



TRADE & INDUSTRIAL POLICY STRATEGIES

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**RESEARCH REPORT SUBMITTED TO THE
DEPARTMENT OF TRADE AND INDUSTRY**

Regional Technical Regulations and Institutions: The role of standards institutions in unlocking value chains

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Abbreviations and Acronyms

AFRAC	African Accreditation Cooperation
AFRIMETS	Inter-African Metrology System
AFSEC	African Electro-technical Standardization Committee
ARSO	African Organisation for Standardisation
AU	African Union
BIPM	International Bureau of Weights and Measures
CGE	Computational General Equilibrium (models)
COMESA	Common Market for Eastern and Southern Africa
CFTA	Continental Free Trade Area
EAC	East African Community
EU	European Union
IAF	International Accreditation Forum
IAPSC	Inter-African Phytosanitary Council
IBAP	Inspection Bodies Accreditation Programme
IEC	International Electrotechnical Commission
ILAL	International Laboratory Accreditation Cooperation
IPPC	International Plant Protection Convention
ISO	International Standards Organisation
IMS	Information Management system
ITU	International Telecomms Union
MAURITAS	Mauritius Accreditation Service
MLAP	Medical Laboratory Accreditation Programme
NAFP	National Accreditation Focal Point
NTB	Non-Tariff Barrier
NMISA	National Metrology Institute of South Africa
NRCS	National Regulator for Compulsory Standards
OIE	World Organisation for Animal Health
PAQI	Pan-African Quality Infrastructure
SABS	South African Bureau of Standards
SADC	Southern African Development Community
SADCA	SADC Cooperation in Accreditation

SADCAS	SADC Accreditation Service
SADCMEL	SADC Cooperation in Legal Metrology
SADCMET	SADC Cooperation in Measurement Traceability
SADCSPSCC	SADC SPS Coordinating Committee
SADCSTAN	SADC Cooperation in Standards
SADCTBTEG	SADC Technical Barriers to Trade Expert Group
SADCTBTSC	SADC Technical Barriers to Trade Stakeholder Committee
SADCTRLC	SADC Technical Regulation Liaison Committee
SANAS	South African National Accreditation Service
SPS	Sanitary and Phytosanitary Standards
SQAM	Standards, Quality, Accreditation and Metrology
STEM	Science, Technology, Engineering, and Mathematics
TBT	Technical Barriers to Trade
TFTA	Tripartite Free Trade Agreement
UN	United Nations
WTO	World Trade Organisation
ZNMI	Zimbabwe National Metrology Institute

Executive Summary: Possible Interventions

Technical regulations refer to standards and compulsory specifications that apply to certain products and processes, and which can play an important role in regional trade. Firms that wish to trade in value chains need to be able to comply with the regulations set by lead firms and state regulators, or risk being excluded from those value chains, and replaced with compliant competitors. It is therefore essential that Southern Africa's technical infrastructure aids firms in meeting technical regulations in order to develop working regional value chains. Failure to do so could see otherwise capable regional firms excluded from value chains and replaced with compliant firms from outside the region.

This report makes nine key recommendations, all of which aim to strengthen the capacity of the Southern African Development Community (SADC) Technical Infrastructure to achieve its core mandates, while promoting regional value chain development.

PRIORITY INTERVENTION

Recommendation 1: Creation of a System of Registering and Sharing Import Refusal Data

With thousands of complex technical regulations being overseen by technical infrastructure with clear capacity limits, SADC must develop monitoring systems that allow officials to quickly identify problem areas and act to resolve them. Creating a central database that records when products have been turned away for failing to meet compulsory specifications will give states the capacity to easily and efficiently identify problems being faced by their exporters, and to intervene with either support to the firm or discussions with the importing countries. Such a database would smooth trade in the region and vastly improve the capacity of technical experts to do their job, all at minimal cost.

