria for assessing the adequacy of a given policy approach concerning specific problems of social exclusion and need for protection (both closely related with poverty). Once the nature and scope of trade-related poverty effects is known, the best set of assessment criteria can be selected from these documents for reviewing existing policies.

4.4 Changes to the approach

The present design proposes no significant changes to that put forward in the IR. On the other hand it does:

- Offer **greater detail on the original design**, including data sources and analysis methods, including how we plan to use mixed methods to triangulate the qualitative and quantitative streams of data.
- Include **comparison with the three OSBP sites visited in 2016**, which was not contemplated in the IR but which was made possible by the series of visits eventually undertaken for the PPA.
- Discuss the breakdown of methods and sources by evaluation question
- Propose to have **more countries' national survey datasets included** in the quantitative analysis, than were present at the time of the PPA.
- Include an analysis of the Women and Trade programme as a major TMEA intervention that addresses the needs of women traders. This programme had not begun when the IR was written.

[97] https://ispatools.org
[98] https://www.researchgate.net/publication/284721503_Analytical_Framework_for_Inclusive_Policy_Design_-_UNESCO

4.5 Timing

The work for the PGIS will be undertaken from Q1 through mid-year, 2019. We are already seeking access to the second round of household, enterprise, price and fiscal data to enable the before and after comparisons discussed above. Once these data have been obtained, the quantitative analysis will be conducted. Qualitative and quantitative analyses and findings will be shared across the teams, to explore parallels and divergence between individuals' and communities' experiences exposed through the FGDs, and the aggregate groupings in the quantitative data.

4.6 Hypothetical responses to the evaluation questions

This section offers hypothetical responses to the evaluation questions related to the PGIS (HEQ4 and its DEQs).

DEQ4.1 on the nature and scale of likely impact of TMEA programming on the poor, either directly or indirectly? How is the causality working and who are affected by short- and long-term, positive and negative impacts?

The study finds that poverty has decreased more quickly in areas close to the trade corridor than in areas that are far away from the trade corridor, particularly in X country. The effect exists in Y and Z countries as well but with less strength. Furthermore, the study finds that the decrease in poverty has been more pronounced amongst households employed in the tradeable sectors. This finding is prominent in all X, Y and Z. These findings are consistent with the hypothesis TMEA has had beneficial effects on poor households, likely through one or both of two pathways: employment/wages and prices.

When combined with the qualitative findings, which show that those near the corridors tended to report the greatest increases in income and reductions in market prices, this gives us a high level of confidence that poverty measures are improving, and more so nearer TMEA interventions than farther from them. While we cannot attribute the change to TMEA, it is likely that some of the improvements have occurred because of positive changes in the trade environment. The evidence to support this conclusion is clearly laid out in Chapter #.

DEQ4.2 on who has benefited from reduced trade costs, and how benefits from reduced transport time and cost passed on to poor people, if at all.

The study finds that retail prices of tradeable goods have increased less quickly than non-tradeables[99]. This suggests that reduced trade costs are passing through to consumers. Furthermore, we find that the price convergence is greater in areas located closer to the trade corridors than outside the corridors. This is consistent with the hypothesis that friction from transport costs and other trade-related costs continue to hamper price convergence in peripheral areas, while in TMEA-supported corridors those costs are diminishing.

The relative decrease in the prices of tradeable goods has negatively affected net producers of maize, such as Countries X and Z, as confirmed in the qualitative fieldwork.

[99] Tradeable and non-tradeable categories are part of the PGIS design, per the use of these terms in the PPA. They refer to goods that are more or less likely to pass through Trademark-supported channels, respectively.

The national survey data comparison with the data from 2012 shows XX% increase in employment in tradeable sectors, and some indication of income increase at about YY% nearer the corridors and none far from the corridors. This suggests that poor households are also benefiting from decreased trade costs through the growth/employment channel.

DEQ4.3 on the adoption of any complementary policies to translate benefits from increased trade into poverty reduction

The third channel through which trade is hypothesised to affect poverty is through government spending. While a reduction in tariffs may have direct negative effects on government revenue, it is likely that the increased economic growth will in time compensate for this loss by generating additional revenue – which could be used for pro-poor spending.

The data show that government revenues have increased more rapidly over the studied period than in preceding years in countries W, X and Z. Furthermore, the increase has been higher than the average for Sub-Saharan Africa. It is not possible to quantify how much of this might be directly attributable to TMEA, but notable that the changes occurred in three TMEA countries along the Northern Corridor, where programme effects have been shown to be stronger (please see the OPM Performance Evaluation, Chapter #.)

The share of pro-poor government expenditures has risen in Countries W and X between 2011 and 2017, per the World Development Indicators collected by the World Bank. In Countries Y and Z, government expenditures have been less pro-poor, partly offsetting the benefits of increased public revenue (Data for Countries A and B are not available).

DEQ4.4 on mitigating measures for any potentially negative impacts on subgroups, including poor people in localised areas

Neutral and negative outcomes were identified in the quantitative analysis in sites farther from the trade corridors relative to those nearer the corridors, in all four countries, but especially in Countries X, Y and Z. The policy research included as part of the qualitative research finds no evidence of policy-based mitigation in any of the three countries, while in Country W, government policies have been proactive in increasing support to the poor with the nation-wide roll-out of its cash transfer programme. Country W started this programming in those more peripheral areas farthest from services, which would seem to indicate their intent to support those with the most trenchant poverty conditions. Country W's smaller population and physical extension is not closely comparable to larger, more populous Countries X and Y, where these zones far from the corridor are much more extensive.

At the same time, Country Y's political context was less stable over the period of TMEA's potential influence, with two presidential elections and multiple changes in cabinets and other high positions, such that policy mitigation for pro-poor spending was likely low on the list of priority actions.

Trademark's own mitigation work included the case of Mombasa Port, where they identified potentially negative impacts arising as a corollary to the infrastructure upgrades. TMEA worked with the X, Y and Z stakeholders to design a plan to mitigate negative consequences, including relocation and vocational support. Qualitative fieldwork with beneficiaries of this programming found mixed results. Evidence of TMEA's inputs to support the communities and economic activity displaced by the port work was present, including the vocational training offer. But for the most part the community members in the destination site could not identify individuals who had relocated from the Mombasa Port area. The rationale behind this unexpected outcome is unknown, as no members of that prior community could be located for interviews.

DEQ 4.5 on specific programme benefits or negative consequences for women and girls, including impacts on relations such as power and influence, and on how the programme might increase benefits to women and girls within its trade focus

The qualitative research found evidence of substantial programme benefits as well as of negative consequences for women and girls in the site visits, interviews, focus groups and other methods used. The Women And Trade programme activities were lauded for the successes of women traders, entrepreneurs, and organisation leaders that emerged. Respondents reported that their trade quantities and values had increased, leading to greater income. Particular interventions that addressed localised needs were often mentioned: the creche constructed at ZZZ OSBP; the trade information desk and Certificate of Origin support at YYY; the warehouse where traders were allowed to bring their goods throughout the week for sorting and aggregating at XXX OSBP; the voice the women had gained by participating on the Joint Border Committees (JBCs) at WWW, XXX, YYY and ZZZ.

These findings are buttressed by the quantitative research showing greater parity of women heads of households' (WHH) incomes with those of men (MHH) in the quantitative analysis of households on the corridors. Data from the non-corridor sites retained the sharp differences between WHH and MHH. While it is surely the product of more than just TMEA interventions, the corridor locations were more prosperous in general, with a higher level of employment and income for women, combined with a better price structure that favoured agricultural households' solvency.

Respondents also shared positive experiences from within their families, such as greater voice in family decision-making that came along with the greater resources they were bringing home; support within the family for child care and eldercare; and intra-family respect for their economic and other efforts. Women who served on the JBCs had gained a larger perspective and learned to feel like "leaders of our communities," as one group reported. Such responses were prevalent in all OSBPs visited.

There were a handful of responses that were less positive, including about continuing harassment of women and theft of women's trading goods at CCC border post (reported by six independently contacted respondents). Some families were less positive about the change in breadwinning status that increased cross-border trading brought about: among the 165 women who took part in interviews or focus groups with the evaluation team, seven reported that they faced difficulties at home because their families – most often their husbands – were uncomfortable with their new status. Many more noted that they were still responsible for housework despite having increased the family income significantly and spending more time trading; this was seen as a double burden. The negotiation of women's status or place in the family appears to be an open question in many households. A women's port workers' association also cited continuing sexual harassment at work in port offices, and an inability to break what they called the "glass walls" of lower-salaried office work.

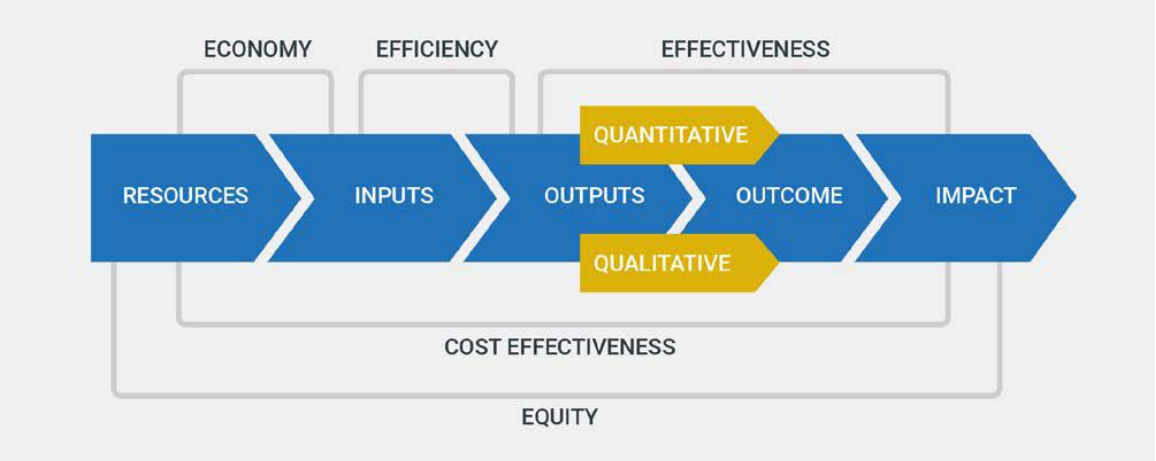
DEQ4.6 on critical factors for sustaining any positive impacts.

This question will synthesise lessons learnt throughout the PGIS, with conclusions designed around any positive impacts that are definitively identified – like changes in women's status and earnings through the Women In Trade programme, mitigating measures that worked in non-corridor areas, effective pathways for reducing costs and frictions for trade along the corridor, etc.

5 VfM Study

This VfM assessment builds on *DFID's Approach to VfM.*[100] Accordingly, it examines the "Four Es" of economy, efficiency, effectiveness, and equity set out in DFID's approach. These concepts, as defined in DFID's guidance, are differentiated along the logic chain of an intervention from inputs to impact. A further dimension of VfM relates to cost-effectiveness, that is, the ratio of outcomes or impact to total costs incurred.

Figure 8: VFM conceptual framework



Source: King & OPM (2018)[101]; based on DFID (2011)

While the Four Es provide a conceptual foundation for systematically assessing and reporting on VfM, their use in a specific programme and setting requires further explanation of how these concepts relate to the programme's design and performance. Furthermore, the Four Es alone do not provide a transparent basis for distinguishing 'good' VfM from 'excellent' or 'poor' VfM. This VfM assessment is based on agreed definitions for these terms, aligned with the programme TOC, supporting robust judgements and transparency in the assessment and reporting of VfM.

We adopt an evaluation-specific approach to VfM in this assessment. The approach involves making transparent, evidence-based judgements about how well resources are being used, and whether the value derived is good enough to justify the investment.[102] The discipline of evaluation is underpinned by a logic of evaluative reasoning that enables valid judgements to be made from empirical evidence.[103] Explicit evaluative reasoning enhances the credibility and use of evaluation for accountability, learning and adaptation, by providing a transparent and agreed basis for making judgements.[104]

[100] DFID (2011). DFID's Approach to Value for Money (VfM). Department for International Development, July 2011.
[101] King & OPM (2018), OPM's approach to assessing Value for Money. January 2018.
[102] King, J. (2017). Using Economic Methods Evaluatively. *American Journal of Evaluation*.
[103] Davidson, E.J. (2014). *Evaluative Reasoning*. Methodological Briefs: Impact Evaluation 4. Florence: UNICEF.
[104] King, J., McKegg, K., Oakden, J., Wehipeihana, N. (2013). Rubrics: A method for surfacing values and improving the credibility of evaluation. *Journal of MultiDisciplinary Evaluation*, Vol 9 No 21.

5.1 Scope and objectives

The VfM assessment will focus on the VfM achieved by the TMEA programme under Strategy 1, which finished in June 2017. This is because the evaluation of TMEA's achievement of its intended outcomes and impact by the external evaluation team will use outcomes data under Strategy 1, following the TOC set out under Strategy 1. However, the assessment will also provide recommendations for further enhancing VfM under Strategy 2, including recommendations for strengthening VfM assessment and reporting by TMEA during Strategy 2. It will also highlight recommendations for maximising VfM on other similar future programmes.

The VfM assessment will answer DEQs 5.21 and 5.22 under HEQ5, as follows:

Table 16: DEQs for the VfM assessment

VFM DEQS
DEQ5.21 Is the programme providing VFM?
DEQ5.22 In which activities/components and countries does the programme achieve higher VFM than others and what are the lessons learnt for driving greater VFM across the board?

Accordingly, the specific objectives of this VfM assessment are:

1. To provide a complete assessment of VfM for the whole programme under Strategy 1 and recommendations on how VfM can be strengthened at whole programme level under Strategy 2;
2. To examine the costs of key inputs and outputs and the VfM of selected key programme components under Strategy 1, providing independent verification that the resources put into Strategy 1 were worthwhile;
3. To provide recommendations to enhance VfM and to strengthen TMEA's own VfM assessment and reporting during Strategy 2;
4. To provide recommendations for maximising VfM on similar future programmes.

The assessment will be undertaken from a donor perspective: it focuses on resources from TMEA's principal donors[105] channelled directly through TMEA and the achievements of outputs and outcomes by TMEA specified by those donors. It does not explicitly consider what VfM would look like from the perspective of the EAC, relevant East African governments, or the communities and beneficiaries targeted by the programme.

5.1.1 Complexity and adaptation

TMEA is a complex programme working to create systems change in a complex political economy. This influences the way we need to look at VfM. TMEA is expected to be responsive to the evolving context in East Africa. There will be some aspects that are planned ('intended strategy') but do not take place ('unrealised strategy'). At the same time, new approaches ('emergent strategy') will be adopted. Rather than looking for simple links between activities, outputs and outcomes, the VfM assessment will determine whether adaptive management is

[105] The Governments of the UK, Finland, Denmark, USA, Canada, Belgium and the Netherlands.

occurring and is effective, and account for unrealised and emergent strategy. This will be done by:

- **Efficiency level:** assessing delivery of outputs and noting deviances against workplan and budget; assessing whether deviances represent failure to deliver, or sound adaptation in response to evolving conditions (opportunities and risks), political economy, and learning about 'what works' from programme MEL and other sources; and noting how resources are reallocated across programme components (e.g. across Strategic Outcomes or intermediate outcomes within and across countries), in order to maximise programme performance[106]

- **Effectiveness level:** assessment of key drivers of effectiveness includes whether TMEA regularly reviewed, updated and responded to political economy analysis, had processes in place to regularly identify and mitigate risks, and has MEL systems and processes in place to learn and adapt; our assessment of achievement of outcomes will take into account changes to the expected outcomes, as identified in the ToC and results framework, and whether those changes are an appropriate response based on adaptive management, and helped to enhance programme performance and achieve better results.

5.1.2 Alignment with TMEA's VfM

TMEA has invested much time and resource in progressively formalising and monitoring its programme VfM. An Action Plan was presented to the Board and VfM key performance indicators (KPIs) were approved in the 2015/16 financial year (FY), and have since been added to. Regular audits by KPMG (2013, 2015) and TMEA's own internal audits (2016, 2017) have reported on select Economy indicators (mainly expenditure on travel, workshops, conferences, accommodation, *per diems*, and administrative costs) and donor Annual Reviews have assessed TMEA's VfM against Effectiveness, Efficiency and Economy criteria.

We have sought to align our VfM framework with TMEA's VfM strategy, framework, indicators and targets. We indicate whether and how we are integrating the KPIs into our framework under the relevant criteria in the framework. We will not conduct our own analyses against the KPIs, but will report those that are available in TMEA's own reports.

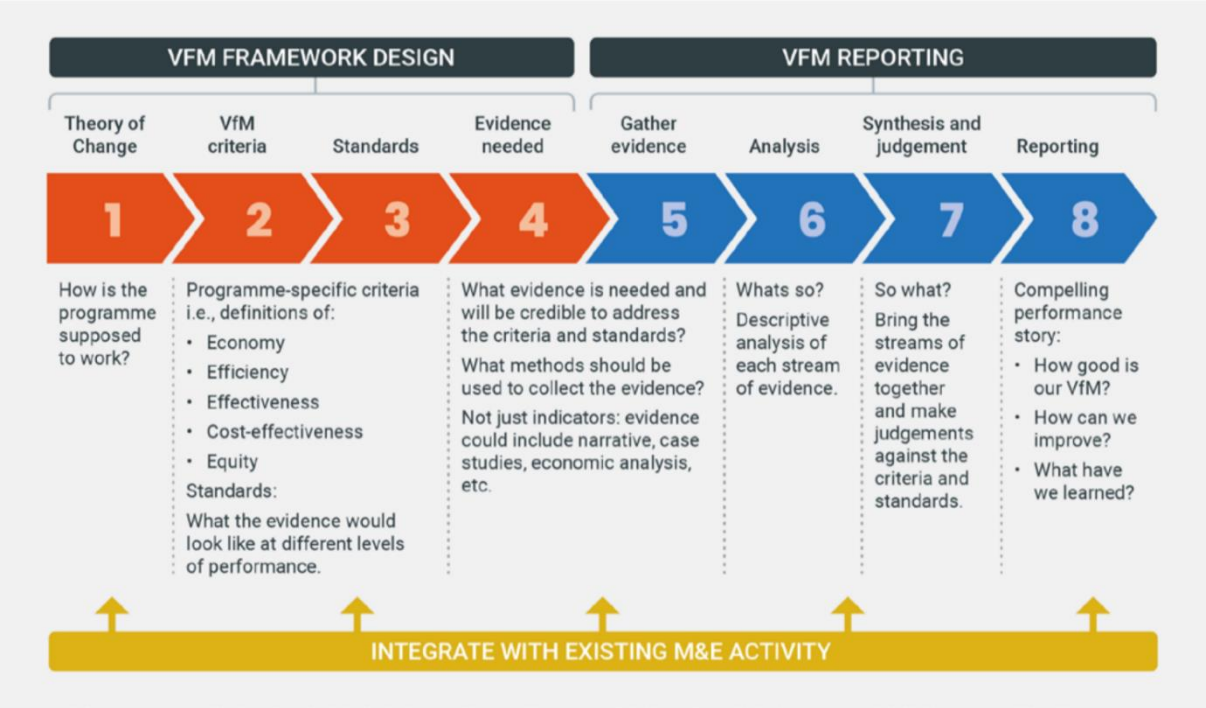
As part of our assessment of Effectiveness, we will also review TMEA's own VfM strategy, assessment and reporting, and provide recommendations for strengthening them under Strategy 2 (i.e. objective 3, above).

5.2 Key steps

The key steps in the VfM assessment are summarised in the figure below, followed by an explanation of each.

[106] Accordingly, the standard for excellent might be: "TMEA can demonstrate that it enhanced programme performance significantly through adaptive management, and can provide evidence as to how this led to better results'

Figure 9: Overview of our evaluation-specific approach to VfM



Source: King & OPM (2018)

5.2.1 Framework development (steps 1-4)

We are currently in the process of developing the VfM framework. This has involved reviewing key programme and evaluation documents, an internal workshop with OPM staff and consultants (including the consultant responsible for deliverable 6B, which made an early assessment of TMEA programme VfM), and calls with key TMEA and DFID staff, to provide an overview of our approach and check details on TMEA programme and operations and data availability. The steps below outline the process we have followed.

Step 1 – Theory of Change (TOC)

A TOC explains how activities are understood to produce results (e.g., reduced trade costs, improved trade facilitation, enhanced business regulation for trade) that contribute to achieving intended impacts.[107] In VfM assessments, we use the TOC to assist in the identification of sub-criteria, standards and indicators that are relevant to the programme's results chain. We have examined the programme ToC and aligned our VfM criteria with programme outputs (for the assessment of efficiency), outcomes (for the assessment of effectiveness) and impacts (for the assessment of cost-effectiveness).

[107] Rogers, P. (2014). *Theory of Change*. Methodological Briefs: Impact Evaluation 2. Florence: UNICEF.

Steps 2-3 – Sub-criteria and Standards

The complexity of development programmes often means their performance cannot be judged solely on the basis of indicators, devoid from any evaluative judgement. Well-reasoned judgements of the quality and value of results are required. Sub-criteria and standards provide an agreed transparent basis for interpreting the evidence and arriving at sound judgements. In this context:

- *VfM sub-criteria* are selected dimensions of performance that are relevant to the programme – i.e., programme-specific definitions of economy, efficiency, effectiveness, equity, and cost-effectiveness. The sub-criteria describe, at a broad level, the aspects of performance that need to be evidenced to support an evaluative judgement about VfM. Table 12 shows an example (note that this is not specific to the TMEA programme).