SHORT-TERM INTERVENTIONS

Recommendation 2: Promote ISO 9000 as a Lead Standard in the Region

Firms are often unaware of the standards and their benefits, and lack the excess capacity to dedicate resources to achieving compliance with key standards and regulations. Government efforts to promote accreditation are often stymied by the vast diversity of standards and regulations different firms face, leading to a fragmented and inefficient promotion strategy. To overcome this, a lead-standard approach should be employed, in which accreditation with one key standard is supported for firms across the region. The best key standard for non-agricultural firms is the cluster of cross-cutting quality management standards known as ISO 9000. ISO 9000 standards are already the most popular in the region, and demanded by a wide range of industries. Promoting it as a lead standard has a triple benefit: it helps firms develop the quality management processes needed to meet other standards, it familiarises firms with the standardisation processes, and it builds relationships between firms and technical professionals – all of which should empower firms to meet their core standards.

Recommendation 3: Ensure the Financial Sustainability of the SADC Accreditation Service

Efforts to promote firms to obtain accreditation are closely linked to the availability of a strong network of regional testing laboratories, which are in turn closely dependent on a functional and well respected accreditation system. SADCAS, the SADC Accreditation Service, is the agency responsible for accreditation among 13 of SADC's 15 member states, and is primed to make an important contribution to technical

regulation in the region. Unfortunately, SADCAS faces an uncertain financial future, which threatens the progress made so far and makes essential long-term planning difficult. Assuring the financial sustainability of SADCAS would go a long way to accelerating the growth of technical regulations in the region.

Recommendation 4: Establish a SADC Metrology Instrument Bank

Building technical capacity is vital to trade and value-chain development, but it is difficult for smaller SADC states to prioritise, given many pressing developmental challenges and scarce resources. Vital functions such as metrology are often extremely expensive to develop and maintain, requiring investment in costly technical equipment, most of which is imported from overseas. Larger countries, in particular South Africa, have a far longer history of metrology and other testing functions, and a pool of older, but still functional, equipment. A SADC Metrology Instrument Bank would leverage the heterogeneity of the region by creating a stockpile of second-hand but still functional instruments that smaller countries could access for testing and training. This will provide a low-cost route for developing metrology capabilities across the region.

Recommendation 5: Support the development of linkages between the SADC Technical Barriers to Trade Stakeholder Committee and Regional Business Organisations

Functioning mechanisms to engage with the private sector are particularly important for technical regulations, because of the diversity and complexity of the field, which limits the capacity of the state to authoritatively monitor the impact of changing regulations. Regional private sector engagement is extremely limited, with the lead body in this area – the SADC Technical Barriers to Trade Stakeholder Committee (TBTSC) – largely non-functional. While fixing the TBTSC won't have a major impact on the functioning of technical regulation in the region, it should be considered a priority because it can be resolved quickly and cheaply. Simply creating linkages between the SC and regional business organisations, and providing limited seeding funding for travel, should be enough to improve the functioning of the committee.

LONGER-TERM INTEVENTIONS

Recommendation 6: Strengthening Coordination of Donor Engagement The region's technical infrastructure remains extremely reliant on donor funding, and while donor reliance is almost always identified as a problem with SADC structures, the larger concern is a lack of donor coordination. The technical infrastructure consists of many parts – standards, accreditation, metrology, conformity assessment – and each part must be functional for the broader system to work. Currently, donor support targets specific problems and functions, which may not reflect the most pressing issue for the broader system. The resultant lack of control by local coordinators risks creating a technical infrastructure with parts that work, but in a system that doesn't. Creating a single funding channel, which centralises donor support and distributes funds according to need, would help resolve this coordination problem, and assure the optimal distribution of scarce funds.

Recommendation 7: Skills Creation and Auditors

While SADCAS remains a vital organisation, accreditation processes remain very slow in the region. While this is disputed by official reports, some respondents noted that laboratory accreditation through SADCAS can take up to 18 months. Once that laboratory is established, firms approaching the lab will often face similarly long wait times for certification. The common blockage in both of these problems is a lack of

qualified assessors and surveyors. This is particularly difficult problem to address, given that it is driven by the region's broader structural problem of a lack of technical skills. Even when skills exist, testing firms often lack the capacity to attract talent to the field, and when they do, skills often come at a high cost premium. No single intervention can resolve this, and a scatter-shot of programmes will most likely be needed. One key solution would, however, be to create or expand scholarship programmes that require graduates to work in the technical regulation space on graduation. This approach has proved useful in closing skills gaps in the private sector, and has the added benefit of building crucial STEM (Science, Technology, Engineering and Mathematics) skills while simultaneously improving the region's technical infrastructure.

Recommendation 8: Support the Development of Standards Economic Impact assessment capacity in SADC Standards Institutions

Standards development continues apace across the region – at national, SADC-regional, Africa-regional, and multilateral levels – however, these standards are generally not constructed with specific economic outcomes in mind. Of the 16 standards organisations in the region (including SADC Cooperation in Standards, SADCSTAN), only South Africa has a team specially designated to assess the likely economic impact of standards. Others are reliant on technical committees which, while extremely technically capable, are likely to prioritise scientific and engineering issues, and industry best-practise, over explicitly economic priorities. SABS-led capacity building on economic impact assessment for standards institutions would help institutionalise economic considerations in the development of regional technical regulation, and act as a check on any serious problems.

Introduction

The South African Bureau of Standards has 6 861 standards, with around 950 in development at any given time.¹ Regional neighbours have less, but Zambia still clocks in at 1 800² and Tanzania at 1 500³. Then there are countries outside the region – such as the United States’s 11 000 standards⁴ and China’s 21 410 standards⁵. In addition to these are regional bodies (regional economic communities and continental organisations around the globe), sector-specific bodies (such as the International Electro-technical Commission), and international bodies such as the International Standards Organisation, which alone has 21 000 standards. Each individual standard is immensely technically complex, requiring specialist scientific knowledge, and is supported by equally complex processes of testing and metrological calibration.

Within this overwhelmingly complex field of technical regulation, most standards will not threaten trade and industry, and many will make an incredibly important contribution to industrial growth – but there will inevitably be certain areas that require policy harmonisation or compliance support to firms. The **central challenge** facing the SADC technical infrastructure is building the capacity to identify and react to any emerging problems in this complex, fluid area.

Building this capacity is essential given the increasing fragmentation of production processes along value chains. Whereas quality managers in lead firms could have previously inspected the quality of their production processes by exploring a single factory, they must now monitor the quality of production among multiple supplier firms in multiple countries. Trustworthy common standards are essential to facilitate this process. Firms that cannot attain these common standards could find themselves excluded from participation in value chains. This is a particularly challenging problem for Southern African firms, which often have little excess financial resources to divert to complying with technical regulations, and face high costs in a region that has limited conformity assessment facilities. Assisting firms in meeting the standards required by value chains is essential to building regional productive structures. This can only be achieved by a regional technical infrastructure that has the institutional capacity to be effective, that facilitates and promotes conformity assessment, and that assures that standards and compulsory specifications are appropriately calibrated.

This study will explore ways to equip Southern Africa’s technical infrastructure to deal with the challenge of calibrating technical regulations in such a way as to encourage the development of regional value chains. It begins by setting the scope of the study, and offering a quick overview of the debates in the literature on technical regulation, with a full literature review included as Annex 1. It then proceeds in three core sections. Section 1 assesses the technical infrastructure in the region, at both SADC and national levels. Section 2 offers some preliminary insights on specific areas of concern with current

¹ “Standards – SABS Standards Key Facts”, South African Bureau of Standards website, https://www.sabs.co.za/Standardss/standards_kf.asp.

² “Standards Development”, Zambia Bureau of Standards website, <http://www.zabs.org.zm/viewT5/standardsdevelopment>.