Table 17: Example of programme-specific definition and sub-criteria for Economy

Definition of Economy criterion: The X programme manages resources economically, buying inputs of appropriate quality at the right price

Sub-criteria for Economy criterion:

- Programme X followed good practice to manage key economy drivers
- Evidence of good costs management
- Average costs of key inputs of appropriate quality compare well with benchmarks
- Spend on indirect costs (as defined by the programme) as percentage of total cost are within predetermined target

- *VfM standards* provide defined levels of VfM (i.e., excellent, good, adequate, and poor) for each of the criteria. Table 13 shows an example (note that this is not specific to the TMEA programme).

Table 18: Example of programme-specific standards for Economy

Performance	Sub-criteria
Excellent	The programme can demonstrate that it is has consistently maximized value in its procurement practices by following international best practice guidelines, drawing on multiple criteria which go beyond price alone And meets all criteria under 'good' performance
Good	The programme can demonstrate results of good cost management, such as partner contributions, effective procurement and good contract negotiation Average unit costs for key inputs generally meet agreed benchmarks Management costs as percentage of total costs *generally at or below* agreed benchmark And meets all criteria under 'adequate' performance
Adequate	Average unit costs for key inputs do not consistently or materially exceed agreed benchmarks Management costs as percentage of total costs *generally near* agreed benchmark

	The programme verifiably followed good practice to manage key economy drivers
Poor	Any of the conditions for adequate are not met

The rubrics (sub-criteria and standards) against which TMEA will be judged will be discussed and agreed in a workshop in Nairobi before any evidence is collected (see below for more information on the workshop).

Step 4 – Identifying evidence required

In a logical and sequential process of evaluation design, we will identify the evidence needed, and the methods to collect the evidence, after defining the VfM sub-criteria and standards. The preceding steps are important to help ensure that the evidence is relevant, measures the right changes, and is appropriately nuanced.

We will use a mix of quantitative and qualitative evidence. Indicator-based (quantitative) measurement makes a valuable contribution to evaluating programme performance and VfM. Indicators alone, however, are insufficient to support well-reasoned evaluative judgments. Broader contextual (including qualitative) evidence is also important, to provide additional information about performance and support appropriate interpretation of the indicators.

The use of mixed methods and data sources and types, and triangulation across findings, helps to extend the comprehensiveness of the assessment (breadth and depth of understanding) and enhance the validity and credibility of the assessment.

5.2.2 VfM assessment (steps 5-8)

Steps 5-8 – Gathering evidence, analysis, synthesis and judgements

After agreement on the rubrics and the evidence for the assessment, we will gather the necessary evidence. The documents and data required will be defined immediately after the Nairobi workshop. We will meet with TMEA staff immediately following the workshop to collect as much evidence as we can; we will continue to gather any remaining evidence remotely.

When carrying out the VfM assessment, we will first analyse the stream of evidence for, and make a judgement against, each criterion (the ‘E’s). Synthesis will then be undertaken to triangulate and consider the totality of evidence across the criteria collectively and give an overall VfM assessment of TMEA. The evidence and judgements will be discussed and agreed in a participatory workshop involving key stakeholders from DFID and TMEA before the report is finalised.

Additionality and contribution analysis: VfM assessments need to take into account the counterfactual (i.e. what would have happened if an intervention had not taken place – the ‘do nothing’ scenario) and make a judgement regarding attribution. Attribution is about demonstrating whether the observed outcomes came about as a result of the programme intervention or due to other factors. In the TMEA context there is no experiment (e.g. a randomised control trial) to assess impacts against a measured counterfactual. Instead, some *ex post* ‘detective work’ is necessary to assess the outcomes and impacts of the programme

against the evidence of activities, outputs and outcomes specified in the TOC, consider alternative explanations for attribution (e.g. another programme), and present a conclusion based on a transparent, logical, reasoned argument.

Additional economic concepts such as those shown in Table 2, which draws on concepts from additionality[108] as well as the SROI's Guide to Social Return on Investment[109] are also important in any VfM assessment. Using these concepts helps to facilitate an assessment of the plausible contribution of TMEA while avoiding over-claiming the programme's impact.

Table 19: Framework of economic considerations

Factor	Definition	How it is applied in the TMEA assessment
Deadweight	Would the observed outcomes have occurred without intervention?	Outcomes and impact under the effectiveness and cost-effectiveness criteria
Shared effects /contribution	Did other (non-TMEA) interventions or programmes also influence changes, e.g. other infrastructure investment by TMEA or other donors?	Outcomes and impact under the effectiveness and cost-effectiveness criteria
Gains through positive externalities	Did the programme contribute to verifiable indirect benefits, e.g. increased investment/leverage of resources, more effective regional management of resources?	Outcomes and impact (unplanned positive effects) under the effectiveness and cost-effectiveness criteria
Losses through e.g. displacement, substitution, leakage or negative externalities	Did changes occur that cannot be claimed as programme benefits (e.g. diverted human resources from other relevant work, reduced outputs or outcomes elsewhere, benefitted people outside the intended target groups/areas), or did the programme generate negative effects or costs for other parties?	Outcomes and impact, (unplanned negative effects) under the effectiveness and cost-effectiveness criteria
Sustainability	Are results expected to increase, stay the same, or drop off over time?	Sustainability under the cost-effectiveness criterion

The VfM study will draw on OPM's Phase 2 evaluation studies (the performance evaluation and its contribution tracing method, and the trade and growth and poverty and gender impact studies) to the extent that they address these issues. The findings and conclusions around substantiation of TMEA contribution claims and econometric and other models will enhance the detective work mentioned above, to give greater confidence to the claims against which VfM will

[108] See for example UK Government Homes and Community Agency Additionality Guide 4th edition 2014. https://www.gov.uk/government/publications/additionality-guide.
[109] SROI Network (2012), Guide to Social Return on Investment. The Social Return on Investment Network, January 2012.

be weighed. The evaluation studies are not designed to address the issue of deadweight (i.e. what proportion of the observed impacts would have happened in the absence of the TMEA programme). The VfM assessment will make a very light-touch assessment of deadweight by looking at a key proxy indicator such as pre-TMEA level of trade growth in the region. This will be used to ensure our assessment of TMEA's contribution to change is not overestimated.

5.3 Possible rubrics for the TMEA programme

The programme-specific rubrics will be discussed and agreed in a workshop in Nairobi involving key stakeholders from DFID and TMEA. Tentatively, based on our conversations and analytical work to date, and subject to discussion in that workshop, we suggest that the sub-criteria may include:

Economy

- Good management of key economy drivers (e.g., staff recruitment and remuneration processes and policies, consultant fee-setting processes and policies, procurement practices)
- Average costs of key inputs of the right quality, such as staff salaries and consultant fees (to be confirmed at the Nairobi workshop) compare well with benchmarks.
- Indirect costs as a percentage of total programme costs

Efficiency

- Good management of key efficiency drivers (e.g., staff and consultant composition and management (including outsourcing decisions), management of partner/grantee relationships (appraisal and selection, monitoring, results management)
- Delivery of programme outputs to workplan and budget, allowing for deviations for adaptive programming and contextual factors (technical efficiency and dynamic efficiency)
- Comparison of unit costs on five OSBPs; benchmarked against the costs of other OSBPs, if costs are available in published studies (technical efficiency)
- Evidence that the programme has enhanced its performance and achieved better results through good adaptive management, i.e. delivery is responsive to context, opportunities and risks, and ongoing learning about what works, including moving resources around across programme components (e.g. across Strategic Outcomes or intermediate outcomes within and across countries), in order to maximise programme performance (dynamic efficiency) and there is evidence of a systematic process to weigh up choices about how to allocate resources/spend money to create a balanced portfolio with potential to generate all intended outcomes and impacts (allocative efficiency)
- Quality of CBAs undertaken by TMEA on key programme components (Dar and Mombasa Ports and a sub-sample of the OSBPs) (allocative efficiency)

Effectiveness

- Good management of key effectiveness drivers (political economy analysis, risk management, programme VfM strategy, reporting and management)
- Achievement of outcomes (intermediate and strategic) against the programme ToC and results framework, taking into account changes to stated outcomes and targets as evidence of adaptive management

Cost-effectiveness

- TMEA is on course to create more value than it has consumed (breakeven analysis) (see description in section 5.4.1) and has generated additional non-monetised outcomes
- Comparative VfM on a selection of key programme components
- Outcomes and impact are judged to be sustainable, and TMEA is developing a transition plan which considers sustainability of delivery processes after Strategy 2

Equity

- Equity and gender considerations were present in TMEA's research and analysis and support to projects
- TMEA contributed to gains for key vulnerable groups at outcome and impact levels.

5.4 Levels of analysis

5.4.1 DEQ5.21: Is the programme providing VFM?

This question will be answered by examining evidence and making judgements on all rubrics in the framework for the TMEA programme as a whole. Cost data will be examined in the aggregate, and disaggregated by Strategic Objective. This will include examination of staff salaries, as they are set centrally with one set of scales applicable in all countries. We will use the comparators reported in the Remuneration Survey undertaken by Deloitte (June 2016) and report how TMEA responded to the findings and recommendations of that survey. The analysis will include assessment of the impact of cuts in staff salaries at the beginning of Strategy 2 on staff retention.

Key economy, efficiency and effectiveness drivers will be examined at corporate level (i.e. performance in Nairobi HQ).

Delivery of outputs (for efficiency), achievement of outcomes (for effectiveness), contribution to impacts (for cost-effectiveness and equity), and additionality concepts (shared effects, unintended positive and negative outcomes and sustainability) will be examined in the aggregate against the corporate-level ToC and results framework, drawing on evidence in the OPM evaluation studies.

Assessment against the equity rubrics will draw on findings in the Poverty and Gender study, showing which groups appear to have benefited and/or lost out in terms of the employment/wages and prices effects of the TMEA interventions, and pro-poor spending by governments due to increased revenue, while taking into account difficulties with the attribution of these effects to TMEA. Winners and losers may include different groups of poor households, women and men, consumers and net producers, depending on their location, sector, employment status, skills, access to resources and so on. The assessment will also review evidence specifically on benefits for women and girls in terms of employment, wages and prices, and shifts in the relative power and influence of women in their homes and communities as a result of changes in their participation in trade and in associated processes such as policy formulation. The breakeven analysis will also by undertaken for the whole programme, based on whole programme ex-ante CBAs in the original Business Case. Breakeven analysis enables rapid assessment, using limited data, of the prospect of programme benefits equalling or exceeding costs, without needing to conduct a full cost-benefit analysis. Ex-ante CBAs (Pogorelsky, 2012) on defined aspects of TMEA indicate that TMEA, if effective, should generate

a high return on investment – and provide a general indication of the level of impact at which benefits would start to exceed costs. Break-even analysis will examine whether the assumptions in these CBAs are still reasonable and whether TMEA's contributions to sustainable outcomes and impacts are sufficient to break even. Importantly, we will only be able to undertake breakeven analysis if the assumptions in the 2012 calculations are broadly still valid. Data on benefits (i.e. time savings and induced trade) will be taken from the OPM performance evaluation and the Trade Impact Study. Those studies will review the quality of the results data sourced from the TMEA Results Meter and Corridor Observatories; we will make note of any issues with the quality of the data in our report.

We will also provide external validation of the quality of the methodologies used for the ex-ante CBAs undertaken or commissioned by TMEA on key Strategy 1 infrastructure projects. This will cover the CBAs on the two ports and two of the five OSBPs. We will discuss selection criteria for the OSBPs at the Nairobi workshop. They may include who conducted the CBAs (TMEA vs other named contractors), the costs and perceived risks of each OSBP, and if there are particular concerns such as underperformance relative to original expectations. We will seek access to the spreadsheets used for the CBAs and our Trade Economist will review the methodology used and the assumptions made for each CBA. The review is likely to involve interviewing the analysts responsible for the CBAs to understand features of the analyses that are not obvious from our review of documents and data.

The purpose of this analysis will be to provide lessons from Strategy 1 and recommendations to maximise VfM under Strategy 2 for the whole programme.

5.4.2. DEQ5.22: In which activities/components and countries does the programme achieve higher VFM than others and what are the lessons learnt for driving greater VFM across the board?

1. Comparison of key costs data across projects/country programmes

1.1 Data on costs (5 country offices)

The key cost drivers that we propose to analyse are staff salaries and consultant fees. This will be confirmed at the Nairobi workshop. Staff salaries are set centrally with one set of scales applicable in all countries, hence this analysis will be at corporate level (answering DEQ5.21, as described above). Consultant fees are project-specific, proposed in competitive tenders and assessed in the tender evaluation process. This means they vary across projects depending on market rates for different countries and kinds of projects.

We will decide which kinds of TMEA projects should be included in the analysis in the Nairobi workshop (likely to include a selection from SO1, SO2 and SO3), and then identify a set of comparable non-TMEA projects in the region against which to benchmark consultant fees. We will look for projects of a similar nature (including trade and infrastructure projects) funded by DFID or other donors, implemented by OPM or other contractors, and which span the countries in which TMEA works. A list of potential projects is shown in Annex I. We will seek permission to access and use the data needed for our comparisons: DFID assistance may be helpful. The analysis will take into account the different cost structures of different country economies and qualitative assessment of other factors which may account for differences.

The purpose of this analysis will be to understand if TMEA expenditure appears reasonable relative to expenditure in other comparable programmes, bearing in mind differences in context.

2. Comparison of unit costs on OSBPs

We will produce cost calculations for the construction and set-up of each of the 5 OSBPs. The costs will include direct project costs and apportionment of indirect costs (e.g. central overheads at 9%, a proportionate share of running and staff costs for the TMEA managers who manage the OSBP projects, and possibly costs for TMEA regional staff providing technical and advisory support) using a top-down approach. We will include the contributions of other partners, if TMEA has this data. We will make comparisons across the five OSBPs in order to understand if some were achieved at lower costs than others without compromising on their stated objectives.

We will also compare the costs of the TMEA-facilitated OSBPs with other OSBPs in the region, if costs can be found in published studies. We will use the 2nd edition of the One Stop Border Posts Sourcebook (May 2016)[110] produced by the New Partnership for Africa's Development (NEPAD) as a starting point to identity suitable comparators (the source book identifies 25 OSBPs in East Africa). Criteria for selecting suitable comparators will be decided at the Nairobi workshop and may include: location, geographic features, physical facilities, management operation type (eg public PPP), and scale (for example, traffic/trade volumes).

Both analyses will take into account the different cost structures of different country economies and qualitative assessment of other factors which may account for differences.

3. Comparison across some key programme components

We will undertake a qualitative assessment of VfM in key programme components using the matrix in in Annex J and standards set out in a generic rubric. The assessment will draw on the following data:

(a) What went in and what came out?

- Approximate spend/band of expenditure (e.g. high/medium/low): the level of precision will depend on the selection of components and TMEA's ability to apportion costs accordingly;
- Headline results (outcomes/impact of selected component): extracted from OPM evaluations (2C3A and 2D2E and the performance evaluation)
- Evidence from economic evaluations, if available: see more information below.

(b) VfM assessment criteria

- Relevance and significance of the issue addressed to TMEA objectives (high/medium/low): extracted from OPM evaluations (2C3A and 2D2E, 6A and the performance evaluation)
- Magnitude/significance of component outcomes/impact relative to cost or expectations (high/medium/low)
- Expected sustainability of component outcomes/impact (high/medium/low): extracted from OPM evaluations (2C3A and 2D2E, 6A and the performance evaluation)

[110] See https://www.tralac.org/news/article/11453-one-stop-border-post-osbp-sourcebook-2nd-edition.html.

(c) **VfM judgement**: an overall judgement on VfM of each component based on a generic rubric

A programme component is understood to be a collection of projects (possibly with some activities implemented directly by TMEA) that together aim to contribute to any of the intermediary outcomes. The criteria for selecting key programme components for the exercise will be discussed and agreed at the framework workshop. Selection criteria may include:

- Components with the largest share of TMEA budget and/or projects (using data in deliverable 2A);
- At least one component in each SO;
- Perceived VfM performance during Strategy 1 (some high and some low-performing components)
- Data on results, relevance and sustainability is readily available in OPM reports.[111]

For SO1, these criteria may conceivably result in selection of the Mombasa and Dar ports, and the three OSBPs assessed in the SO1 effectiveness evaluation (2C3A). This would allow for useful intra-component comparisons, i.e. which of the ports, and which of the OSBPs, represent better VfM and why, taking into account any relevant contextual differences in context and implementation. We expect the results of economic evaluations to inform the analysis of SO1 projects; we will not undertake any economic evaluation of our own, but will report the findings of analyses undertaken by (or commissioned by) TMEA, along with the relevant assumptions and limitations.[112]

For SO2 and SO3, the possible selection is less clear, given the wide-ranging and disparate nature of the projects contributing to each SO. The potential to make useful intra-component comparisons is also less clear. For these SOs, we will discuss the purpose and value of any potential analyses in the framework workshop; if it is agreed that there is value to the analyses, we will agree selection criteria and identify potential components. Perceived VfM performance may be the primary selection criteria here, allowing us to review key factors underpinning good and poor VfM.

The matrix allows us to make a VfM judgement against each component. This, theoretically, allows us to make cross-component comparisons of VfM, e.g. how do the ports compare with the OSBPs in terms of their VfM? However, these comparisons need to be carefully qualified, taking into account differences in the nature of the projects, the enabling political and economic environments and other implementation differences.

The matrix will be populated based on document review. The evidence and proposed judgements will be discussed in an expert workshop with key TMEA and DFID staff.

Rationale for our choice of analyses. The analyses to respond to DEQ5.22 will allow us to understand if TMEA expenditure on key inputs and key outputs (OSBPs) appears reasonable

[111] This means the components would need to be composed largely if not completely of projects in the sample for deliverables 2C3A and 2D2E.

[112] The Phase 1 OPM evaluation of SO1 projects (deliverable 2C3A) reports the findings of economic and financial evaluations (net present value (NPV) and internal rate of return (IRR)) carried out in 2016 for the infrastructure projects at the Mombasa and Dar ports based on reports by Ernest Young (Economic and Financial Analysis for Selected berth Upgrade projects at the Port of Mombasa, November 2016) and MTBS.

relative to expenditure in other comparable programmes, and to identify examples of good VfM in selected key programme components. Both analyses will be useful in informing good VfM practice under Strategy 2. As the information in the table below demonstrates, the assessment features both internal (within-programme) comparisons and external benchmarking against other programmes. We will undertake benchmarking against external comparators at two levels – key costs (economy level), and unit costs of OSBPs (efficiency level), if comparable data and studies are available and accessible. These benchmarking assessments will be contextualised with qualitative data around the nature of each programme, including the kinds of activities undertaken, the nature of expertise required of staff and consultants, the political economy context associated with trade reforms, and so on.

Table 20: Internal and external benchmarking

Rubric (criteria/sub-criteria)	Internal comparisons	External comparisons
Economy (average costs, spend on management)	Consultant costs on sub-sample of projects.	Key inputs costs (staff and consultants) from similar programmes in the same countries*, if data on the same indicators are available and accessible*
Economy and efficiency (all sub-criteria)	Comparison of unit costs across 5 OSBPs	Costs of other OSBPs in the region, *if data are available in published studies*
Cost-effectiveness	Whole programme breakeven analysis relative to original programme-level CBA in the Business Case; VfM across key programme components in SO1, SO2 and SO3, including reported economic evaluations (CBAs) of large infrastructure projects, if available	

5.5 Participatory workshops

We will conduct three participatory workshops involving TMEA and DFID staff during the course of our VfM assessment

Workshop 1: VfM Framework

The workshop to discuss and agree the VfM framework will be rescheduled, once we have identified a trade economist to join the team. It will be facilitated by members of the VfM team and attended by TMEA staff members with sound knowledge of Strategy 1 programming and operations (members of the Senior Leadership Team, SO leaders and the Results lead), key DFID representatives, and members of the OPM evaluation team. The draft framework will be sent to all participants ahead of the workshop.

We will discuss and agree the following during the workshop:

- The proposed rubrics (sub-criteria and standards) for each E
- Selection criteria for the sub-sample of TMEA projects for analysis of input costs, the OSBPs for review of CBA methodology, and the key programme components for VfM assessment
- Possible evidence and indicators, and data availability
- Other programmes which may be used as comparators for economy (input costs) and efficiency (costs of OSBPs) indicators

During the same mission to Nairobi we will meet with key TMEA staff in the Results team and Corporate Services team to clarify the documents and data needed for the assessment, gather as much evidence as possible, and identify key counterparts who can identify and send further evidence after we return home.

Workshop 2: Expert Review Workshop

We will hold a one-day workshop part way through the assessment. The principal objective of the workshop will be to discuss the matrix used to make judgements on the VfM of key programme components. The workshop will also be used to verify our early analyses and fill in gaps we have identified during document and data review.

The workshop will be attended by key TMEA with sound knowledge of Strategy 1 programming and operations and DFID staff.

Workshop 3: Verification/Judgements Workshop

We will hold a final verification workshop towards the end of the assessment, once we have assessed and collated all of the evidence. The draft report will be sent to attendees ahead of the workshop. During the workshop we will discuss the evidence and agree judgements against each E and come to a summative judgement for the programme as a whole. The workshop will be attended by key TMEA with sound knowledge of Strategy 1 programming and operations and DFID staff.