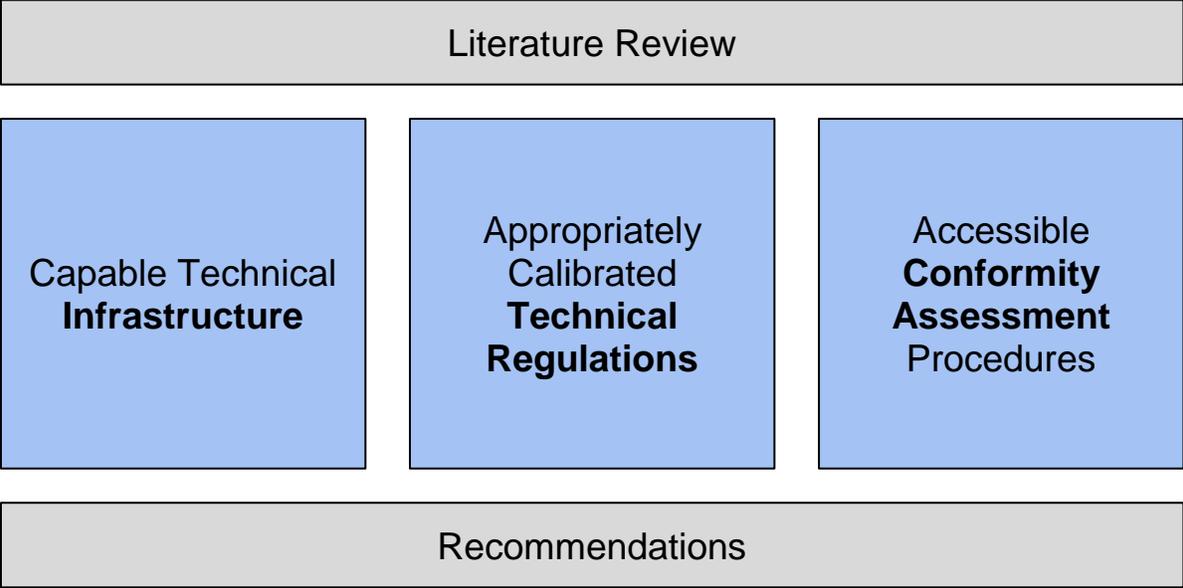
³ “TBS Standards Catalogue”, Tanzania Bureau of Standards website, <http://www.tbs.go.tz/standards/>

⁴ “Domestic Programs (American National Standards) Overview”, American National Standards Institute, https://www.ansi.org/standards_activities/domestic_programs/overview.aspx?menuid=3.

⁵ “PRC Standards System: standards Used in China”, ANSI Standards Portal, https://www.standardsportal.org/usa_en/prc_standards_system/standards_used_in_china.aspx.

technical regulations. Section 3 analyses the state of access to appropriate conformity assessment. The paper concludes with a menu of possible policy interventions, a summary of which is presented in the Executive Summary.

Structure of the Study



Study Scope

Technical regulations often refer to compulsory requirements that firms must comply with, but in this study the term is used more broadly, to cover a broad range of compulsory and voluntary standards and the processes that underpin their implementation. The broader definition is chosen because compliance with legally-voluntary standards is still often essential to enter value chains in which lead firms require such standards. The primary focus is on four areas, as listed below, with definitions drawn from the World Trade Organisation agreements on Technical Barriers to Trade⁶ and Sanitary and Phytosanitary Measures⁷:

1. **Compulsory Requirements** (also referred to as **Technical Regulations**): Document which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method.
2. **Standards**: Document approved by a recognised body, that provides for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method.
3. **Conformity Assessment Procedures**: Any procedure used, directly or indirectly, to determine that relevant requirements in technical regulations or standards are fulfilled.
4. **Technical Barriers to Trade** (TBTs): Technical regulations that act as a barrier to trade.

A number of other, extremely important standards are not directly dealt with in the study. These include the vitally important **Sanitary and Phytosanitary** (SPS) measures, which include food safety standards and govern trade in agricultural goods. A number of newer standards, which have proliferated in recent years, are also not directly examined. These include **environmental** standards, **labour** standards, and **responsible business practises**. Some of these are developed through traditional means – such as ISO 14001 standards on environmental management or ISO 26000 standards on social responsibility. A number of others are the result of ad hoc initiatives by new stakeholders – such as the United Nations Global Compact on corporate sustainability, the Global Reporting Initiative, or the Ethical Trade Initiative – further expanding the reach and complexity of the broader standards field. Beyond these public standards are any number of private standards, which vastly outnumber public standards and are likely more influential in value chains.

These standards nevertheless remain vitally important for value chains. SPS measures are often far more contentious than technical regulation in South Africa, and affect many more traders in the region (mainly because regional agricultural trade is larger than that of manufactured goods). New standards bring new

⁶ World Trade Organisation. 1995a. “Agreement on Technical Barriers to Trade.” https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm.