5.6 Sources and methods

The VfM assessment is undertaken primarily on the basis of desk review. The assessment is designed to draw heavily on the OPM evaluation without duplicating the work undertaken by the evaluation team. The nature and extent of information on results available to us will therefore be defined by the final design and scope of the evaluation studies.

The following documentary sources will be used for evidence on programme costs, practices, and results:

- TMEA programme financial data, using templates provided by our team;
- TMEA VfM documents (strategy, framework, reports on VfM KPIs and other indicators), external and internal audits, and due diligence assessments;
- TMEA organisational handbooks, manuals, and policy documents
- TMEA cost-benefit analyses (CBAs) (programme and infrastructure projects);

- The TMEA monitoring data and results framework, Results Meter, and evaluations (including country programme evaluations and others not reported in OPM evaluation reports);
- Key TMEA programme documents, e.g. DFID's Programme Memorandum (2008) and Business Case (2013), TMEA's annual reports, donor Annual Reviews (whole programme and country level), as relevant;
- Relevant reports from the OPM evaluation, such as Deliverable 2B (Institutional and organisational assessment of TMEA, with an assessment of M&E systems and a preliminary VfM review), Deliverables 2C/3A and 2D/2E (evaluation of outcomes against SO1, SO2 and SO3) and the performance evaluation and two impacts studies described in this document, all produced by the external evaluation team.

Our document review will be supplemented by a small number of interviews with key stakeholders in DFID and TMEA. The interviews will focus on TMEA's adherence to good practice around the key economy, efficiency and effectiveness drivers during Strategy 1, evidence of adaptive management and processes for resource allocation and how they have improved programme performance and results, the additionality concepts set out in the table above, and additional information needed for the breakeven analysis. These interviews will be conducted by Skype or phone, and/or in person at the same time as the Expert Review Workshop, after we have analysed the information available in documentary sources.

5.7 Changes to the approach

While there are no significant deviations to the approach to VfM assessment, it is important to note the following:

- **Our economic evaluation at cost-effectiveness level for the whole programme will focus on a breakeven analysis, as described in section 5.3,** which can be readily performed with limited data. It will be complemented by TMEA's own cost-benefit analyses on the whole programme or components of the programme (e.g., infrastructure projects, if TMEA has collected the necessary evidence, tracked the assumptions, and repeated the necessary calculations.
- Assessment of the **sustainability of delivery processes** will be based on evidence of TMEA's transition planning in preparation for the end of Strategy 2 funding. We will not assess the mandates, capacities, resources and frameworks of the public or private institutions which may be expected to take on some of TMEA's activities

5.8 Timing

Data on outcomes and impact will reflect achievements at the end of Strategy 1 in June 2017, as assessed by the evaluation team. Data on costs will cover the period from the start of the programme in 2010 until the end of Strategy 1 (June 2017). As the VfM assessment draws on the evaluation findings, the final VfM assessment will be delivered approximately six to eight weeks after the evaluation team's final deliverables. This will ensure good VfM in the process by facilitating coherence between the evaluation and VfM assessment, and by avoiding duplication of effort.

5.9 Hypothetical responses to the evaluation questions

Below we explain how our findings, conclusions and recommendations will be summarised in the Executive Summary, and briefly discuss how they will be presented in the main body of the final report.

DEQ5.21

The summary findings of the VfM assessment of the whole programme will be reported in a table like the one below. The table contains an evaluative judgement and a summary of the evidence on which this is based for each of the Es individually, and then for the programme as a whole. The evidence reported will depend on the sub-criteria and indicators included in the final framework. The information in the table represents a very brief summary of findings which will be reported in much greater depth in the main report, with a section for each of the Es. The examples in the table are purely illustrative and do not represent any analysis undertaken to date.

The table will be followed by a summary of our recommendations on (1) how the whole programme can improve VfM under Strategy 2; (2) how the programme can improve its VfM assessment and reporting; and (3) how our lessons may be useful for other similar programmes in the region.

Finally, we will outline any caveats and limitations that apply to the analysis, such as concerns over the quality of data used in the analysis, limitations to the comparisons that can be made with other programmes, limits to ascertaining the extent of TMEA's contribution to outcomes which are shared with other actors.

Table 21: Example of table with VfM assessment for the whole programme

VfM criterion	Evaluative judgement	Basis for judgement (illustrative)
Economy	Excellent	The programme has consistently followed good practice to manage key cost drivers, secure savings, and keep costs down. These efforts ensured that key input unit costs were consistently below agreed benchmarks. Spend on indirect costs remained within the pre-defined target of x%.
Efficiency	Good	Deliverables generally met the required quality and timeliness within budget, and the programme has been managed adaptively, thereby extending results, but there was a small shortfall against x output targets and some internal delays. The programme had sound procedures in place to assess the alignment of potential projects with the programme ToC, but evaluation of outputs suggests that some (x%) projects were not clearly aligned.
Effectiveness	Good	The programme has followed good practice to enhance its effectiveness, including developing a good understanding of political economy and managing relationships well. It improved its MEL systems over time, although there were concerns over monitoring data against its results framework. Internal VfM assessment and reporting was infrequent and lessons have not yet informed better VfM practice. The independent evaluation indicated that the programme achieved most of its expected outcomes, with some notable shortfalls against targets. These can be partly explained by contextual factors such as X and Y. The evaluation also

		identified x unplanned positive outcomes, and x unplanned negative outcomes
Cost-effectiveness	Good	Our breakeven analysis indicates that the programme is on course to provide a positive NPV by 2020; it has also generated important additional non-monetised outcomes not included in the breakeven analysis. Key stakeholders expressed concerns over the sustainability of key activities beyond the current funding cycle; the programme has started transition planning to address these concerns.
Equity	Adequate	Consideration to equity and gender was inconsistent in the programme's own planning and in appraisal of funded projects. The independent evaluation was able to identity some benefits for key vulnerable groups in terms of price reductions on key commodities and wage increases, but the benefits were highly concentrated in a few localised groups and more can be done to ensure that benefits extend further. There is limited evidence that girls and women's interests have been progressed.
Whole programme VfM	**Good**	

DEQ5.22

1. Comparison of key TMEA costs data across projects/country programmes and with other similar programmes

We will report average costs of key inputs across a sub-sample of TMEA projects and on other similar programmes. Our commentary will summarise and contextualise the findings. For example: "consultant fees were consistently lower in TMEA's capacity-building projects compared to its infrastructure construction projects by an average of x%. This was the same across all country programmes with these types of projects. We found a similar differential to exist in other similar programmes (A and B) in the region. Consultant fees paid on TMEA's capacity-building projects were broadly similar to those paid by similar programmes in the region, but fees paid on TMEA's infrastructure projects were generally higher, by a margin of x%. The differences may be accounted for by, for example, specific types of expertise required in TMEA's infrastructure projects".

2. Comparison of unit costs on OSBPs

We will report the cost of setting up each of the 5 OSBPs, and the costs of other comparable OSBPs in the region. Our commentary will summarise and provide detailed contextualisation of the findings. For example: "x and y OSBPs were set up at lower cost than the other three OSBPs, with no compromise on the original stated objectives. The higher costs on OSBPs a, b, and c were due respectively to factors such as……..: implementation delays on OSBP a, poor forecasting of costs on OSBP b, and the need for much closer oversight and management by TMEA staff in the case of OSBP c. We compared TMEA's costs of setting up the OSBPs with similar OSBPs in comparable locations. We found that OSBPs a and y were constructed at lower cost than the OSBPs constructed under the A and B Programmes funded by XY. The differences seem to be due to TMEA's close oversight of project management and costs, compared to a more arms-length approach by Programmes A and B. On the other hand, OSBPs b, x and z were constructed at higher cost that OSBPs constructed under the C Programme. The differences are largely explained by factors such as ……..the lower specification and smaller overall scale of the OSBPs constructed under the C Programme.

3. Reporting on key programme components

For the key programme components, the summary findings will be reported in the matrix shown in Annex J. Our commentary will consider:

(1) Intra-component comparisons; for example, Port A had, at the end of Strategy 1, achieved greater VfM than Port B, as demonstrated by the IRRs on each project, which reflect the different level of results: although both ports have stalled on the issue of port reform and modernisation, only Port A has made good progress on infrastructure and improved productivity. The lower level of benefits at Port B needs to be contextualised by the particularly complex political economy surro8nding issues of port reform in country B.

(2) Cross-component comparisons: for example, work on the OSBPs had, at the end of Strategy 1, demonstrated higher VfM than work on the ports. This reflects the particular challenges associated with port reform and the adoption of the landlord model, which poses a challenge to key vested interests. The OSBPs do not face these same challenges, and also require lower investment from country governments; they have therefore generally been met with greater political support and engagement.

This will be followed by a summary of our recommendations on how VfM can be strengthened in particular programme components during Strategy 2.

Finally, we will outline any caveats and limitations that apply to the analysis, such as concerns over the quality of data used in the analysis, or limitations to the comparisons that can be made with other programmes.

Annex A Evaluation Matrix

Please see attached Excel sheet for the evaluation matrix.

Annex B Status and evolution of the evaluation questions

The High-level and Detailed Evaluation Questions (HEQs and DEQs, respectively) contained in the tables below have been slightly updated to reflect the changes in implementation, terminology and priority areas for study since the Inception Report was approved. Where DEQs were answered in previous deliverables, this is noted with the deliverable in bold in the right column.

HEQ1[113] and its DEQs	Status and deliverable(s)
HEQ1: Has the programme been effective in delivering its outputs? How has this been affected by the programme's organisational performance and how could this be improved?	
DEQ1.1 To what extent are TMEA programmes' outputs generally consistent with the programme TOC?	**Answered:** • ***2A Preliminary Output Assessment*** maps projects censally in the three SOs. • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** answer them for SO1
DEQ1.2 Were project outputs achieved in accordance with plans/expectations and within budget? For ongoing projects, what is the likelihood of achieving the project output targets within the programme time-span?	**Answered:** • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** answer them for SO1 • ***6B Interim Evaluation Synthesis Report***

[113] HEQ1 and HEQ2 have been revised since the Inception Report. HEQ1 comprises questions about outputs, while HEQ2 and its DEQs will answer questions about outcomes. The latter is to be answered in the Performance Evaluation, while HEQ1 and its DEQs were answered in the Phase 1 deliverables.

DEQ1.3 What constraints were/are encountered in achieving the project outputs? What are the reasons for non-achievement of the outputs?	**Answered:** • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** answer them for SO1 • ***6B Interim Evaluation Synthesis Report*** summarizes major constraints and reasons for non-achievement
DEQ1.4 Who were/are the main beneficiaries of the outputs? Are there organisations or groups of people who are negatively affected by the outputs?	**Answered:** • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** answer them for SO1
DEQ1.5 To what extent have supported organisations (i.e. government agencies and the implementing partners) built capacity and capability on relevant trade-related matters?[114]	**Answered:** • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** answer them for SO1 • ***6B Interim Evaluation Synthesis Report*** provides summary information on capacity building efforts and achievements
DEQ1.7 To what extent does TMEA have the management arrangements, systems, processes and human resources appropriate for carrying out its mission (i.e. how suitable are these for the purposes of carrying out its activities)?	**Answered:** • ***2B Institutional and Organizational Assessment*** explicitly addresses this question • There is also detailed information on management, systems and processes in ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** for 40 projects, with detail project-by-project in Annex 5
DEQ1.8 To what extent do TMEA's financial (including procurement), human resource and risk management processes enable it to efficiently and effectively manage its contractual relationships with implementing partners?	**Answered:** • ***2B Institutional and Organizational Assessment explicitly addresses this question*** • There is also detailed information on financial and risk management processes in ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** for 40 projects, with detail project-by-project in Annex 5

[114] "Government agencies" were added to DEQ1.5, given that many TMEA activities partner with national counterparts to implement programming. DEQ1.6 on outcomes has been subsumed into the new HEQ2 on programme and strategic outcomes.

	• There is also detailed information on financial and risk management process in SO1 in ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects***
DEQ1.9 To what extent do the processes TMEA has in place promote organisational learning and sharing of good practices?	**Answered:** • ***2B Institutional and Organizational Assessment explicitly addresses this question*** • There is also detailed information on organisational learning and good practice sharing in ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** for 40 projects, with detail project-by-project in Annex 5
DEQ1.10 Are the M&E tools and processes in place appropriate, both in terms of results and in terms of finances? How could they be strengthened?	**Answered:** • **Report on Monitoring and Evaluation Processes at TMEA** explicitly addresses this question • **2B Institutional and Organizational Assessment** includes a section on this question • There is also detailed information on M&E tools and processes in ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** for 40 projects, with detail project-by-project in Annex 5

HEQ2 and its DEQs	**Status and Deliverable(s)**
HEQ2[115,116]: To what extent has TMEA been effective in achieving expected intermediate outcomes and to what extent has TMEA programme been effective in contributing to achieving programme strategic outcomes? Did the programme bring about any unintended outcomes?	
DEQ2.1 To what extent has TMEA contributed to reducing corridor trade times and increasing corridor volumes?[117] DEQ2.2 To what extent has TMEA contributed to increasing ease of trading across borders? DEQ2.3 To what extent has TMEA contributed to improving business competitiveness? DEQ2.4 Has TMEA caused any unintended outcomes? What are they and who has been affected?	**Unanswered:** Will be answered in the ***Performance evaluation***

[115] The original HEQ2 dealt solely with OSBP and Ports projects, and was partially answered in the formative evaluation (Deliverable 3A). However, DFID asked to ensure the outcomes question (DEQ1.6) was more completely answered. This proposed new HEQ is the result.
[116] Being "effective" in achieving outcomes is added in the Sept 18, 2018 draft at DFID's request, so the language sounds the same as that from the deleted DEQ1.6.
[117] HEQ2 was previously focused only on ports and OSBPs, but is here extended to cover all strategic outcomes. The first three DEQs were reformulated to correspond to the TOC. DEQ2.4 was added.

HEQ3 and its DEQs	Status and *Deliverable(s)*
HEQ3: What is the likely impact of TMEA on trade outcomes and growth, and what factors are critical in order to ensure the sustainability of positive impacts?	
Effectiveness: programme-level trade outcomes	
DEQ3.1 To what extent have TMEA interventions, including those of a policy nature, led to a reduction in trade times, trade costs and trade risks?[118]	**Unanswered:** Will be answered in the ***Trade and growth study (TGIS)***
Trade impact	
DEQ3.2 What has been the impact of any achieved trade cost reductions from TMEA on trade (both intra- and extra-regional)?[119]	**Unanswered:** Will be answered in the ***Trade and growth study (TGIS)***
DEQ3.3 How has any improved trade policy environment led to increased trade?	
Economic growth impact	
DEQ3.4 To what extent has any changes in trade resulting from TMEA interventions contributed to economic growth?	**Unanswered:** Will be answered in the ***Trade and growth study (TGIS)***
DEQ3.5 What factors are critical in order to ensure the sustainability of positive impacts?[120]	

HEQ4 and its DEQs	Status and deliverable(s)
HEQ4: What is the likely impact of TMEA on poverty and gender, and what factors are critical in order to ensure the sustainability of positive impacts?	
Poverty impact	
DEQ4.1 What is the nature – and, where possible, scale – of the likely impact of the overall programme and of key TMEA projects in the portfolio on the poor—direct and indirect? Who is affected by potential short- or long-term impacts, both positive and negative, how, and how is the causality working?[121]	Partially answered in ***5A Preliminary Poverty Analysis;*** will be completed in ***Poverty and Gender Impacts Study (PGIS)***

[118] The former DEQ3.2 was a repeat of this question, only about policy interventions. These have been combined to ensure context and intervention logic and outcomes are considered together.
[119] The word “increased” was removed from modifying “trade”, as the impact has not yet been determined. “Increased” presumed an impact.
[120] This question, and 4.6, were added in response to DFID’s comment that the HEQ mentions sustainability but the DEQs did not.
[121] It is critical to note that this will be speculative and subject to exogenous distortions. Tracing causality rigorously, this far along the results chain, is outside the scope of the evaluation.

DEQ4.2 In particular, who has benefited from reduced trade costs? How are the benefits in reduced transport time and cost being passed on to poor people through lower prices or lower price increases?	Partially answered in ***5A Preliminary Poverty Analysis;*** will be completed in ***Poverty and Gender Impacts Study (PGIS)***
DEQ4.3 Are complementary policies being adopted to translate the benefits of increased trade into poverty reduction?	Partially answered in ***5A Preliminary Poverty Analysis;*** will be completed in ***Poverty and Gender Impacts Study (PGIS)***
DEQ4.4 Are measures being taken, and are they successful, in mitigating potential negative impacts on any sub-groups – in particular poor people in localised areas?	Partially answered in ***5A Preliminary Poverty Analysis;*** will be completed in ***Poverty and Gender Impacts Study (PGIS)***
Cross-cutting issues	
DEQ4.5 To what extent has the programme benefited women and girls (noting that the programme design did not purport to benefit them equally)? Have there been any negative consequences for women and girls? Has the programme had an impact on relations, including power and influence, between girls/women and boys/men? How could the programme increase benefits to women and girls within its trade focus?	Partially answered in • ***5A Preliminary Poverty Analysis*** and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** answer them for ports and OSBPs • Will be completed in ***Poverty and Gender Impacts Study (PGIS)***
DEQ4.6 What factors are critical in order to ensure the sustainability of positive impacts?	Unanswered; will be answered in ***Poverty and Gender Impacts Study (PGIS)***

HEQ5 and its DEQs	**Status and deliverable(s)**
HEQ5: How robust and verified are the causal links and assumptions in the TOC? What does this imply for the relevance, coherence and sustainability of the programme, and what are the lessons learnt that are relevant beyond TMEA?	
Programme relevance: TOC causal links and assumptions	
DEQ5.1 To what extent are the causal links and assumptions underpinning the TOC evidence-based or verified? [122]	**Partially answered** in ***6B Interim Evaluation Synthesis Report;*** will be completed in the ***Performance Evaluation.***

[122] We eliminated DEQ5.2 "Are the results framework targets and milestones relevant and realistic?" Given the late advent of this evaluation, a year after the RF was finalised, support to make targets and milestones more relevant and realistic is unhelpful. This is particularly true in light of their new Strategy 2 RF with deeply altered indicators, targets and milestones, and in light of the DFID Annual Reviews' intensive and detailed suggestions that underpin many of those changes.

DEQ5.3 To what extent does the programme support EAC regional trade development priorities?	**Partially answered** in ***6A Preliminary Relevance and Sustainability Assessment*** for outputs; to be completed in the ***Performance Evaluation***
DEQ5.4 How have changes in policy and in the political economy in the region impacted on the programme or on its relevance?	**Partially answered** in ***6A Preliminary Relevance and Sustainability Assessment***; to be completed in the ***Performance Evaluation***
DEQ5.5 Do TMEA interventions complement other ongoing initiatives (both government and private sector)?	**Partially answered** in ***6A Preliminary Relevance and Sustainability Assessment*** for projects; to be completed in the ***Performance Evaluation***
Coherence and coordination	
DEQ5.6 What are the strengths and weaknesses of the working model observed to date?	**Partially answered:** • ***6A Preliminary Relevance and Sustainability Assessment*** for outputs; • ***6B Interim Evaluation Synthesis Report*** through analysis of the model's TOC, relevance, coherence and sustainability • To be completed in the ***Performance Evaluation***
DEQ5.7 Is the complementarity and coordination between national and regional levels optimal throughout all programme components and activities?	**Partially answered:** • ***6A Preliminary Relevance and Sustainability Assessment*** for projects; • ***6B Interim Evaluation Synthesis Report*** through analysis of the projects' relevance, coherence and sustainability • To be completed in the ***Performance Evaluation***
DEQ5.8 To what extent does the TMEA model bring greater results than the sum of its parts? How could this be strengthened?	**Unanswered**; to be answered in the ***Performance Evaluation***
DEQ5.9 Is using one organisation – a not-for-profit company – the best vehicle for impact on trade, and on poverty reduction through trade? What are the strengths and weaknesses of this approach?	**Partially answered:** • ***2B Institutional and Organizational Assessment*** • To be updated in the ***Performance Evaluation***
DEQ5.10 To what extent are the programme's governance arrangements leading to the delivery of high quality and timely outputs?	**Partially answered:** • ***2B Institutional and Organizational Assessment*** • To be updated in the ***Performance Evaluation***
DEQ5.11 Is the operational model at donor level appropriate and efficient for delivering TMEA? What are the key enablers which need to be preserved, and what are the remaining constraints arising from donors' systems?	**Partially answered:** • ***2B Institutional and Organizational Assessment*** • To be updated in the ***Performance Evaluation***

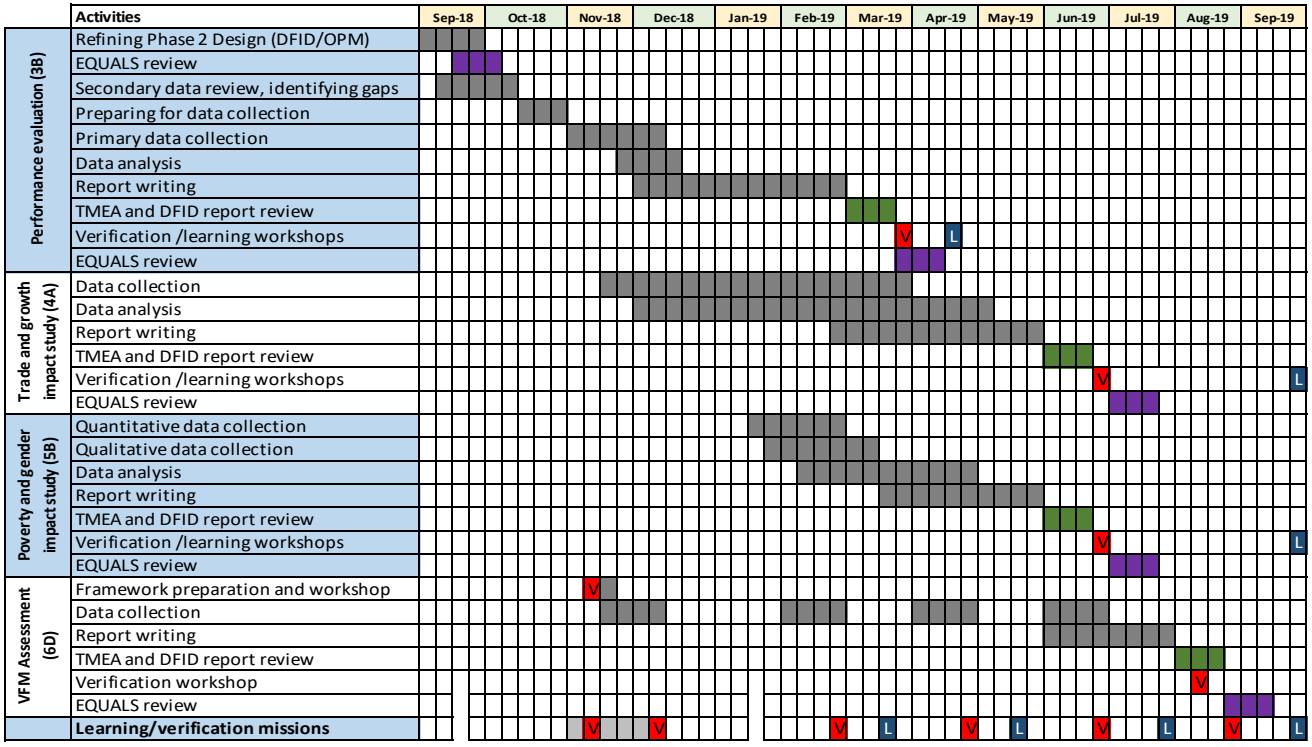
DEQ5.12 Did TMEA align with country systems and agencies in an effective manner for ownership, and for impact? How could this be strengthened?	**Partially answered**: • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** for SO1 • To be completed in the ***Performance Evaluation***
DEQ5.13 Are the focus and activities of TMEA consistent with, and additional to, those of others' development programmes in the region? To what extent has the programme facilitated improved coordination?	**Partially answered**: • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** for SO1 • To be completed in the ***Performance Evaluation***
DEQ5.14 What sorts of approaches have been more successful in working with regional institutions in Africa?[123]	**Partially answered** in: • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** for SO1 • To be completed in the ***Performance Evaluation***
Sustainability	

[123] Two DEQs here, sub-titled "Cross-cutting", have been eliminated. The first read: "What has the impact been on corruption across the various components, notably at border crossings?" While the evaluation team will speak with team members about how corruption might have affected their work, this DEQ could be an impact study of its own. However, TMEA did not directly undertake projects on corruption, so looking for their impacts expends resources on a tangential pursuit. The DEQ on unintended consequences will cover this issue as and when it arises. Moreover, corruption is extremely sensitive in the context, as TMEA continue to interact with institutions that would see this as criticism of a very high and offensive order.
Similarly, DEQ5.16 asked "What impact has the programme had on other issues, such as extractives and environment/climate?" which would examine issues well outside TMEA's areas of influence and focus. While the Mombasa port project worked on "green port" practices, this is the only substantial, direct TMEA activities related to environment and climate. None related to extractives. TMEA has a difficult enough job to influence the areas it is working on directly, and the evaluation to capture them, without seeking impacts in areas where they didn't intervene. "Other issues" are better covered under the HEQ2 "unintended impact" question, than devoting attention and resources the evaluation team needs for other EQs.

DEQ5.17 What benefits (both social and financial) of the programme are likely to be sustainable and would continue with or without TMEA (staffing and funding)?[124]	**Partially answered in:** • ***6A Preliminary Relevance and Sustainability Assessment*** for outputs • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5 • To be completed in the ***Performance Evaluation***
DEQ5.20 How are stakeholders engaged through the programme and beyond its life, and how do they take TMEA lessons learnt into account?	**Partially answered** in: • ***2D/2E Effectiveness and Outcome-level evaluation SO2 and SO3*** answers these questions for SO2 and SO3 outputs of a sample of 40 projects, with detail project-by-project in Annex 5; and • ***2C Effectiveness and outcome-level evaluation SO1*** and ***3A Consolidated Formative Evaluation of Ports and OSBP projects*** for SO1 • To be completed in the ***Performance Evaluation***
VfM Assessment	
DEQ5.21 Is the programme providing VFM?	**Partially answered** in • ***2B Institutional and Organizational Assessment*** • To be updated in the ***Performance Evaluation***
DEQ5.22 In which activities/components and countries does the programme achieve higher VFM than others and what are the lessons learnt for driving greater VFM across the board?	**Unanswered**; to be answered in the ***Performance Evaluation***

[124] DEQ5.18 here read "What should be the essential components of a future exit strategy in order to sustain impact?" Exit strategies were salient at project level (and covered in detail in deliverable 2D/E and its Annex 5), but not at programme level, as TMEA intended to continue operations with or without donor funding. TMEA are currently in Strategy 2 and talking about "Strategy 3" even today. The evaluation will continue to talk about sustainability in DEQ5.17 and especially 5.20, which was are more appropriate to how TMEA operated during Strategy 1, when there effectively was no exit strategy. DEQ5.19 read "What is the likelihood that individual results and overall impact will be sustained after existing donors stop funding, and will there be a lasting positive impact on the poor" which is duplicative of DEQ5.17 and the new question at DEQ4.6.

Annex C Proposed timeline



Annex D Evaluation technical limitations and challenges

The text that follows was included in the annexes to the IR and it is updated here to reflect the ways the present design plans to manage the specialised risks and challenges that come with attempting to assess impact down such a long causal chain.

Contextual factors

There are a range of contextual factors that will influence the poverty and gender study. Most important among these will be the wider changes in the economies of the six TMEA countries. The overall economic performance of the economies will be influenced by trade and, therefore, potentially by the activities of TMEA. However, there are a very large number of other factors that will influence the performance of the individual country's economy over the period of the study. These include: fiscal and monetary policy, including exchange rate movements during the period; the broader political context, including the security issues currently prevailing in South Sudan and Burundi, as well as the threats from terrorism in some countries; external economic shocks, including the prices of key commodities on the world markets; social policy – and policy choices on the distribution of expenditure and the extent to which it complements trade reforms and/or mitigates negative effects of such reform. Finally of course there are the shifts in trade policy itself which, whilst influenced by TMEA, are not entirely predictable and cannot be determined by TMEA's activities. Disentangling the impacts of these wider changes on men and women and on poverty in a precise way will be impossible. Hence, the best that we can hope to achieve is to provide persuasive evidence about the sort of contribution that TMEA interventions may have made towards these objectives (Mayne, 2011)[125].

Moreover, the data requirements for conducting these analyses are demanding. We hope to obtain timely household, enterprise, price and fiscal data to match what was done for the PPA, but clearly the timing of the availability of future survey data cannot be assured. Moreover, data in some areas (e.g. wages and employment) are very weak, even though shifts in wages and employment may be an important part of the impact of TMEA's activities.

As noted, it is highly unlikely that we will be able to establish clear pathways of how TMEA projects have affected poverty and gender outcomes. We will therefore be relying on a mix of quantitative analysis of groups before and after TMEA interventions (making a distinction between groups that are likely to have been directly affected and those that have not), supplemented with qualitative evidence from extensive interviews and FGDs to explore the nature of the underlying causal mechanisms at play.

There are clear limitations to such an approach. First, whilst it is likely that we will be able to show the changes in poverty, and how these are gendered over time – and there is a reasonable prospect of being able to link these changes to changes in prices and other intermediary variables – it is much less likely that we will be able to provide a clear causal link between TMEA's activities and the changes observed in intermediate variables. Second, whilst the design of the qualitative interviews will conform to best practice in comparative studies, the

[125] Mayne, J. (2011). Addressing Cause and Effect in Simple and Complex Settings through Contribution Analysis. In *Evaluating the Complex*, R. Schwartz, K. Forss, and M. Marra (Eds.), Transaction Publishers.

groups selected will clearly not be a representative sample of the populations of the countries from which they come. As a result, it is possible that the pathways this purposive sample describes may not be the same as those experienced by others who were not selected.

Risks and challenges

In the Inception Plan we anticipated a number of risks and challenges associated with the proposed approach to this research.

First, whilst there is an established approach to estimating the broader impact of trade on poverty, as elaborated in the proposal, measuring the poverty impact of specific TMEA interventions will be complex and determining attribution almost impossible. The best outcome is likely to be evidence that indicates the extent to which TMEA's activities have contributed to the poverty objectives that it has set. Second, there is a risk that the data do not exist or are not accessible, for one or more countries, to support a conclusive investigation of the impact of TMEA's projects on poverty.

Both of these risks are likely. With few exceptions, the nature of TMEA's hypothesised impacts of on poverty (and upon men and women) is through indirect channels. Whilst we anticipate that it will be possible to gather evidence, particularly on the direct poverty and gendered impacts of some TMEA projects, for most it will not be possible to determine clear attribution.

The evaluation team has planned two important responses to meet these risks head-on. First, the evaluation will collect sufficient and appropriate evidence on direct impacts of TMEA, where appropriate. Whilst the poverty impact of TMEA projects may be primarily indirect, some of TMEA's projects are designed to have direct impacts on local communities and individuals, and it is there we will explore direct impact on poor men and women affected by the project.

Second, to attempt to discern the size of any indirect impact of trade-related changes on the poor we will focus our attention in the study on actual changes. Whilst the PPA had to rely on simulations, because of the length of time over which the evaluation is taking place, we have an important opportunity to measure actual changes in trade, prices, wages, employment and poverty over a relatively long period. This will be the focus of our quantitative study.

Limitations in the performance evaluation methods

Availability of accurate, independent evidence for contribution tracing (CT) will be the key difficulty in data collection and analysis. Preparing for data collection well before fieldwork will provide an extended opportunity to capture these pieces of data, and to cast our net more widely across different stakeholders, watchdogs, monitors and others where reasonable expectations exist for the existence of relevant data. But it is important to recognize that it is possible we will not be able to independently substantiate some claims in which TMEA strongly believe their contribution is established. One further contingency is the full range of additional data collection methods and sources included as part of the performance evaluation. Where evidence useable by a CT analysis is not forthcoming, making a strong and defensible case through triangulation of sources and systematic elimination of alternative explanations may also help to strengthen contribution stories.

Survey or evaluation fatigue is another potential limitation for the performance evaluation. TMEA's own evaluations, DFID Annual Reviews and audits, and the independent evaluation total a significant burden on TMEA and counterparts' time and energy. Knowledgeable individuals in revenue authorities or ports, for example, will have answered numerous requests for information on their participation this year, and TMEA already reports they are concerned

about the burden this imposes. Nevertheless the importance of the accountability exercise this independent evaluation represents cannot be eliminated; it is a vital exercise around a very large investment. As such the evaluation team will have to work to minimise burdens where we can, work around the schedules of our interlocutors, and maximise the Appreciative Inquiry and active listening techniques that can make respondents feel appreciated.

TMEA team members say that their work should all be pointed towards reduction in trade costs, and reductions in time. In theory this might focus scrutiny on two indicators that can then show robust progress that reflects efforts across this wide and varied programme. In reality, however, it will be very difficult to link some of their important strands of work – policy work, capacity building, soft support to processes – to those two indicators, and even less so to quantify the impacts of that work on those indicators. Fortunately, there are other impacts that are as important to detect as changes in trade costs and time, and those are what our performance evaluation will seek to show.

The reduction in trade times indicator appears to be far more challenging to collect and calculate than it might seem at first blush. Time to enter a port, transfer goods to trucks, transit out of the port, and through the corridor – often passing through OSBPs – is actually a figure with many separate components that can all vary on a large number of variables. This will be a vital area to unpick, and it will not likely be answered in a definitive and unambiguous way, because of the range of variables involved. Still, the evaluation team recognises the centrality of this indicator and will work to codify how it works, and its advantages and disadvantages.

External validity of this study is likely to be very limited, as mentioned in the text, because of the singularity of the cases and the political economy and other context circumstances that have helped or hindered them. Our best response to this limitation is to include important detail – particularly through the CT interview and evidence processes – that can be instructive for readers who may be looking to apply some of TMEA's lessons in another context.

The timing of the evaluation also presents something of a limitation, in that the programme being evaluated ended a year ago. The greatest difficulty is likely to be the degree to which our questions and focus areas are "out of step" with TMEA respondents' pressing new responsibilities. At the same time, this timing allows for very nearly an ex-post look at more matured impacts, where these may exist.

Annex E Detail on Contribution Tracing Method

'Contribution Tracing' (CT) is one of the rigorous non-experimental approaches to establishing the validity of contribution claims in impact evaluation. It is based on the principles of both Process Tracing and Bayesian updating of probabilities and offers explicit criteria to guide evaluators in data collection and in measuring confidence in their findings with regard to the contribution of an intervention. CT uses both quantitative and qualitative data collected by means of a range of methods – interviews, document reviews, focus groups, observation, and the like.

CT is a theory-based impact evaluation design, with its own comparative advantages among other non-counterfactual and non-experimental designs. It is particularly strong at reducing confirmation bias, providing more transparency and predictability for data collection efforts and ultimately increasing the internal validity and credibility of evaluation findings (Befani and Stedman-Bryce, 2016). CT provides guidance on what evidence to seek out, and how to assess the strength of evidence, if observed, in relation to a contribution claim.

CT uses the principles of Process Tracing (PT) combined with a branch of mathematics called Bayesian Updating. PT is an established social science method that enables causal inferences to be made within a single case. CT also makes use of the logic of the four probative tests of Process Tracing by using Bayesian updating to quantify the confidence that an intervention has contributed to an outcome.

The four probative tests are called 'straw in the wind', 'hoop', 'smoking gun' and 'doubly decisive' tests, and they refer to the strength of a piece of evidence to support or refute a hypothesis. Another way to think of these tests is the degree to which the evidence thus tested is necessary and sufficient for causation. The table below lays this out.

Table 22: The four probative tests of PT[126]

		Is the evidence **sufficient** to establish causation?	
		NO	YES
Is the evidence **necessary** to establish causation?	NO	**Straw in the wind** Evidence that points toward accepting or rejecting a hypothesis, but is not enough	**Smoking gun** Evidence that confirms your hypothesis.
	YES	**Hoop test** Evidence that, if absent, disproves the hypothesis	**Doubly decisive** Evidence that both confirms the hypothesis *and* eliminates other hypotheses

In CT, the logic around these probative tests undergirds the calculation of probabilities of posterior confidence, as described below.

Bayesian updating is a method of statistical inference used to calculate posterior confidence in a contribution claim based on prior confidence. A mathematical procedure tests the

[126] Adapted from Collier, 2010, based on Bennett, 2010 which builds on concepts from Van Evers, 1997.

difference between the true positive rate, or 'Sensitivity', and the false positive rate, or 'Type I Error'. Here, *sensitivity* means the probability of observing an item of evidence if the contribution claim is true. *Type I Error* is the probability of observing an item of evidence if the contribution claim is *not* true. The larger the difference between the Sensitivity and the Type I Error, the higher the probative value of an item of evidence in relation to a specific contribution claim. Thus, the evaluator's task is to identify evidence with the highest probative value.

Bayes theorem comes from the fact that the 'conditional probability' of claim C being true, given observed evidence E (indicated by P(C|E)) is defined by a particular relationship: that (P|E) multiplied by the probability that evidence E is observed is equal to the probability that claim C is true *and* evidence E is observed, or in symbols;

$$P(C|E)*P(E)= P(C \text{ and } E)$$

Now notice that

$$P(C|E)*P(E)= P(C \text{ and } E)= P(E \text{ and } C) = P(E|C)*P(C) \text{ so}$$

$$P(C|E) = P(C)*P(E|C)/ P(E)$$

which is known as Bayes theorem.

Also notice that the probability of observing evidence E is equal to the probability of observing it and claim C being true plus the probability of observing it and the claim not being true, i.e.:

$$P(E)= P(E \text{ and } C) + P(E \text{ and not } C)$$

and plugging this into Bayes theorem gives

$$P(C|E) = P(C)*P(E|C)/((P(E|C)P(C) + P(E|\sim C)P(\sim C))$$

where

- P(C) is referred to as the "prior" confidence of claim C being true i.e., one's confidence in it *before* knowing whether evidence E is observed or not.
- P(C|E) is the "posterior" confidence in the claim being true *after* having observed evidence E;
- P(E|C), the probability of observing E given that C is true is referred to as "sensitivity" and
- P(E|~C), the probability of observing E given that Cl is not true is referred to as "type 1 error"

It is common to assume that the prior confidence in claim C is 0.5, meaning 'as likely as not'. This gives us:

$$P(C|E) = P(E|C)/(P(E|C) +P(E|\sim C))$$

It is immediately apparent that a low Type 1 error P(E|~C) will give high posterior confidence, while the sensitivity (P(E|C)), appears on the top and bottom of the expression and will largely cancel out. Even with a P(E|C) as high as 1 (that is, evidence that *must* be observed if a claim is true); if the evidence E is just as likely to be seen as not when the claim is not true (i.e., P(E|~C) =0.5), our confidence in that claim is only 0.66 or 'about as likely as not'.

Unfortunately, this sort of evidence is very common in evaluations, while evidence with a low P(E|~C) is much harder to find. Note however that there is some hope in combining multiple pieces of evidence – if that evidence is independent. Consider two independent pieces of pieces of evidence E1 and E2. The probability of observing both of them if the claim C is not true is P((E1 and E2)|~C) and if they are independent this is equal to P(E1|~C)*P(E2|~C). Even if both pieces of evidence are “as likely to be seen as not” when the claim is false i.e. P(E1|~C)=P(E2|~C)=0.5, the probability of seeing both is 0.25 which becomes ‘unlikely’.

Table 9 below shows the probative value of evidence with various combinations of sensitivity and Type 1 error.

Table 23: Confidence in claim C after seeing evidence E under various combinations of subjective probabilities of seeing evidence E if claim C is not true (Type 1 error) and seeing evidence E if claim is true (sensitivity)

	Type 1 Error P(E|~C)						
Sensitivity P(E|C)	**Virtually Certain**	**Very Likely**	**Likely**	**About as likely as not**	**Unlikely**	**Very Unlikely**	**Exceptionally Unlikely**
Virtually Certain	About as likely as not	About as likely as not	About as likely as not	About as likely as not	Likely	Very Likely	Virtually Certain
Very Likely	About as likely as not	About as likely as not	About as likely as not	About as likely as not	Likely	Very Likely	Virtually Certain
Likely	About as likely as not	About as likely as not	About as likely as not	About as likely as not	Likely	Very Likely	Virtually Certain
About as likely as not	About as likely as not	About as likely as not	About as likely as not	About as likely as not	Likely	Very Likely	Virtually Certain
Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	About as likely as not	Likely	Very Likely
Very Unlikely	Very Unlikely	Very Unlikely	Very Unlikely	Very Unlikely	Unlikely	About as likely as not	Very Likely
Exceptionally Unlikely	Exceptionally Unlikely	Exceptionally Unlikely	Exceptionally Unlikely	Exceptionally Unlikely	Very Unlikely	Very Unlikely	About as likely as not

Combinations that provide strong support for the claim are shown in blue.

Implementing Contribution Tracing

The key steps in implementing CT are the following:

1. Develop a testable claim

Developing a testable claim requires developing a claim which is detailed and measurable. Initial claims may need to be refined to make them more testable. For example:

- Untestable: The campaign supported reforms in the health system
- More testable: The campaign has shown the current health insurance-based system to be ineffective in delivering universal healthcare
- Testable: The campaign led the Government of Ghana to revise its methodology for calculating membership of the National Health Insurance Scheme (NHIS)[127]

The more detailed the claim the easier it is to make, as it is tailored to a specific case and therefore unique. Claims around impact are harder to test and attribute solely to the intervention. However, testable claims can be made at the level of outputs and different types of outcomes of the project (immediate and long-term outcomes). The number of claims to test will depend on the resources available.

The choice of any claim can be done together with the 'evaluand' (the implementing agency) based on their view of their most important achievements according to their TOC. We ask for their proudest accomplishments, most important achievements, or other appropriate wording, and write a brief summary of that story in the template (see figure below). This enables us to make the best use of limited resources by identifying those outcomes that were materialised and which have contributed to longer term outcomes or impact or have greater potential to do so. By doing so, we can also assess any unintended outcomes of the intervention that were not necessarily planned at the beginning.