⁷ World Trade Organisation. 1995b. “The WTO Agreement on the Application of Sanitary and Phytosanitary Measures” https://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm.

challenges, such as EUREPGAP requiring that citrus orchards have washing facilities and portable toilets every 600 meters, a tough task for many informal farmers.⁸

While standards beyond technical regulation aren't directly examined in this study, they are nevertheless often touched on or discussed. This is because the technical infrastructure discussed often overlaps between all standards. Initiatives that improve capacity in standards bodies, improve conformity assessment facilities, help firms improve quality controls, or add new monitoring capacity, all create benefits for both technical regulations and other standards.

Limitations

The study faces a number of serious limitations. Foremost among these are the highly diverse nature of technical regulations, with the term covering a vast array of products, with unique technical regulations for different products and product types. In general, technical regulations can be more effectively studied at a product level, rather than as a single topic. This complexity is underpinned by a lack of overarching data or monitoring systems that allow for easy access to a big-picture understanding of technical regulation in general. Given these barriers, the study focuses primarily on improving the systems and institutions that underpin technical regulations, and equipping those institutions with the capacity to make the sort of constant refinement that is necessary for effective technical regulations.

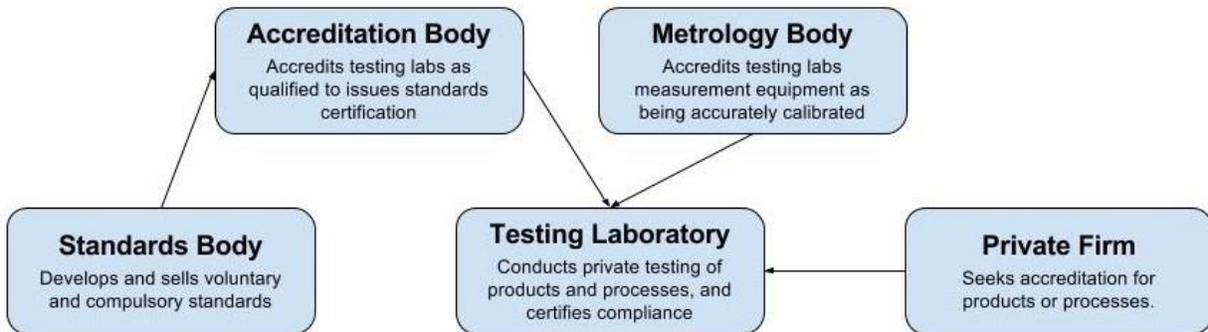
⁸ World Bank. 2003. "Standards and Global Trade: A Voice for Africa." Washington, DC: World Bank.

Primer on Technical Regulation

This section provides an introduction to technical regulation and presents the results of a review of literature in the field – those familiar with the field can skip this section.

Discussions of technical regulations generally encompass the greater Standards, Quality, Accreditation, and Metrology (SQAM) infrastructure, a typical model of which is outlined in Figure 1.

Figure 1: Typical Structure of National Technical Infrastructure



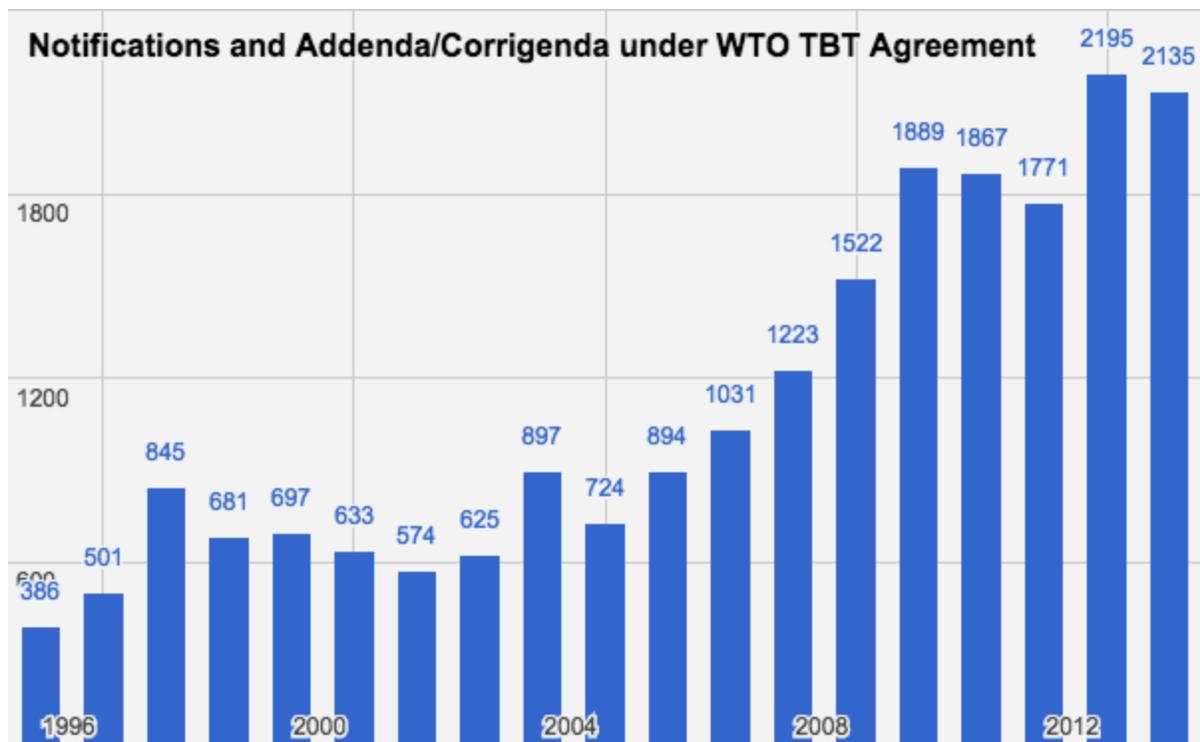
This model is rarely reproduced in real life exactly in this form. In South Africa, for example, responsibility for voluntary and compulsory standards is split, private testing is also undertaken by the standards body, and all of the actors undertake tasks well beyond that described. Nevertheless, this is the general picture imagined when discussing the technical infrastructure.

Technical regulations are generally considered as improving product quality and protecting consumers, while imposing some costs on firms and potentially creating barriers to trade. The literature on the subject reveals a slightly more complex picture, with four key conclusions possible.

First, technical regulations are expanding worldwide. This is generally attributed to (1) growing capacity in developing countries, and the resulting expansion in the technical rules used to govern their goods; (2) the use of technical rules as a form of protectionism, to compensate for the reduction in traditional forms of protection, such as tariffs and quotas; and (3) the rise of new concerns such as the carbon efficiency of production. Figure 2 shows the recent expansion in technical regulations worldwide.

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Figure 2: The Global Growth of Technical Regulations



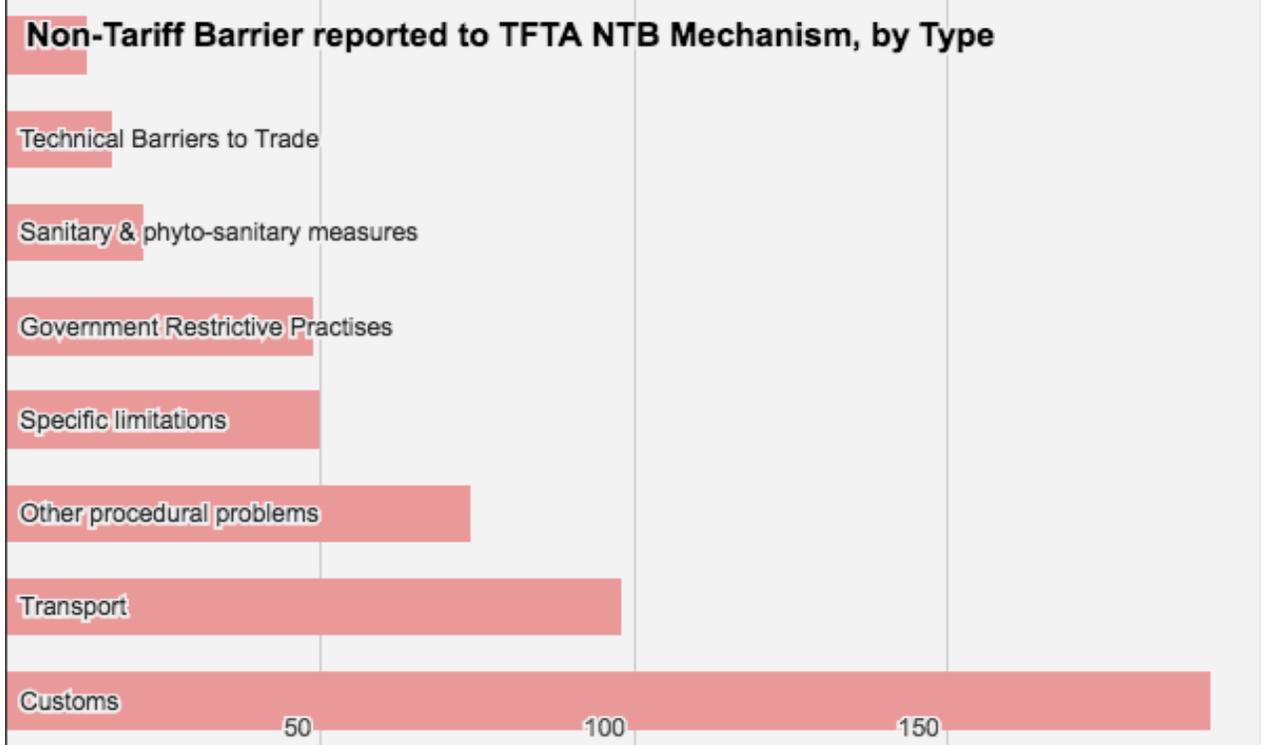
Source: USTR. 2014. "2014 Report on Technical Barriers to Trade." Washington, DC: United States Trade Representative.