The longer version of that story that emerges from the in-depth interview is maintained separately for evaluation records and can be returned to it later on; this can be helpful if there is significant difference from the story told by the implementing partner or agency and what is finally validated through the CT process.

Excellent interviewing skills – proposed in this study using an Appreciative Inquiry approach – are crucial to get all the necessary details of the story and uncover where it can be tested. By asking questions for every step we then gradually build up the story and complete the template. The basic template is below, which is then adapted and step names changed to fit each outcome story.

[127] Stedman-Bryce, 2013.

Figure 10: Contribution Story template

Contribution Story:	
Subjective Probabilities: Virtually Certain (VC), Very Likely (VL), Likely (L), As likely as not (ALN), Unlikely (UL), Very Unlikely (VUL), Exceptionally Unlikely (EUL)	
Narrative Summary:	
Step 1 Project Activities	**Evidence 1: Evidence for Claim That Activities Happened**
Reports written, training provided etc.	(e.g. reports, emails etc.)
Step 2: Changes In Government Institutions	**Evidence 2a: Evidence For Claim That Institutions Changed**
New structures or changed laws or regulations	Government Documents
	Evidence 2b Evidence For Claim Change was caused by Activities
	Emails, Timing, Place
Step 3 Improvements in Planning and Budgeting	**Evidence 3a Evidence for Claim that Planning and Budgeting Improved**
New or improved procedures or processes	
	Evidence 3b Evidence for Claim Change due to better Institutions
Step 4 Improvements in Service Delivery	**Evidence 4a Evidence for Claim that Service Delivery Improved**
Changes in the government's delivery of services	
	Evidence 4b Evidence for Claim that Improvement was due to better Planning and Budgeting
Step 5 Improvements in Welfare	**Evidence 5a Evidence for Claim that Welfare Improved**
Changes in Household Welfare	
	Evidence 5b Evidence for Claim Welfare improvement due to service delivery

2. Identify evidence for each step

Once contribution claims and their steps are identified, the next step is to identify evidence for each step to have been materialised. In other words, we follow the stated TOC (which may or may not align with project documentation TOCs) of the outcome of interest and then identify what evidence we want to see for each step (which corresponds to a TOC level: i.e. activities, inputs, outputs, and finally outcomes of interest). In so doing, we ask the evaluand for available evidence which would support their claims about each step taking place, and about the results of those steps having materialised as claimed.

When searching for evidence, it is important to remember about Type 1 error and sensitivity of each evidence. For example, emails/letters and meeting minutes and 'digital exhaust' have lowest Type I errors, P(E|~C) and quite high sensitivity, P(E|C). Minutes are written, there is no interviewer mediation, nor any one-on-one interaction with an interviewer. They are "private", meaning the project teams were not having a meeting because of the evaluation. In contrast, key informant interviews (especially if they were part of the network), have high Type I error values. However, independent KIIs are helpful and would have lower Type 1 error. Surveys often have high Type 1 error because there are lots of ways an outcome could have been achieved.

When we have all the evidence needed, for each step we establish a prior level of confidence. We ask for evidence for steps 1-3 and fill evidence boxes 1, 2a, 2b, 3a, and 3b. We also ask for judgements of probability for the evidence in each box, as shown in the next figure. These are qualified by the implied belief in each claim, together with the evaluand. We focus on one specific piece of evidence at a time, and estimate both the sensitivity and the Type 1 Error of that piece of evidence E for that claim C. In our template, we have added drop-down boxes to

ensure the selection is in our standard CT language; this also helps the interviewer and the evaluand to sense-check their selection against those closest to it in the lists.

Figure 11: Steps and evidence in support

Step 2: Changes In Government Institutions	**Evidence 2a Evidence For Claim That Institutions Changed**	
	P1: Probability of Seeing Evidence if Claim is True	As likely as not (ALN)
	P2: Probability of Seeing Evidence if Claim is NOT true	As likely as not (ALN)
	Belief in Claim given Evidence implied by P1 and P2	P1>UL, UL>P2 : ALN
	Evidence 2b: Evidence For Claim That Change was caused by Project	
	P1: Probability of Seeing Evidence if Claim is True	As likely as not (ALN)
	P2: Probability of Seeing Evidence if Claim is NOT true	As likely as not (ALN)
	Belief in Claim given Evidence implied by P1 and P2	P1>UL, UL>P2 : ALN

It is worth noting that the same piece of evidence can have – in fact will most likely have – different values of sensitivity and Type I error for different claims. That is because its probative value is specific to one claim. Confidence in the same claim will change differently according to which pieces of evidence are and are not observed.

We use the following qualitative descriptors of confidence to estimate probability of seeing evidence if claim is true and not true. In CT, the sensitivity of an item of evidence relates to the probability of observing it, **if** the contribution claim is true. Therefore, not observing such evidence *lowers* our confidence in a claim. The Type I Error of an item of evidence relates to the probability of observing it, **if** the contribution claim is NOT true. The higher the Type I Error (value closer to 1), the *less* unique that item of evidence is in relation to the claim under investigation.

- Virtually certain 99-100%
- Very likely 90-99%
- Likely 66-90%
- About as likely as not 33-66%
- Unlikely 10-33%
- Very unlikely 0-10%
- Exceptionally unlikely 0-1%

If we are more likely to observe an item of evidence if the contribution claim is true (sensitivity), than if the contribution claim is not true (Type I Error), then this evidence increases our confidence in the claim. Conversely, if we are more likely to observe an item of evidence if the contribution claim is not true (Type I Error), then this evidence weakens our confidence in the claim. And if the item of evidence is just as likely to be observed if the claim is true or false, then this evidence does not alter our confidence in the claim. Essentially, evaluators start with a confidence level of 0.5 (no information, about as likely as not) and search for evidence that helps to increase their level of confidence.

Finding evidence for inputs and outputs steps is relatively easy. It is 2b – when we ask about confidence that a change was attributable to the evaluand – when we will face challenges in finding evidence with low Type 1 Error. Type 1 Error will grow as we move from the first steps (activities and outputs) to the last step around the outcomes and the biggest problem we will face is lack of evidence with low Type 1 Error, or, often, inaccessibility of such evidence.

In order to increase the confidence of evidence for attribution, we will look for other factors which might have contributed to achieve the same step and then eliminate these (where possible). This elimination would be supported by our expert knowledge and relevant literature at hand, particularly in later evaluation stages. If some other factors remain at play as major contributing factors to the outcome under scrutiny then we can assess the contribution of our intervention of interest together with the others as one joint causal package.

3. Collect data and update confidence about claim

Once we have done the estimates for each evidence, we need to check evidence mentioned and analyse that evidence to assess whether or not evidence meets our prior confidence (seeing the evidence) and then update the prior probability with the posterior probability using the Bayes formula - the likelihood of claim CC being true given that evidence E has been observed. Here Table 1 above is helpful to identify whether or not our combination of evidence provides strong support for the claim.

Here we can use qualitative methods of data analysis to work with secondary or primary qualitative data. In this case we will not only have a CT table template with steps and evidence and confidence level but also findings from qualitative data analysis of evidence giving more context to the table.

4. Iterate

The steps discussed above then are iterated for each outcome and each piece of evidence as many times as needed. It remains a transparent process, with evaluands' and experts' inputs included as necessary.

5. Put claim and judgements up for challenge

After the calculations are done, the evaluation team will discuss our agreement with sensitivity and Type 1 Error scores. This is a discussion – debate – consensus process within the team.

Criteria for reaching judgments

When conducting CT, the main judgment involved is judgment about probability of seeing evidence in different circumstances using the qualitative markers. Contrary to PT, it does not involve quantifying sensitivity and Type 1 error prior and posterior after we have seen the evidence under scrutiny. Instead, the judgement is about probability of seeing the evidence and then, after seeing the evidence, deciding whether or not our C claim is true or false.

However, Fairfield and Charman (2015) found that giving assignments for the likelihood of observing each piece of evidence if a particular hypothesis is correct required multiple rounds of revision before they became reasonably stable, and there is no guarantee that they would have arrived at similar values had they initially approached the problem from a different yet equally valid starting point (i.e. a different sequencing of the evidence). Given these issues it makes sense to put the claim and judgements up for challenge and then agree or disagree on the final decisions.

The combined judgement about evidence implies a belief about the validity of the claim given that the evidence was observed. This step is carried out by a Excel model.

Figure 12: A summary table of evidence collected

<table>
<tr><th colspan="3"></th><th colspan="7">P2: Probability of Seeing Evidence if Claim is not True</th></tr>
<tr><th></th><th></th><th></th><th>VC</th><th>VL</th><th>L</th><th>ALN</th><th>UL</th><th>VUL</th><th>EUL</th></tr>
<tr><td rowspan="7">P1: Probability of Seeing Evidence if Activities if Claim is True</td><td>Virtually Certain</td><td>VC</td><td colspan="4" rowspan="4">ALN</td><td rowspan="4">L</td><td rowspan="4">VL</td><td rowspan="4">VC</td></tr>
<tr><td>Very Likely</td><td>VL</td></tr>
<tr><td>Likely</td><td>L</td></tr>
<tr><td>As likely as not</td><td>ALN</td></tr>
<tr><td>Unlikely</td><td>UL</td><td colspan="4">UL</td><td>ALN</td><td>L</td><td rowspan="2">VL</td></tr>
<tr><td>Very Unlikely</td><td>VUL</td><td colspan="4">VUL</td><td>UL</td><td>ALN</td></tr>
<tr><td>Exceptionally Unlikely</td><td>EUL</td><td colspan="4">EUL</td><td colspan="2">VUL</td><td>ALN</td></tr>
</table>

Fourteen Possible combinations; P1>UL>P2 : ALN, P1 = UL =P2 : ALN, P1 = VUL =P2 : ALN, P1 = EUL =P2 : ALN, P1>UL, P2=UL : L, P1>UL, P2=VUL : VL, P1>UL, P2=EUL : VC, P1 = UL, P2> UL : UL, P1 = VUL, P2> UL : VUL, P1 = EUL, P2> UL : EUL, P1 = UL, P2=VL : L, P1 = VUL, P2=UL : UL, P1 = EUL, P2= UL or VUL : VUL, P1 = UL or VUL, P2= EUL: VL

CT therefore offers less arbitrariness in assigning qualitative markers than other methods such as PT, which involves assigning numerical values to the likelihoods when attempting to quantify inherently qualitative data.

Nature of findings expected to be produced

In presenting the findings of CT we will aim at achieving a balance between the findings and conclusions, and the methodological details. CT will also make it possible to make each step visible to the reader and allow him/her to understand and see how judgments were made and on the basis of what evidence.

The ultimate product of CT is a precise contribution story that is backed up by evidence and can be tested. Such a contribution claim will be unpacked and discussed in more detail for every outcome assessed. The analysis tables will be provided in an Annex with necessary signposting in the main text.

It will also be possible to present both claims i.e. the initial and the final and demonstrate how precise, accurate and evidence-based the claim has become as it involves and changes throughout the CT process. Through qualitative data analysis, we can also cite particular pieces of evidence that help us contextualise and detail the contribution claim.

Annex F Differences between the design and the Inception Report

Performance evaluation

The performance evaluation design put forward in the IR was proposed as a summative evaluation only of the ports and OSBPs, as the IR timeline planned for the effectiveness study on intermediate and strategic outcomes as part of an earlier deliverable. As that level of analysis was not possible given the unexpected and compounded challenges discussed in the introduction to this report, it is being taken up again in this phase of the evaluation, specifically in the performance evaluation.

This has the effect of stretching out the period in which outcomes and impacts may have matured, which may indeed be helpful in the detection of impacts. Still, the underlying proposed analysis comes from the same school of non-counterfactual, non-experimental evaluation designs:

- While Process Tracing (PT) was proposed at inception, Contribution Tracing (CT) – a method that builds precisely on the logic of PT – is now considered **a stronger candidate method to substantiate TMEA's contribution claims**, as it will enable us to: reduce cognitive bias by focusing interviewees on evidence rather than causal claims; produce and use posterior estimates[128] to guide how we combine and interpret different sorts of evidence; reach a judgement about the strength of evidence supporting causal claims; and be more transparent with our analysis.
- In closing the first phase of the evaluation, without the Team Leader who had designed that exercise, the new Team Leader attempted to follow his logic but found it impossible to do so without **necessary new data collection** – particularly as the majority of projects had finished in the year's time since the data had been collected. TMEA viewed the resulting draft "pathway" documents as invalid as they were so out of date.
- That new data collection is currently underway (during the recent July-August visit to TMEA by several evaluation team members, and continuing into the performance evaluation data collection scheduled for Q4 2018). Given that Strategy 1 projects were completed since the original datasets were compiled, this allows the **estimation of outcomes achievement and TMEA contribution to continue through intermediate outcomes levels and to strategic outcomes** as well. This may well be a preferable way to view the pathways, since the strategy and design behind them did not "stop" at the intermediate outcomes level, as designed in the IR.
- Similarly, the extended period for data collection and analysis on the "full" pathways through their strategic outcomes allows for a **stronger analysis of complementarity** across TMEA component areas, which was designed in the IR to be done with projects that were not yet completed. This may give stronger evidence about synergies across component and support as well the validation and refinement of hypothesized TOC linkages. Where categories and layers were proposed to support these lessons learnt in the IR (see next bullet), the

[128] A conditional probability that is assigned after the relevant evidence or background is taken into account

appreciative inquiry proposed to garner evidence on complementarity seems more likely to find the types of results that will be helpful.

- One of the elements of the IR design was an exercise to map outcomes according to categories (advocacy and policy advice, knowledge generation and studies, institutional strengthening and training, technical and or financial cooperation, and provision of infrastructure and / or direct services to final users (e.g. SWIFT)) and layers (regional, national and local).
- The categories proposed in the IR, while still valid to describe the closed projects, are nonetheless not useful analytically in the manner proposed. There are no formulas for how these categories would determine or predict success, no “ideal mix” to postulate for lessons learnt. While it may be that the previous Team Leader had other plans for those categories and layers, unfortunately his intentions were not captured. However, we feel our present design is focused on the necessary details to generate lessons learnt, and will draw upon the categories and layers as needed in describing our findings.

Trade and Growth Impact Study

While there are no significant deviations to the approach proposed in the inception report, the current approach has taken a more targeted and measurable approach. The value chain/sector approach proposed here will be able to yield more valuable insights into how TMEA interventions have triggered changes, through which channels, and how have the gains been distributed across a sector. While the proposed methodology loses some of the macro approach proposed in the inception report, we have retained the CGE modelling so as to obtain some of the higher-level impacts resulting from change in that sector. We can therefore measure the wider economic benefits arising from the sector’s change, which have been brought about by TMEA’s intervention in areas that have impacted that sector. The tools used in the evaluation will not substantially differ from those proposed in the inception report, namely econometrics (gravity equations in particular for the estimation of AVEs), partial and general equilibrium modelling, and other dynamic economic analysis.

It is important to note the following:

- While we would have **richer, more relevant and more precise data** at the sector level, we would not capture the larger macro-economic gains arising from TMEA. A larger, more comprehensive “macro” approach would have (1) either entailed a number of assumptions and weaker results, particularly with respect to measuring the contribution of TMEA at a large scale; and (2) required substantially larger resources for data collection and a longer time scale.
- The team will rely more heavily on collecting **enterprise level data**, particularly with respect to inputs, intermediary products, exports and non-tariff information. The team will aim to quantify the effects of barriers that were removed by TMEA, which is aligned to the thinking proposed in the IR.
- We will exploit the richer data available under TMEA’s efforts at compiling **road and transport data** including those of the Northern Corridor Transport Observatory, and where possible, enterprise and transporters’ data.
- We will **avoid duplication with the Impact Model**, an ex-ante model which is being elaborated by TMEA, while at the same time finding ways that our findings may improve the reliability and realism of the Impact Model.

Poverty and Gender Impact Study

The present design proposes no significant changes to that put forward in the IR. On the other hand it does:

- Offer **greater detail on the original design**, including data sources and analysis methods, including how we plan to use mixed methods to triangulate the qualitative and quantitative streams of data.
- Include **comparison with the three OSBP sites visited in 2016**, which was not contemplated in the IR but which was made possible by the series of visits eventually undertaken for the PPA.
- Discuss the breakdown of methods and sources by evaluation question
- Proposes to have **more countries' national survey datasets included** in the quantitative analysis, than were present at the time of the PPA.

Value for Money Assessment

While there are no significant deviations to the approach to VfM assessment, it is important to note the following:

- We may undertake **benchmarking of key cost indicators against other programmes**, if similar programmes can be identified and if we have access to their data. The framework identifies other forms of comparative analysis for some indicators where comparison with other programmes may not be possible, including comparison with original estimates (for example costs in the Business Case or original contract, if available), comparison against TMEA's KPI targets, and review of annual trends within TMEA data.
- We do not propose to undertake **analysis of costs per output, beneficiary or outcome** because the nature of the outputs and outcomes generated in this kind of programme (e.g. infrastructure reform, process improvement. stronger institutions, policy reform) do not lend themselves to meaningful benchmarking against other programmes, and therefore do not provide useful information for making judgements on VfM.
- **Our economic evaluation at cost-effectiveness level will focus on a breakeven analysis, as described in the chapter on VfM (section 3),** which can be readily performed with limited data. It will be complemented by TMEA's own cost-benefit analyses, if TMEA has collected the necessary evidence, tracked the assumptions, and repeated the necessary calculations.
- Assessment of the **sustainability of delivery processes** will be based on evidence of TMEA's transition planning in preparation for the end of Strategy 2 funding. We will not assess the mandates, capacities, resources and frameworks of the public or private institutions which may be expected to take on some of TMEA's activities.

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Annex H Draft long list of projects for contribution tracing

Component and activity	Potential countries
SO1: Improved transport laws and infrastructure	
Mombasa Port infrastructure and reform support	Kenya
Dar Port infrastructure and reform support	Tanzania
OSBPs infrastructure and reform support (one or more)	Busia (Kenya/Uganda) to complement women in trade research; others per successes identified in TMEA
SO2: Increased ease of trading across borders	
2.1 Strengthening EAC regional integration: long-term TA for the EAC and two Ministries of EAC Affairs at national level	Regional Rwanda, Uganda, Tanzania or Kenya
2.2 Effective trade systems, agencies and procedures: Single window/electronic single windows, automation of tea auction	Tanzania, Rwanda or Uganda
2.3 Effective NTB Mechanisms: EAC policy support and NTB reporting hotline; two national monitoring committees	Regional Rwanda, Uganda, Tanzania or Kenya
2.4 Effective EAC Trading Standards: EAC support; country-level projects with two national standards bureaus	Regional Rwanda, Uganda, Tanzania or Kenya
SO3.1: Enhanced business environment for trade	
3.1.2 Improved processes for traders, especially women: EASSI; export TA for SME, Busia WCBTs, street sellers	Regional South Sudan, Tanzania, Uganda/Kenya, Burundi
SO3.2: Improved export capability	
3.2.1 Improved quality and standards of goods and services: Traidlinks; regional visa and tourism promotion	Regional Rwanda, Burundi

Please note that this list is of the major component projects in TMEA's portfolio. When the OPM proposes a selection for the contribution tracing (see Step 1 in the Performance Evaluation chapter and Annex E), we will select from their contribution claims *related to* these (or possibly other) projects or groups of projects. For example, one of TMEA's likely contribution claims is that their work at Mombasa Port has reduced time to import and export through that port, through the combination of projects they've carried out, by a certain figure (amount or percentage of time). It is that claim we will investigate using CT.

Annex I Possible projects for benchmarking costs

We have identified the following projects in the East Africa region/TMEA countries as possible comparators against which to benchmark key costs. As far as possible, we have sought projects in the same sector and roughly the same time period from a variety of funders and implementers. We have also included a selection of OPM-implemented projects in different sectors as a fall-back, should it be difficult to get access to data from projects implemented by others. We consulted the following sources: DFID Development Tracker, https://devtracker.dfid.gov.uk/; World Bank 'Projects' site, http://www.projects.worldbank.org/; JICA, Project data site, https://www.jica.go.jp/english/our_work/types_of_assistance/index.html; USAID projects site, https://www.usaid.gov/where-we-work/africa; EU projects site, https://ec.europa.eu/europeaid/sectors/economic-growth/regional-integration_en; OPM's Project Database.

No	Project name	Sector/focus	Time period	Total value	Funder	Implementer	Countries of Implementation (TMEA countries)
1	Competitiveness and Trade Extension Programme (COMPETE)/East Africa Trade Hub (EATH)	Regional integration, business competitiveness, investment and trade facilitation	2009-2014	US$102.8M	USAID	Chemonics International Inc.	Burundi, Rwanda, Uganda, Kenya, Tanzania, and limited assistance to South Sudan
2	East Africa Trade and Investment Hub	Regional integration, business competitiveness, investment and trade facilitation	2014-2019	US$64M	USAID	DAI Global, LLC	Burundi, Kenya, Rwanda, Tanzania, Uganda
3	World Bank Trade Facilitation Facility	Trade facilitation, infrastructure, capacity building, regional integration, improving trading environment (i.e. procedures and regulations)	2009-2015	£34.3M	DFID (£12.5 million); the Netherlands, Sweden and Canada	World Bank	Kenya, Rwanda, Tanzania, Uganda, Burundi
4	Regional Infrastructure Programme for Africa (RIPA)	Technical capacity building, investment support (in infrastructure), trade facilitation, improving trading environment (i.e. procedures and regulations) and regional coordination	2012-2016	£79.25M	DFID	AfDB (IPPF); EU (ITF); ICA	Kenya, Tanzania, Rwanda, Uganda, Burundi in East Africa

No	Project name	Sector/focus	Time period	Total value	Funder	Implementer	Countries of Implementation (TMEA countries)
5	East Africa Trade and Transport Facilitation Project	Regional integration, capacity building, investment support (in infrastructure), trade facilitation	2008-2015	US$340.4M	World Bank, AfDB, DFID, TMEA, Govts	Govts of recipient countries; Rift Valley Railway Company	Uganda, Kenya, Tanzania, Rwanda
6	Capacity Development for International Trade Facilitation (Customs Administrations) in the Eastern African Region	Technical and institutional capacity building and trade facilitation	2007-2017		JICA		Kenya, Burundi, Rwanda, Tanzania and Uganda
7	Supporting Indian Trade and Investment for Africa	Trade and investment facilitation, institutional support, capacity building in selected value chains, improving trading environment (i.e. procedures and regulations)	2014-2020	£19M	DFID	International Trade Centre; evaluated by OPM	Kenya, Rwanda, Tanzania and Uganda
8	Corridors for Growth	Investment in public and private infrastructure (port); technical and institutional support	2016-2021	£71M	DFID	WB and TMEA	Tanzania
9	Regional Economic Integration Support (REIS) Programme	Regional integration; trade facilitation, improving investment climate	2013-2018	€19.6M	EU	Trade, Industry, Finance and Investment (TIFI) Directorate	SADC, including Tanzania
10	Trade Facilitation Support Programme	Technical support to reforming trade facilitation practices, including laws, procedures, processes and systems	2014 - ongoing		World Bank	Mid-term stocktaking to be conducted by OPM	Over 40 countries (with 28% in sub-Saharan Africa)
11	MCF Savings at the Frontier	Improving the delivery channels and agents of formal financial services	2015-2021	£11.5M	Mastercard Foundation	OPM	Tanzania

No	Project name	Sector/focus	Time period	Total value	Funder	Implementer	Countries of Implementation (TMEA countries)
12	Kenya Extractives	Natural Resources Governance; public sector capacity building	2015-2018	£4.5M	DFID	OPM	Kenya
13	GEFA Int. WASH Results Programme	Sustainability and process evaluation of the result-based financing WASH interventions	2013-2018	£4.4M	DFID	OPM	Kenya, Tanzania, Uganda, South Sudan
14	Research on Improving Systems of Education (RISE)	Research on education systems and systems reform; capacity building; institutional support	2014-2023	£36.9	DFID	OPM	Tanzania
15	UNAIDS Technical Support Mechanism	Technical and institutional support, capacity building	2017-2022	£9.7M	UNAIDS	OPM	Sub-Saharan Africa
16	DFID (MAINTAIN) Shock Response Essential Services	Operationally relevant research on contingency planning, disaster response and disaster risk financing	2017-2023	£14.8M	DFID	OPM	Kenya, Uganda
17	Strengthening Education Systems for Improved Learning (SESIL) Programme	Institutional support, technical assistance to the education assessment system; institutional coordination	2016-2021	£5M	DFID/Mott MacDonald	OPM	Uganda

Annex J Matrix for assessing VfM across programme components

	What went in and what came out?			Value for Money assessment criteria			VfM judgement
Component	**Approximate spend/spend band (date e.g Dec 2016)**	**Headline results (component outcomes /impact)**	**Evidence from economic evaluation, if available (date) (e.g. IRR)**	**Relevance and significance of the issue addressed to TMEA objectives**	**Magnitude /significance of component outcomes/impact relative to cost/expectation**	**Expected sustainability of component outcomes/impact**	
SO1: Ports							
Mombasa	*US$47.55m (Dec 2016) (2C3A)*	*Good progress on infrastructure and productivity; stalled on port reform*	*IRR = 19.3% (berth reconstruction); comparison to other similar programme*	*High: deep sea cargo ports are a critical are necessary part of international trade-facilitating infrastructure…. (2C3A)*	*High: investment has reduced dwell time significantly (2C3A); good potential to increase trade traffic and volumes*	*Medium: needs more attention to port reform and modernisation (2C3A)*	*e.g. good*
Dar	*US$12.72m (Dec 2016) (2C3A)*	*Failed to achieve strong results in any area*	*IRR = ?;comparison to other similar programme*	*High: deep sea cargo ports are a critical are necessary part of international trade-facilitating infrastructure…. (2C3A)*	*Low: little tangible benefit derived from investments (2C3A)*	*Low: needs more attention to infrastructure improvement, productivity and port reform and modernisation (2C3A)*	*e.g. poor*
SO1: OSBPs							
Busia							
Malaba							
Mirama Hills							
SO2:							
SO3:							

Annex N: Terms of Reference

Independent Evaluation of TradeMark East Africa

INVITATION TO TENDER – VOLUME 3

Terms of Reference and any Additional Information Documents

Closing Date for Tenders: 13 February 2015

Independent Evaluation of Trade Mark East Africa

Terms of Reference

A. Introduction

1. The TradeMark East Africa (TMEA) programme aims to improve trade competitiveness in East Africa by reducing transport time/costs and improving the trade environment. It targets an increase in trade of 10% (above trend 2010-2016), contributing to sustained economic growth and poverty reduction. The TMEA agency was officially launched in February 2011 as a specialist not-for-profit agency to implement the TMEA programme. TMEA is currently funded by the UK, Belgium, Canada, Denmark, Finland, Netherlands, Sweden and USA. TMEA's secured budget to date totals about £330 million ($540m). The first phase of the programme officially runs to June 2016, but funding is likely to continue over a second phase up to 2020.

2. This is a large, high-profile programme in an area of great interest for continued development work, which calls for a robust and independent evaluation. DFID is commissioning this key evaluation as acting Evaluation Manager on behalf of all TMEA donors.

B. Purpose and Objectives

Purpose

3. The evaluation has 2 equally important purposes:

   (a) To identify and feed lessons learnt into the management of the remainder of the current programme and the design of any potential continuation of the TMEA programme and/or future regional trade integration programmes (driver: improving trade development programmes and enhancing the global evidence basis);

   (b) To account for progress at outcome and impact level in an internationally recognised independent and impartial manner (driver: oversight and accountability requirements).

Objectives

4. This is an evaluation to assess the impact of the TMEA programme on trade, inclusive economic growth, and poverty reduction, and understand causal pathways and the mechanisms at work. As an impact evaluation, it emphasises causality and where possible attribution or at least contribution to outcomes and impacts.

5. Growth and poverty reduction are high level goals. It may not be possible to measure an attributable impact of TMEA on these goals. However, the evaluation will need to analyse pathways and understand the way in which the TMEA programme has affected poor people, and the way in which it has contributed to growth.

6. The core objectives of the evaluation are:

   1) Test the **Theory of Change (TOC),** assessing all causal links and the robustness of underlying assumptions (including links between trade, growth and poverty

reduction), and adjusting the TOC to serve as a reliable guide to interpret the programme and to make programme improvements.

2) Analyse and, to the extent possible measure: the regional integration programmes' **impact** on regional trade, growth and poverty (and on the various stakeholders, in particular on men and women separately, poor and vulnerable groups, as well as traders and consumers); and **sustainability**.

3) Assess the **effectiveness** of the TMEA programme, including organisational effectiveness, and whether the programme represents **Value For Money.**

4) Throughout, identify **lessons learnt relevant beyond TMEA**, i.e. insights on enabling and constraining factors, critical actions and gaps which would be generalizable to future programmes or to other contexts.

C. Recipients

7. The primary recipients of the services comprise TMEA's Programme Investment Committee (PIC) as well as the planned Council and Board[1] alongside the National Oversight Committees which exist in five of the six countries with active TMEA interventions.

8. The evaluation will provide evidence on trade and development of interest more widely. In particular, outputs of the evaluation are likely to attract significant attention from many actors, including the East African Community (EAC), regional governments, regional institutions such as the EAC Secretariat, multilateral and bilateral partners, business and civil society

9. The ultimate beneficiaries are the citizens of partner countries, whose lives should be improved through improved projects and programmes.

D. Background

Context

10. Despite significant growth, East Africa's share of world exports is below 0.1% - around half the global average on a per capita basis. It costs East African countries twice as much to trade than it does East Asian and developed countries. Transport costs are excessive and especially for landlocked countries – freight costs are more than 50% higher than in the United States and Europe and add nearly 75% to the price of exports from Uganda, Burundi and Rwanda. [*Nathan Associates, 2011*] The problem is not just one of distances – inefficient customs and port processes, excessive bureaucracy and poor infrastructure all impose substantial transport delays and significantly increase costs. These problems are both national and regional and advocate for a regional approach to solutions, focused on developing East Africa's transit corridors to open up its economic opportunities and reduce the high costs of doing business and trade.

11. The East African Community (EAC) was re-established in 1999 by Kenya, Tanzania and Uganda. Burundi and Rwanda subsequently joined in 2007. The Customs Union formed

[1] See Governance reforms outlined in Background section.

in 2005 has led to a 67% increase in trade between EAC countries, but considerable work remains to make it fully effective, such as removing non-tariff barriers, implementing a first point of entry system for the clearance of goods and collection of import duties and implementation of a common trade policy. The Common Market is scheduled to be fully implemented by 2014, although this timing is likely to slip. The EAC is also part of the Tripartite (COMESA-EAC-SADC) initiative, which it chaired from July 2013 to June 2014. The EAC has made the most progress on economic integration of any of the regional economic communities in Africa, and represents a major opportunity for lesson learning across the broader Tripartite through creating a larger market; allowing producers and traders across the region to exploit economies of scale; increasing investment and accelerating the introduction of new technologies. EAC integration is also expected to increase political stability and provide a focus for shared legislative and regulatory reform.

12. Evidence from a range of studies points to improvements in the business environment associated with trade competitiveness leading to improved growth, jobs, incomes and social effects. While the relationship between trade, growth and poverty reduction is complex, very few countries have grown over long periods of time or secured a sustained reduction in poverty without a significant change in competitiveness and a large expansion of their trade. Poverty reduction in broad terms has followed as a consequence of increases in income, employment and government social expenditures. However, there are risks and opportunities in the short and longer term for particular poor groups (and regions) as increased trade transforms livelihood possibilities.

TMEA

13. TMEA is a multi-donor funded programme, which was officially launched in February 2011 as a specialist not-for-profit agency to implement programmes to promote trade growth in East Africa. TMEA aims to increase exports (by 10% above trend 2010-2016) through cutting the costs of trade, especially through reduced transport time (by 15%), and a focus on the national implementation of regional trade agreements. This national focus is innovative for a regional programme, and as a result, TMEA has presence in all EAC countries (plus South Sudan, which has applied to join the EAC) with its headquarters in Kenya. TMEA seeks to deploy a wide range of instruments quickly, including financial aid, output-based aid and technical assistance, to tailor interventions to the needs of partners, and to manage fiduciary risk.

Theory of Change (TOC)

14. Figure 1 illustrates the TOC for the TMEA programme. A detailed description is available in the business cases and a separate TOC document (see Annexes). There are several layers to TMEA's TOC. The TOC can be viewed as a hierarchy where various sub-theories link up and across the programme's focus areas.

15. At the higher end of the TOC it is proposed that three necessary key 'trade competitiveness' elements contribute to increasing trade. These elements are increased physical access to markets, enhanced trade environment and improved business competitiveness.

16. Correspondingly, TMEA's 3 Strategic Objectives are articulated as follows:

    SO1 - Increased Physical Access to Markets (around 44% of the budget)
    SO2 - Enhanced Trade Environment (around 42% budget)
    SO3 - Improved Business Competitiveness (around 14% budget)

17. Increased trade is believed to contribute to increased economic growth and subsequently reduce poverty. Precise effects depend on the nature of trade reforms and how the poor make their living [Winters & Martuscelli, April 2014]. Thus examining localised situations and the pathways to growth and poverty is a key part of this evaluation. Economic growth and poverty reduction do not appear explicitly in TMEA's overarching TOC since they are very high in the logic hierarchy; however they are captured in some of the donor programme documents.

18. Each of the boxes in Figure 1 is expected to contribute to increased trade, but no one element is sufficient by itself. A number of assumptions underpin the relationship between the black boxes and each strategic objective.

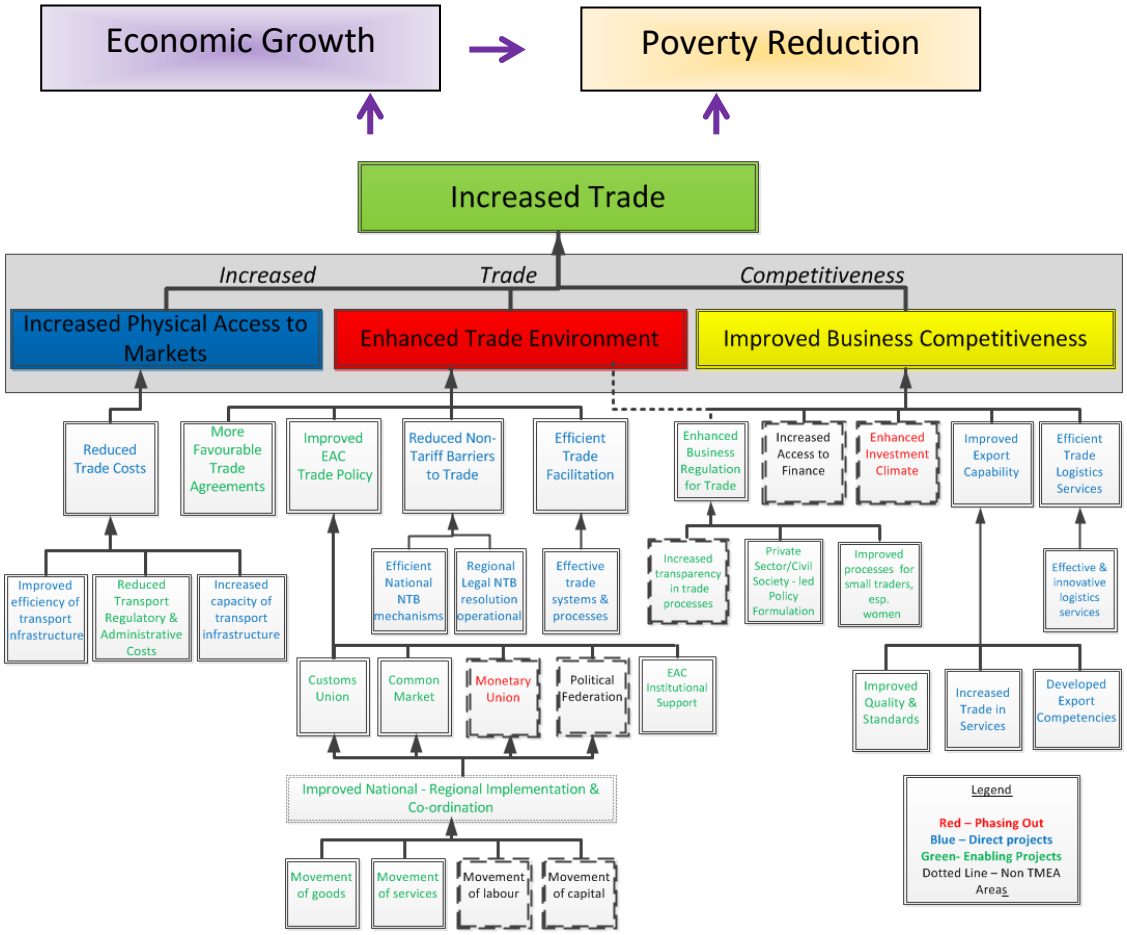
19. These include, on the expected result of "increased trade", that:
    - There are sufficient buyers who are willing to pay for East Africa's improved quality products and services;
    - The private sector uses the opportunities of increased affordable market access to increase and/or expand the number and size of exporting firms;
    - The private sector increases the sophistication of exports;
    - The private sector has the capacity and will to utilise opportunities presented by an enhanced trade environment.

20. On the simplified logic on the relationship between "increased market access" and "trade", that:
    - Current trade costs in East Africa are a deterrent for exporters and importers;
    - Reducing trade costs will make a significant contribution to increasing market access for East African importers and exporters;
    - Transport prices are a major contributor to trade costs;
    - Indirect costs caused by delays are a major contributor to total transport prices;
    - TMEA has greater ability to influence the reduction of indirect costs as opposed to direct costs, e.g. fuel, labour, truck operating costs;
    - East African transport logistics service providers will pass on costs savings brought about by reducing delays to consumers of logistics services';
    - The East African logistics industry is competitive;
    - TMEA interventions will contribute to reducing transportation costs as will other organisations' interventions, i.e. World Bank, JICA, USAID;
    - Increases in other costs will not be more than any reduced indirect costs.

21. A number of assumptions underpin the simplified logic on the relationship between "enhanced trade environment" and "trade":
    - Implementing the EAC regional trade agreements will contribute to enhancing the trade environment in the region;
    - There is sufficient demand by partner state parliaments, public sector, private sector and civil society organisations to drive the regional economic community agenda forward;
    - Regional trade policies will be prioritised by partner states over national trade policies and priorities.

22. Within this complicated picture of factors that are necessary to achieve increased trade, TMEA has a more specific focus driven by practical reasons, as indicated through the colour coding (see legend at bottom right of Figure 1). All current projects now fall in either the 'direct' or 'enabling' category.

Figure 1



23. Each of the strategic objectives is unpacked a bit more in the TOC document (see Annexes), which describes the expected causality chains and key assumptions.

24. Just as one example, the cost of access is seen as a component of the cost of the goods. One key factor contributing to high transport costs is inadequate infrastructure that does not meet current and future traffic needs, resulting in congestion and delay. This delay has a cost. Even where the transport infrastructure is adequate, delay can result from inefficient use of assets. Key causes of unnecessary delay include low labour productivity, bureaucratic inefficiency, poor transport regulation, and corruption. For these reasons, most of TMEA's activities in this area are designed to reduce unnecessary delay. Yet for activities to have the intended outcome, certain assumptions must hold:

- The activities must actually result in time savings (delay reductions);
- The value of those time savings must be greater than the cost required to achieve those savings;
- The net savings must be passed along from transport services providers to consumers via the price of transported goods;
- The resulting price reductions must induce additional trade in those goods (that is, the demand curve must be elastic).

Governance

25. Currently, a Programme Investment Committee (PIC) supervises the activities of TMEA and provides strategic direction to TMEA to ensure that it achieves its developmental goals. The PIC is supported by a regional (EAC) Programme Coordinating Committee (chaired by a Deputy Secretary General at the EAC Secretariat) and a National Oversight Committee (NOC) for each country[2] programme. The scope of authority of the PIC is set out in the PIC Constitution and is entrenched in the Articles of Association of TMEA. The PIC is the apex governing body and has primary responsibility for governing the affairs of TMEA. There is also a TMEA Board (required under Kenya company law), which handles financial management and human resource issues, but this is effectively a sub-committee of the PIC as all Board decisions require a "no objection" from the PIC.

26. However, it was recognised recently that there is a need to resolve and simplify the potential overlap between the Board (which has "de jure" liability for TMEA operations but is not the apex body for decision making) and the PIC (which has the decision making power, but not the legal responsibility, although a court is likely to determine that it has "de facto" liability). In November 2014, the PIC approved a new TMEA Constitution (see Annexes) which will in due course establish a Council (mainly handling strategic direction) and a professional Board (mainly handling operational decisions). A recruitment process is now underway to contract Board members. Once complete, a date will be set for the new Constitution to become effective (likely to be mid-2015), at which point the current PIC and Interim Board will be dissolved and replaced by the new Council and Board.

27. A unique feature of the TMEA governance structure is the delegation of oversight roles at the national level. Although these National Oversight Committees (NOCs) are mainly advisory bodies to the PIC, they play an immensely important role in supervising and monitoring the national level programmes. The NOCs are chaired by Permanent Secretaries (the Ministry of EAC) and membership includes all key donors, government agencies, private sector and civil society representatives.

Monitoring and evaluation architecture

28. In August 2013, a revised monitoring, evaluation, and learning (MEL) approach paper was reviewed by the TMEA PIC. It was agreed to incorporate plans for an independent external evaluation into the MEL to ensure complementarity of the internal and external evaluation work and to avoid duplication. A Joint Evaluation Group (chaired by DFID) was established as a sub-committee to the PIC to oversee the evaluation work. Terms of reference for the JEG are attached in the Annexes. The revised MEL approach paper was approved at the PIC meeting in May 2014 and is attached in the Annexes.

29. As set out in the MEL, TMEA's monitoring and evaluation system is comprised of the following components:
    - Overall results framework, a sub-set of outputs from individual project monitoring plan, which serves as an important accountability tool for TMEA donors;
    - Individual project monitoring plans;
    - Quarterly external progress reports;
    - Quarterly internal programme performance review meetings (QuORTs);
    - A Management Information System (MIS) that requires TMEA project managers to input and update project work plans and monitoring plans;

[2] Processes for setting up a NOC in South Sudan are still underway.

- A “Results Meter” has been developed to serve as an aggregate score card to show progress towards targets in the results framework (this Results Meter is likely to be subject to an external quality assurance early 2015);
- An Annual Review commissioned by investors to assess progress against the TMEA results framework;
- An evaluation plan, outlining the division of labour between internal TMEA evaluation work (mainly formative evaluations) and the independent external evaluation work (commissioned here).

30. TMEA also has a research programme (previously involving a call down contract with the Institute of Development Studies (IDS). This has examined the literature on linkages between trade, growth and poverty reduction, as well as simulated modelling on the impact of the EAC customs union. However, it has not conducted any primary data collection on TMEA projects.

31. TMEA organises its information management on the basis of around 200+ project budget lines, of which around 165 were active at August 2014. In some instances, several project budget lines could be seen as sub-components of one ‘intervention’ (eg. support to the revenue authority in Burundi is broken down by categories of expenditure).

Key stakeholders

32. Key stakeholders for the evaluation include:
    - TMEA donors, who are represented on the Programme Investment Committee (PIC);
    - The East African Community Secretariat (the Secretary General sits on the PIC as “Patron”; and a Programme Coordinating Committee in Arusha manages the TMEA-EAC partnership);
    - National Oversight Committee (NOC) members (including government, private sector, civil society and donor representatives at the national level);
    - Staff involved in oversight and implementation of TMEA projects;
    - Implementing partners at regional and national level;
    - Ultimate beneficiaries (producers, transporters, clearing and forwarding agents, consumers) of TMEA’s programme support.

E. Key questions

33. The key evaluation questions below reflect the 4 core objectives of the evaluation (see section B), which can be summarised as: test the Theory of Change; impact and sustainability; value for money and effectiveness; and lessons learnt relevant beyond TMEA. These are outlined below.

34. In addition, for each of the key evaluation questions, an indicative set of sub-questions is provided in Annex 1.

Question 1. How robust and verified are the causal links and assumptions in the Theory of Change (TOC) and does the TOC provide a reliable guide for programme interventions?

As a premise for the evaluation, the full TOC will need to be re-examined. This question will require an analysis of constraints to trade/growth/poverty reduction, an assessment of the robustness of the assumptions underpinning the TOC, and an assessment of whether the logframes, targets and milestones are appropriate and realistic.

This will need to consider carefully the political economy around the programme and trade in the region, economic contextual changes, policy changes, and TMEA's relationship with related initiatives (both government and private sector). It will also need to consider the relevance of the instruments and mechanisms used.

Question 2. What is the likely impact on trade, growth and poor people, and what is critical in order to ensure sustainability of positive impacts?

This question covers the key issue of TMEA's current and likely impact on regional trade, the links to growth and poverty reduction, and the sustainability of their interventions. Of particular interest will be to understand the *mechanisms* at work, to identify why and how things worked, who benefited and how, and any potential negative impact. There is a specific interest in understanding how TMEA activities to reduce transport time have impacted on poor people, and how the programme has benefited or harmed women and girls. Of particular interest also is the issue of sustainability, and of identifying the essential components of a future exit strategy.

Analysing and understanding the pathways through which the TMEA programme is likely to have affected poor people (positive and negative, intended and unintended impacts) is a crucial question for the evaluation. As noted above however, measuring TMEA's impact on regional poverty as a whole programme is not expected to be possible. However, analyses of pathways and measuring localised impact for selected interventions, should be feasible. On the other hand impact on trade is expected to be quantifiable with reasonable attribution, and the evaluation should also verify the programme's claims to impact on trade.

Question 3. Where has the programme been effective and achieved good Value For Money and how could this be improved?

This question will assess effectiveness, economy and efficiency, including whether TMEA activities have produced the outputs anticipated in the results framework, organisational effectiveness whether and where the TMEA programme has provided value for money. This will also require and an assessment of the operational model and of the M&E system

Question 4. What are the lessons learnt that are relevant beyond TMEA?

All sections above should contribute to this question. Throughout the evaluation, lessons learnt should be identified that may be relevant beyond TMEA in order to inform future programming as well as contribute evidence towards comparative effectiveness of regional programming. This question is separated out to emphasize the importance of generating learning that is transferable to other programmes (by TMEA donors and others) and which contributes to the global evidence basis, and of capturing this in a way which promotes uptake.

35. OECD-DAC evaluation criteria map onto the questions structure presented in the Annex to a large extent, but are not of equal interest and the evaluation will focus on ***effectiveness, efficiency*** and ***impact*** criteria.

36. The set of sub-questions in the Annex is indicative. Sub-questions of particularly high importance to the primary recipients (i.e. PIC and NOCs) are marked with an asterix. Not all questions will apply in equal depth at all evaluation stages. Some questions are for consideration early with more of a formative angle, others only at the end but the evidence needs gathering from the outset. Note also that the indicative sub-questions in the Annex may contribute to more than one objective.

37. The Evaluator will need to review and adjust the set of sub-questions, and consider any other questions required to meet the 4 objectives – while remaining very focused on these objectives and avoiding unnecessary inquiries. The Evaluator will need to consult with stakeholders more widely to refine the evaluation sub-questions during the inception phase, for agreement by PIC.

F. Scope

38. The independent evaluation commissioned through these TORS consists of one single evaluation. This will include a Theory Based approach located within the TMEA TOC and which includes the pathways to trade and growth and to poverty reduction for the whole portfolio, as well as similar documentation (sub-theories) for individual projects (projects of particular importance would be large investments, those of a catalytic nature, and those targeted to provide livelihood gains to particular groups e.g. small holder farmers and traders).

39. Nonetheless, it is expected that to meet its objectives the evaluation will need to be carefully structured, and comprise various components. As an indication, the evaluation is expected to require the following components, though bidders are free to select whatever structure and approach they feel most appropriate to address the objectives and key questions:

    - *A study of impact on poverty*, examining the pathways to poverty across the programme, who is benefiting and who is losing out, and providing a sense of the likely scale of benefits or losses where feasible for example in selected localised areas/interventions.

    - *A study of impact on trade*, establishing how trade changed as a result of the TMEA programme, how an increase in trade resulted (if confirmed by the evaluation) or why it did not, key enabling factors and constraints - contextual and programmatic.

    - *An institutional assessment of TMEA as an organisation* covering organisational capacity, organisational effectiveness and delivery performance, factors in the wider enabling environment, and partnership analysis across the different partners.

    - *A formal evidence synthesis* approach covering the work of the Evaluator, the monitoring, internal evaluations and learning conducted by TMEA, and evidence from other research activities around trade and poverty reduction in East Africa.

40. The following interventions are of particular interest: Mombasa port, Dar es Salaam port, and the One Stop Border Posts (OSBPs). In particular, the evaluation should look at pathways to poverty on the Mombasa port and at least 3 of the OSBPs, and set out baselines and design for looking at impact of work on the Dar port in due time.

41. The evaluation will need to balance of breadth (e.g. to deliver a programme, portfolio level evaluation) and depth (e.g. to understand pathways to poverty impact).

42. Given the project timelines it is expected that the first reports will encompass a substantial formative element.

43. TMEA comprises a number of infrastructure projects. As per key questions, this evaluation examines the effect of the projects, and would exclude engineering inspection type of activities.

Roles and responsibilities of the independent Evaluator vs TMEA

44. During inception the Evaluator will need to work with TMEA to determine respective responsibilities monitoring and evaluation activities, particularly for collecting data, for agreement with the PIC (and Council once established). Bids should provide a clear initial approach of how they propose to manage the interface with the TMEA organisation and its work and how they will refine this during inception.

45. Broadly speaking, TMEA is responsible for monitoring against the results framework (including outcome level and impact on trade), for project monitoring, and for internal evaluations as indicated in the Joint Evaluation Plan (JEP). The Evaluator is responsible for quality assuring monitoring data, for quality assuring and triangulating any evidence they use, providing recommendations and guidance to strengthen data quality, and identify and carry out new data collection required specifically for the purposes of the independent evaluation.

On monitoring data:

46. Data for monitoring the results framework is the responsibility of TMEA, including both underlying and aggregate data. The Evaluator is expected to review periodically the monitoring data gathered by TMEA (result framework data and other data to be used in the evaluation) and to make prompt recommendations to improve the quality of these data and ensure their suitability for evaluation, and where appropriate to propose complementary data collection measures.

47. The Evaluator will be responsible for the identification and provision of any new primary data needed for the purposes of the independent evaluation – whether as an area not covered by the existing M&E or for triangulation purposes. The Evaluator will need to determine which arrangements would be most cost-effective overall and least burdensome on beneficiaries or programme implementers. If additional data needs to be added to existing TMEA monitoring processes for the purposes of the evaluation, the Evaluator will provide support on methodological development for indicators and data collection.

On evaluations:

48. A Joint Evaluation Plan (JEP) has been agreed by the PIC (see Annexes). Proposed evaluation work has been divided between “internal” (TMEA’s internal evaluation programme, based on learning priorities) and “external” (this independent evaluation).

49. Aside from the overall independent evaluation, the JEP identifies selected key projects under each of TMEA's three strategic objective (SO) pillars. This independent evaluation will encompass the overall impact evaluation, summative evaluation reports of all three pillars, Mombasa port, Dar es Salaam port, and OSBPs. TMEA will manage internal formative evaluations of selected projects under SO2 and SO3, plus two ex-ante evaluations and summative evaluations needed urgently.

50. For effective learning and consistency of approach, the independent Evaluator and TMEA will need to discuss the internal formative evaluations, to ensure that pertinent issues relevant to the independent evaluation are taken into account such as agreement on indicators, issues to be covered, or exploring relevant challenges.

Links to other programme evaluations

51. The Evaluator will need to consider other evaluations underway in the region, by the TMEA donors or by others, for any substantial overlap or synergies or lesson learning. In particular, the evaluation should consider risks and opportunities faced by the TMEA programme, by learning from evaluative exercises of other trade or integration programmes, such as any IMF or WB regional programme in Africa, DFID's TMSA, DFID's AgDevCo, or others.

52. There is also a higher-level evidence question related to the comparative effectiveness of regional programming, which DFID in particular aims to investigate across DFID-funded wealth creation programmes in East Africa. The TMEA evaluation will contribute to this thematic evidence basis (see evaluation questions in Annex 1). This will require flexibility to use a common framework appropriate for future synthesis, while preserving the integrity of the TMEA programme evaluation.

Extensions

53. It is possible that the scope may be extended to some of the internal evaluation work. This will be reviewed during the inception phase.

54. Should there be a new programming phase beyond 2016, it is possible that this Evaluation contract may be extended to cover part or all of the new phase. It is likely that any extension would be for up to 30 months.

G. Methodology

Evaluation approach and methods

55. Bids should provide a clear description of the design and methodology they will use to answer the key questions, including recognised evaluation methods to be used, proposed counterfactuals if/where appropriate, proposed data collection methods, analytical methods, and approach to synthesis. Ideally this would be supported by an illustrative evaluation matrix.

56. This is a complex programme, with multiple countries, multiple multi-layered projects with different stakeholders and beneficiaries. It is critical for bids to explain how the complexity of the programme and of the evaluation will be managed.

57. In particular, careful attention will need to be given to how the evaluation is approached and designed as a coherent whole, anchored on the overarching TOC. It is expected that a range of quantitative and qualitative methods might be necessary. Bids should take care to articulate clearly how the overall design and specific methods and tools fit together. Bids should explain how a potentially large range of elements will fit together to answer the overarching questions, how the synthesis will manage disparate data sources with variable quality and availability, and where and/or how information might be aggregated.

58. Bids should pay particular attention to demonstrating how rigour and credibility will be upheld at all stages throughout the evaluation.

59. In 2012 TMEA commissioned Upper Quartile to undertake a review of options for evaluating the Impact and Value for Money of its activities, to help TMEA decide on options on structuring and implementing its evaluation activity (see Annexes). This identified a selection of projects, which is different from the more recent selection in the JEP. Bidders should note that the context has evolved and the scale of TMEA has increased since the 2012 paper, and that the approach to the independent evaluation is expected to present major differences.

60. Secondary data, including TMEA's own monitoring and evaluation data, should be quality assured. More generally, triangulation of data and/or findings is essential.

61. Bids should set out clearly the extent to which the proposed approach will answer the questions, and limitations.

62. Bids are strongly encouraged to be as specific as possible in their proposals, including in terms of coverage of any method to be used, the quality level that would be achieved, number of projects covered, sample sizes, etc.

Principles and standards

63. As per DFID evaluation policy, the evaluation should adhere to international best practice standards in evaluation, including the OECD DAC International Quality Standards for Development Evaluation, the OECD DAC principles Standards for Development Evaluation, and DFID's Ethics Principles for Research and Evaluation. Bids should demonstrate how they will achieve this.

64. In line with Paris Declaration principles, the Evaluator - and TMEA M&E approaches - should take account of national M&E systems, draw on existing data where available, ensure new data collection is complementary to existing systems and that new data are made available to national stakeholders as far as possible.

65. Care should be taken to avoid duplication with TMEA's own monitoring and evaluation work, while also ensuring the independence and impartiality of the overall independent evaluation.

66. Given the importance both of the relationship with TMEA, and of the need for independence, bids should take particular care to explain how they propose to manage relationships, and propose suitable management approaches to ensure the success of the evaluation.

67. Disaggregation of data, including by sex, geographical location and income status will be important throughout the evaluation.

68. The Evaluator will need to comply with DFID's policies on fraud and anti-corruption and cooperate with any checks required from them for the duration of the evaluation e.g. annual audited statements, policies on management of funds, etc.

Lesson learning and adaptive management

69. To meet the evaluation's purpose of identifying and feeding lessons learnt into the programme, it is critical that the Evaluator works with stakeholders to cycle ongoing evaluation results back into the evolution of the programme, through regular feedback and reflective activities. This should include building linkages with the programme management.

70. In particular, to facilitate this, specific points for reflection and decision-making may be identified in addition to programme annual reviews. An element of flexibility from the Evaluator will be essential to maximise evaluation utility and use of the evaluation findings.

71. Bids should demonstrate a good understanding and experience of maximising evaluation utility, and outline a convincing approach.

Stakeholders

72. More generally, bids should demonstrate robust thinking as to how stakeholders would be engaged throughout the evaluation.

H. Existing information sources

73. Data are expected to become available in line with TMEA's Monitoring, Evaluation and Leaning (MEL) strategy (see Annexes).

Results frameworks

74. The TMEA results framework indicates key data collected for monitoring purposes. The mapping of the theory of change in the first section of the Results Framework allows the overall programme logic to be scrutinised. The Results Framework contains (or could contain) all necessary information to track all relevant programme results. The TMEA Knowledge and Results team has been working with project teams to set up project level results chains and monitoring plans.

75. Further improvements are in progress. The line of sight between project and the programme TOC is being strengthened. Where missing, appropriate measurable indicators are being designed at impact and Strategic Outcome level and at lower levels, together with targets and collated baseline data. The results framework is also currently being updated to show progress against expected results. This work is expected to be completed by early 2015. The Evaluator will need to assess the sufficiency and quality of the results framework data.

76. TMEA prioritises monitoring efforts according to the importance of different projects (following an A/B/C classification where for A projects the target is to ensure that monitoring is in line the DCED guidelines and C only attempts to monitor at output level), and also within projects.

Baseline data at outcome level

77. Primary data collection on baseline data on outcomes at project level undertaken by TMEA includes: time and traffic surveys for one stop border posts (OSBPs), on cost and time savings for Single Window Information for Trade (SWIFT) programmes, and baselines for ports.

78. OSBP time and traffic surveys have been undertaken to establish both queuing time and time taken to clear customs at the border post, as well as the number of vehicles passing through the border post. Baseline surveys were undertaken before the start of the construction of each border post, and end-line surveys are planned to be undertaken on a consistent basis three months after completion of construction at each border and six months after the initial survey is undertaken. Surveys are undertaken for a period of seven days, including day and night time traffic, and provide an estimate of average time for (a) customs processing and (b) queuing for trucks (either specific types of trucks, or all trucks, on a consistent basis for each border).. A timetable is available on request.

79. Cost and time savings surveys are planned for all SWIFTs. Intermediate outcome indicators include average processing time for applications, transactions volume rates (per day), average processing costs, and average compliance costs incurred by traders to submit applications. Output level indicators include the number of trade agencies integrated within the SWIFT system and/or other agencies as well as percentages of training and communications plans implemented. Data collection will vary dependent on when the system goes live. Baseline data should be completed by the end of October 2014. Time data will then be collected on a quarterly basis while cost data will be collected bi-annually. A timetable is available on request.

80. Both ports annually (June/July) publish usage and performance statistics that include most or all of TMEA's top-line indicators. Currently Kenya Airports Authority (KPA) publishes an "Annual Review and Bulletin of Statistics" which includes ship turnaround time, ship waiting time, and berth occupancy, all of which are in TMEA's monitoring plan. The port monitoring plans also include many smaller-scope operational indicators. TMEA has just launched a consultancy at Mombasa port that will (among other things) determine which of these detailed indicators is most important to understanding the overall performance of the port, and assessing the port's capacity to collect this data. Based on the outcome of this work (first phase due by February 2015) TMEA will consider any revisions of its monitoring plans.

TMEA Management Information System (TMIS)

81. TMEA's on-line Management Information System captures data on financial management, and results performance, while the contracts management system has the detailed information on procurement. TMIS is a programme management tool that requires TMEA project managers to input and update project work plans and monitoring plans. Other functionality includes: summary project descriptions, with key contact details of partners; contact reports e.g. recording discussions; attaching key documentation; developing and maintaining project risk matrices; quarterly reporting; list of upcoming planned outputs and outcomes to assist the communications team plan communication

activities. TMIS assists TMEA to analyse progress against plans across the portfolio of projects and disaggregate according to such categories as strategic outcomes, type of partners and location. TMIS also includes a results page with all the outcomes and outputs that are to set be achieved within different calendar days, and an outcomes page which lists all the outcomes and how they contribute to the TMEA Theory of Change.

82. TMIS Project data is to a great extent already available in TMIS, and by end Dec-14, 90% of all information including monitoring plans and risk plans for all projects should be available on the MIS, populated with targets/milestones, baselines and actual progress data. By June 2015, all projects will have their monitoring plans completed. The Annexes provide an illustrative snapshot of a project monitoring plan as per TMIS. The Evaluator will need to assess the sufficiency and quality of the TMIS data to be used for evaluation purposes.

83. Monitoring procedures are defined in the manual 'TMEA Monitoring, Evaluation and Learning Procedures: how to measure what you are doing, and whether it is working'.

Progress reports

84. Quarterly progress reports for projects and responsibility centres have been produced through the MIS, as well as annual project performance reports. While quarterly reports include expenditure versus budget and actual progress against planned progress traffic lights, annual project performance reports require implementers to reflect on changes in assumptions, articulate lessons and outline how future implementation may change as a result. The PIC has since agreed that TMEA will present progress reports every six months from July 2014.

Results meter

85. TMEA is developing a results-meter which will aggregate project performance results for key projects to estimate programme results (see Annexes).

Research on poverty impact

86. TMEA has recently commissioned a research paper (see Annexes) which explores and maps out direct and indirect linkages between TMEA activities and poverty, together with an analytical framework linking the programme TOC to poverty. The research is expected to be completed by Dec-14.

87. TMEA's toolkit on mainstreaming poverty (see Annexes) outlines how poverty issues will be explored throughout projects and baseline studies. To date this has fed into 3 studies, related to: women cross-border traders, SWIFT, standards and non-tariff barriers. In the first instance the tool kit will be applied to priority projects in 6 key areas: OSBPs, ports, railways, standards, customs modernization and ICTs, private sector and civil society / advocacy.

I. Deliverables and timeframe

88. This contract is expected to run from March 2015 and end in December 2018. There is a possibility of a 30 month extension depending on supplier performance, on-going programme needs and availability of funds. The scheduling of deliverables takes into account 'critical moments'. These however may change and new ones may arise. It is possible that this schedule will be reviewed during inception, timing the second impact evaluation report for a later date so as to allow for a longer reference period. In order to maximise usefulness of the findings, the evaluator will need to be flexible to ensure that the evaluation reports come in time to feed into key decision or knowledge sharing opportunities.

Critical moments

89. At present it is anticipated that evaluation findings may feed in the following:
    - Annual Reviews: yearly by mid-Nov.
    - Design of any phase 2 programming: early 2016.
    - Project Completion Report: (date depending on phase 1 completion date, but likely to be due in 2017).

Overview of deliverables

90. The supplier will need to provide the following key outputs, outlined hereunder and further detailed thereafter:

(a) Inception, design and evaluation reports

- Initial Inception Plan: 6 weeks after contract start
- Inception Report to include QA of existing data: draft 5 months after contract start, approved report 6 weeks later.
- Baseline report: draft at 8 months after contract start, approved report 6 weeks later (approx. Mar-16)
- Impact Evaluation Report 1 to include formative evaluations of Mombasa port, Dar es Salaam port, and impact assessment of One Stop Border Posts (OSBPs): draft by Mar-17, approved report 6 weeks later.
- Impact Evaluation Report 2: draft by Aug-18, approved report 6 weeks later.

- Five brief interim reports, at regular intervals to be specified, with contents to be specified during the inception phase.

(b) Support to TMEA on specific M&E issues

- Fully developed indicators methodology manual or guidance notes for data that are needed to undertake the independent evaluation but are not yet collected through TMEA's own monitoring and evaluation systems.
- Quality Assurance of TMEA data as required for evaluation purposes, and implementable guidance on any improvements required.

(c) Communication products

These will need to be defined in the communications plans and would include at a minimum, for each Impact Evaluation Report:

- A workshop for the key stakeholders, including the Joint Evaluation Group, explaining the recommendations and agreeing how they can be implemented.

- A ‘key findings’ communication product presenting evidence relevant to development actors beyond the TMEA programme.
- Separate reports on selected interventions or issues (notably Dar, Mombasa, OSBPs)

(d) Instruments and data

- An electronic copy of all the instruments used, including research protocols, questionnaires, guidance notes, etc.
- Database(s) with all the qualitative and quantitative data in a commonly used format, together with clear metadata, and which is anonymised and safeguards confidentiality. Copies should be provided at least yearly.

(e) Management reports

- Brief quarterly reports on the ongoing evaluation process including any support provided to TMEA. Submission of these reports will be aligned to PIC meetings as far as possible.

Specific requirements

91. The **Inception Plan** serves as an intermediate product no longer than 20 pages and should include:
    - an initial review, validation and adjustment of the Theory of Change;
    - an initial stakeholders engagement approach;
    - revised evaluation questions;
    - discussion of design issues and approach to completion of the inception phase, particularly to assessing data quality and developing the full evaluation framework.

92. **The Inception Report** should be no longer than 30 pages excluding annexes and include:
    - a review, validation and adjustment of the Theory of Change (including links to growth and poverty reduction);
    - a stakeholders engagement approach, supported by a stakeholders mapping;
    - a communication and dissemination plan;
    - an agreed set of finalised questions and evaluation framework - based on evidence gaps in the Theory of Change, stock-take on the programme to date and requirements of stakeholders of the evaluation;
    - the refined evaluation design or design options, a detailed explanation of evaluation methods to be used, exploration and justification of methodological issues, project selection, proposed counterfactuals where appropriate, and proposed data collection methods;
    - an evaluation matrix, which maps the proposed evaluation design, methods and analytical plan against the evaluation questions;
    - identification of programme monitoring data required from the PMU to meet evaluation needs and timings for this, particularly baseline data;
    - full quality assurance of all data to be used from TMEA’s own monitoring and evaluation;
    - proposal on collection of new primary data – including new baseline data and triangulation data;
    - an agreed division of labour between TMEA and the Evaluator, specific and detailed, down to activity level;
    - a description of the scope of findings to be available in the reports, particularly the first report, and a clear delineation of the depth of information to be provided in each of the impact evaluation reports;
    - a detailed workplan;
    - a final costing for the implementation phase;
    - a review of challenges and risks, mitigating actions and fall-back options.

93. **The Baseline Report** should be no longer than 40 pages excluding annexes and provide:
    - an executive summary;
    - description of the methodology;
    - baseline for all indicators using secondary data;
    - methodologies, instruments and protocols for data collection;
    - summary of the analysis, focusing on what is considered to be of direct relevance to adjust the programme or to decisions on future funding, including in particular results to date, impact to date and expected impact, efficiency and effectiveness (details can be annexed);
    - evaluation findings to date.

94. **The Impact Evaluation Reports** should be no longer than 40 pages for the overall evaluation and 20 pages for pillar or project evaluation, excluding annexes and include: an executive summary, description of the methodology, a full analysis of findings and recommendations tailored to the evaluation questions, and a set of actionable recommendations.

95. Given the lead times from intervention to impact, the first Impact Evaluation Report will focus on formative issues, outcomes, any immediate impacts, and expected future impact on trade and poverty. It will also take a hard look at sustainability. The second Impact Evaluation Report will provide credible assertions of contribution to impact (in all areas including trade, poverty).

96. Reports should communicate overall approach findings in an accessible way for non-technical readers, including presentation of data in visually appealing ways, highly structured and rigorous summaries of findings and robust and accessible syntheses of key lessons. Recommendations should be timely, realistic, prioritised, evidenced-based, targeted, accessible and clear, in accordance with OECD-DAC and UN guidelines.

97. Annexes should include: terms of reference, list of people consulted and interviewed at different stages of the evaluation, list of documents reviewed, any analyses and supporting evidence that is considered to be too detailed for the core section.

98. Draft reports will be subject to an external quality review, managed in accordance with standard DFID procedures for Quality Assurance. Bidders should note this is subject to a 2-weeks turnaround once submitted by DFID for review.

Break clauses

99. In line with the unknowns associated with development programming, break clauses will be put in place related to continuation and scope of the programme as well as satisfactory delivery and value for money of future workplans.

100. The break clauses are likely to be at the end of the inception phase, after the baseline report and at the mid-term point.

J. Challenges and Risks

101. Bids should clearly identify challenges, risks, and propose mitigating actions.

102. Key risks and challenges are likely to relate to:

- Complexity of the programme, including conceptual complexity, scale of the programme across multiple countries and multi-layered projects, complex strategic context;
- Reconciling the need for programme-level conclusion with the fact that causal relationships are typically more easily 'proved' at the lower level of the causal chain;
- Managing trade-offs between breadth and causal identification in order to secure both feasibility and credibility/rigour/usefulness of the evaluation;
- Examining impact – pathways to poverty reduction and the difficulties in attributing impact to TMEA;
- Uncertainty about the availability and quality of monitoring data;
- The programme and some projects having already started, without collecting all the baseline data that would ideally be used for evaluation;
- The full impact of certain programme components is likely to occur after the current programme end date and even after the current evaluation reporting dates;
- Differences in the interests of stakeholders;
- Changing political economy.

K. Abilities & Expertise to Deliver This Requirement

103. The team will require a broad set of skills to design and manage a complex evaluation of the TMEA programme. For example, private sector development and advocacy assessments will be very different to infrastructure assessments so a diverse range of expertise will be required.

104. Consortia are strongly encouraged as it is expected that this would be necessary to provide the relevant expertise and presence. They may encompass a range of actors including private companies and/or research organisations and/or evaluation institutes, at local or international level.

105. It is also expected that local expertise, knowledge and access will be essential.

106. Bidders will need to complete a conflict of interest declaration. It is expected that organisations or individuals which have had a major involvement with TMEA would be conflicted out for this independent evaluation. However, given the wide scope and size of work to date on the TMEA programme, it is also expected that a large number of organisations well qualified to contribute to this evaluation assignment may have had prior involvement. Therefore minor implementation involvement or impartial engagement in the area of evaluation or monitoring is unlikely to conflict out a bidder. Bidders should state clearly how they will manage any potential conflict of interest. Potential bidders are welcome to seek informal views from DFID early on.

107. Regarding future TMEA activities it is expected that the successful bidder would be conflicted out of future direct implementation activities that could sway the programme during the lifetime of the evaluation. It is unlikely they would be conflicted out of future monitoring or evaluation TMEA contracts, though it will be important to put in place procedures in case of any potential conflict of interest.

108. The Evaluator should combine the following expertise and experience:

Management expertise
Strong understanding and demonstrated experience of:

- designing and undertaking large and complex evaluations, at portfolio level with expertise of rigorous impact evaluations at intervention level; using mixed methods approaches that meet recognised standards for credibility and rigor;
- stakeholders management skills and ability to work flexibly with donors, partner countries, private sector entities; demonstrated ability to manage sensitive relationships tactfully and productively;
- communication skills - being strategic as well as able to communicate complex studies and findings in an accessible way for non-technical people;
- using evaluations as a tool for lesson-learning both during programme implementation and beyond;
- Knowledge management expertise.

Evaluation expertise
Strong understanding and demonstrated experience of:

- the strengths and limitations of different designs and how to interpret and present findings accurately to both researchers and non-researchers;
- various quantitative and qualitative evaluation methodologies for demonstrating impact;
- undertaking VfM analysis of complex multi-level programmes, combining quantitative and qualitative techniques;

Sectoral expertise
Strong understanding and demonstrated experience of:

- trade issues, including political economy particularly in East Africa, and experience of working on evaluations of trade policies and programmes;
- regional integration and political economy issues in the region, particularly those related to trade, familiarity with public/private dialogue and policy advocacy issues in East Africa, and understanding of social inclusion and gender issues in programming in East Africa;
- the possible impact of trade interventions in a range of areas (e.g. revenues, poverty, vulnerability) on different segments of the population, and ability to generate data to analyse programme effects for these (e.g. women vs. men, low income vs. middle income, rural vs. urban, etc.);

L. Logistics and procedures

109. The Evaluator will be responsible for all logistic arrangements required to conduct the evaluation work. TMEA will facilitate convening of meetings and site visits where necessary. All relevant expenses should be covered by the evaluation contract budget.

M.Reporting and contracting arrangements

Contact points

110. The Evaluator will report to Senior Evaluation Adviser and the Wealth Creation Deputy Programme Manager in DFID's Africa Regional Department.

Governance

111. A Joint Evaluation Group (JEG) is in place to steer and advise the monitoring and evaluation of the TMEA programme at key strategic points. It provides strategic direction on the independent evaluation, and has a strong coordination and facilitation role across the evaluative exercises and to ensure lessons learnt are taken forward. The JEG comprises three PIC members, three senior staff from TMEA (to include the CEO, Strategic Results Director and one other), and one member from the wider stakeholder constituency.

112. The JEG is an advisory sub-committee of the PIC, TMEA's oversight body. For the independent evaluation, the Evaluation Manager (i.e. the person responsible for managing the contract for the independent evaluation) receives advice from the JEG but formally reports to the PIC, in order to preserve a minimum level of independence.

113. Once the new TMEA constitution is implemented (see Background section) the JEG will report to the new Council. It has already been agreed that membership of the JEG will also be revised at that time to comprise two Council members, one TMEA Board member, one senior TMEA staff member, and one member from the wider stakeholder constituency.

114. Governance and quality assurance is further strengthened by a Reference Group comprising 2 to 3 peer reviewers and 2 to 3 relevant DFID or other donor evaluation advisers. The role of the Reference Group is to review the scientific and technical quality of the independent evaluation; to ensure that the design and implementation of the evaluation is robust and credible and that the evaluation is independent andstands up to external scrutiny. The Reference Group will be coordinated by the Evaluation Manager within the donor agency (DFID) responsible for contracting the independent evaluation on behalf of the PIC.

115. Further details about the governance structure for the evaluation can be found in the TORs for the Joint Evaluation Group (see Annexes).

Meetings

116. Meetings between DFID (acting as Evaluation Manager) and the Evaluator will be held as required by agreement at contracting point.

117. The frequency and broad timing of meetings between the Evaluator, the Evaluation Manager, the JEG, the PIC, and Reference Group will be agreed between DFID and the Evaluator during the Inception Phase. As an indication, we expect the RG and the PIC to engage at the key report stages ie inception, baseline, some interim findings reports, impact 1 and impact 2. The JEG in its facilitation role might meet more frequently.

N. Budget

118. The budget for this evaluation is between £2.3m and £2.7m, with a maximum budget of £300,000 for the inception phase. If a phase 2 TMEA programme is agreed this contract could be extended to evaluate phase 2 to a maximum total value of £3.5m. Bidders are not required to submit a proposal including the maximum £3.5m but for the budget range of £2.3m-£2.7m described above.

119. Bidders are strongly encouraged to compete on the basis of their commercial proposal, demonstrating value for money, as well as technical proposal.

120. Bidders should set out a separate budget for each of the activities outlined above (Inception, Baseline, Impact 1 and Impact 2, and on-going evaluation support), along with an approach and methodology for each. In addition, bidders are requested to be very clear about methodology providing a detailed breakdown of costs for the different significant activities to be undertaken during the evaluation.

121. Bids should provide fully detailed costing for the inception phase, and as detailed as possible for the implementation phase. Parameters used for costing both phases should be very clear, and any assumption used for costing the implementation phase should be verifiable during the inception phase.

122. It is expected that some adjustment and refinement to budget allocation for the implementation phase may be required based on the inception work. Although the budget allocation across components of evaluation will be flexible to a reasonable extent, it will not be possible to increase the total envelope agreed for the contract (other than to extend the scope beyond the current phase, as indicated above).

123. Key Performance Indicators (KPIs) will be agreed between DFID and the Evaluator before formal contracting. Bidders are encouraged to make provisions in their commercial tenders to ensure that their fees are linked and subject to performance.

O. Duty of care

124. The Supplier is responsible for the safety and well-being of their Personnel (as defined in Section 2 of the Contract) and Third Parties affected by their activities under this contract, including appropriate security arrangements. They will also be responsible for the provision of suitable security arrangements for their domestic and business property.

125. DFID will share available information with the Supplier on security status and developments in-country where appropriate. DFID will provide the following: A copy of the DFID visitor notes (and a further copy each time these are updated), which the Supplier may use to brief their Personnel on arrival.

126. The Supplier is responsible for ensuring that appropriate arrangements, processes and procedures are in place for their Personnel, taking into account the environment they will be working in and the level of risk involved in delivery of the Contract (such as working in dangerous, fragile and hostile environments etc.). The Supplier must ensure their Personnel receive the required level of training and complete a UK government

approved hostile environment training course (SAFE)[3] or safety in the field training prior to deployment.

127. The Supplier is responsible for ensuring appropriate safety and security briefings for all of their Personnel working under this contract and ensuring that their Personnel register and receive briefing as outlined above. Travel advice is also available on the FCO website and the Supplier must ensure they (and their Personnel) are up to date with the latest position.

128. Tenderers must develop their tender on the basis of being fully responsible for Duty of Care in line with the details provided above and the initial risk assessment matrix prepared by DFID (see Annexes). They must confirm in their tender response that:

a. They fully accept responsibility for Security and Duty of Care.
b. They understand the potential risk and have the knowledge and experience to develop an effective risk plan.
c. They have the capability to manage their Duty of Care responsibilities throughout the life of the contract.

129. If you are unwilling or unable to accept responsibility for Security and Duty of Care as detailed above, your tender will be viewed as non-compliant and excluded from further evaluation.

130. Acceptance of responsibility must be supported with evidence of Duty of Care capability and DFID reserves the right to clarify any aspect of this evidence. In providing evidence, interested Suppliers should respond in line with the Duty of Care section in the ITT Volume 2.

P. References

Annex 1 – Indicative sub-questions for Key Questions in Section E (appended).
Annex 2 – Duty of Care risk assessment (attached)

Programme information
Annex 3 - TMEA strategy 2013-2016 (attached)
Annex 4 - Propositions underpinning TMEA's strategy, May 2014 [TMEA Theory of Change & explanatory note] (attached)
Annex 5 - TMEA constitution (attached)
Annex 6 - TMEA Business Plan 2014/15 (attached)

Programme monitoring and evaluation information
Annex 7 - JEG TORS (attached) * Paragraphs 113 and 114 above reflect the updated position on JEG membership and Reference Group (previously Peer Reviewers)
Annex 8 - MEL approach paper (attached)
Annex 9 - TMEA Joint Evaluation Plan (attached)
Annex 10 - TMEA Results Framework (attached)
Annex 11 - Annual Review 2013 (attached)
Annex 12 - TMEA quarter 1 2014-2015 (Jul-Sep) progress report (attached)
Annex 13 - 2012 Upper Quartile report (attached)
Annex 14 – Project list (attached)

[3] UK Government approved hostile environment training course is known as SAFE (Security Awareness in Fragile Environments). The course should be booked through DFID and factored into the commercial tender.

TMEA Poverty research
Annex 15 - Briefing paper; TMEA's approach to mainstreaming the poverty issue
Annex 16 - Research concept paper

Evaluation policies
DFID Evaluation Policy (on web)
DFID Ethics principles for evaluation and research (on web)

Further supportive documents for information, available on request
DFID Business cases (on web)
DFID Elliot Stern paper (on web)
TMEA Business Plan 2013/14
TMEA quarterly progress reports
OSBP survey timetable
SWIFT surveys timetable
TMIS Overview note
Snapshot of a project monitoring plan as per TMIS
Dar Project Appraisal report
Dar MIS quarterly report
Dar monitoring plan
Mombasa Project Appraisal report
Mombasa MIS quarterly report
Mombasa monitoring plan
OSBPs – sample Project Appraisal report (Kagitumba/Mirama)
OSBPs MIS quarterly report
OSBPs monitoring plan

ANNEX 1 – Indicative sub-questions for Key Questions in Section E

Question 1. How robust and verified are the causal links and assumptions in the Theory of Change (TOC) and does the TOC provide a reliable guide for programme interventions?

- To what extent are the assumptions underpinning the TOC evidence-based or verified?
- Are the logframe targets and milestones appropriate and realistic?
- To what extent does the programme support EAC regional trade development priorities and address the right set of issues?
- Are the assumptions underpinning the TOC results and links being verified?
- How have changes in policy and in the political economy in the region impacted on the programme or on its relevance?
- Do TMEA interventions complement other ongoing initiatives (both government and private sector)?

Question 2. What is the likely impact on trade, growth and poor people, and what is critical in order to ensure sustainability of positive impacts?

Impact on trade **[*very important]**

- What is the impact of achieved trade cost reductions on increased trade (both intra-regional and extra-regional)?
- To what extent have transport time and cost reductions led to transport price reduction?
- To what extent have the removal of NTBs contributed to an enhanced trade environment and to increased trade?
- To what extent have standards harmonisation, and standards testing, impacted on the trade environment and trade flows?
- How has improved trade policy environment led to increased trade?

Impact on poverty **[*very important]**

- What is the nature and where possible scale of the likely impact of the overall programme and of key TMEA projects in the portfolio on the poor - direct and indirect? Who is affected by potential short or long-term impact, both positive and negative, how, and how is the causality working?
- In particular, who has benefited from reduced trade costs? How are the benefits in reduced transport time and cost being passed on to poor people through lower prices or lower price increases?
- To what extent does the programme benefit from robust analyses of the link between trade and poverty?
- Are complementary policies being adopted to translate the benefits of increased trade into poverty reduction?
- Are measures being taken and successful in mitigating potential negative impacts on any sub-groups, in particular poor people in localised areas?

Impact on crosscutting issues

- To what extent has the programme benefited women and girls (noting that the programme design did not purport to benefit them equally)? Have there been any negative consequences on women and girls? Has the programme had an impact on relations including power and influence between girls/women and boys/men? How could the programme increase benefits to women and girls within its trade focus? **[*important]**
- What has the impact been on corruption across the various components, notably at border crossings?

- What impact has the programme had on other issues, such as gender, extractives and environment/climate?

Sustainability
- What benefits (both social and financial) of the programme are likely to be sustainable and would continue with or without TMEA (staffing and funding)?
- What should be the essential components of a future exit strategy in order to sustain impact? **[* important]**
- Have individual results and overall impact sustained after existing donors stopped funding, and is there a lasting positive impact on the poor?
- How are stakeholders engaged through the programme and beyond its life and how do they take TMEA lessons learnt into account?

<u>Question 3.</u> Where has the programme been effective and achieved good Value For Money and how could this be improved?

Effectiveness
- To what extent have TMEA activities led to reduction in transport time?
- Where appropriate, to what extent have TMEA activities led to reduction in trade costs (reduced transport costs, reduced regulatory and operating costs, non-tariff barriers)?
- Is the reduction in time leading to increased physical access to markets?
- To what extent have TMEA activities led to greater standards harmonisation and compliance?
- To what extent has TMEA contributed to improved harmonised policies and programmes of key regional and national actors?
- To what extent have TMEA activities led to increased capacity of key national and regional agencies to implement regional integration commitments?
- Where relevant, how have TMEA activities (including revenue authority reforms as well as activities to promote trade flows) led to increased national revenues?
- To what extent have TMEA activities led to the civil society exercising a positive influence on regional integration, including on policy changes?
- To what extent have TMEA activities led to the private sector exercising a positive or negative influence on regional integration?

Value for Money (VFM)
- Is the programme providing VFM?
- In which activities/components and countries does the programme achieve higher VFM than others and what are the lessons learnt for driving greater VFM across the board?
- What is the value added (effectiveness) of the regional dimension of the programme? (Contributes to evidence towards a regional thematic evaluation question)

Operational model: national and regional levels **[*very important]**
- What are the strengths and weaknesses of the working model observed to date?
- Is the complementarity and coordination between national and regional levels optimal throughout all programme components and activities? What is the effect of constraining factors?
- To what extent does the TMEA model bring greater results than the sum of its parts? How could this be strengthened?

Operational model: Programme set-up

- To what extent are the Programme's institutional mechanisms efficient and effective in delivering programme outputs and regional integration objectives?
- Is using one organisation, a not-for-profit company, the best vehicle for impact on trade, and on poverty reduction through trade? What are the strengths and weaknesses of this approach?
- To what extent are the programme's governance arrangements, together with its financial (including procurement), human resource and risk management processes, leading to delivery of high quality and timely outputs in ways which represent value for money?
- Is the operational model at donor level the most appropriate and efficient for delivering TMEA? What are the key enablers which need to be preserved, and what are the remaining constraints arising from donors' systems?

Coherence and coordination

- Did TMEA align with country systems and agencies in the most effective manner for ownership, and for impact? How could this be strengthened?
- Are the focus and activities of TMEA consistent with, and additional to, those of others' development programmes in the region? To what extent has the programme facilitated improved coordination?
- What sort of approaches have been more successful in working with regional institutions in Africa?

M&E arrangements

- Provide independent Quality Assurance of TMEA's monitoring reports.
- Are the monitoring and evaluation tools and processes in place appropriate, both on results and on finances? How could they be strengthened?