Second, technical regulations tend, on balance, to be trade promoting. While each regulation comes with costs and benefits – hindering and aiding trade – the consensus at present is that having technical regulations is better for trade than not having technical regulations. This is primarily because the existence of standards and regulations encourages upgrading of firm production processes and quality controls, and creates clarity on the technical specifications needed to access a given market, both of which assist in reaching export markets. Clear, explicit standards can act as a guide to firms looking to export. Evidence suggests that this benefit accrues even if foreign rules are different from local standards, because the presence of local rules gives firms the core skills needed to comply with regulations. Nevertheless, differences in regulations across countries and excessive complexity will impose costs on trading firms, with these costs being more difficult to cope with for small firms. Firms respond to these costs in a wide variety of ways. Those that can may simply pay for the necessary compliance, but many will face a trade-off between the cost of compliance and other pressing costs. These firms may choose not to trade, or they may specialise in trade in a specific good (one with less onerous technical rules) or with a specific country (again, often a country with less onerous regulations). Firms that are reliant on exports may consolidate to form a larger company that is better able to cope with regulatory compliance costs, potentially creating competition concerns for the domestic market.

Third, Africa's greatest challenge with technical regulations seems to be in exporting to developed markets. Trade in Africa or Southern Africa does not seem to be hindered significantly by technical regulations. Some specific regulations might be very serious for trade in a single good, potentially blocking trade for that product, but the sum total impact of technical regulations as a category is small, and certainly much smaller than the impact of non-tariff barriers such as transport and customs issues (as can

be seen in Figure 3). Developed countries tend to have rules that are much more difficult to meet, partly because they are just more complex, but also often because they are inappropriate for the conditions encountered by African exporters. For sensitive products, standards might also be employed as de facto protectionism, made unnecessarily complex to protect local markets.

Figure 3: Non-Tariff Barriers Reported to Tripartite Free Trade Agreement NTB Monitoring Mechanism



Source: Tripartite Free Trade Agreement (TFTA) Non-Tariff Barrier (NTB) Mechanism, <http://www.tradebarriers.org/>

Fourth, technical regulations are vitally important to facilitate value chains. The spreading of production along value chains involves a loss of some control by the lead firm, as it must now monitor the quality of goods produced by dozens of external suppliers across the world. Standards provide a common metric that can assist in quality control for the sourcing of goods from suppliers. Many of the standards set in value chains are private standards, developed by lead firms and suppliers higher up the chain. Compliance with formal standards may, however, give firms a more solid footing to comply with private standards. The sought after ISO 9000 quality control standard, for example, simply introduces systems of control that can be applied to any given private standard.

More information, and full references, can be found in the detailed literature review in Annex 1.

Section 1: Technical Architecture in Southern Africa

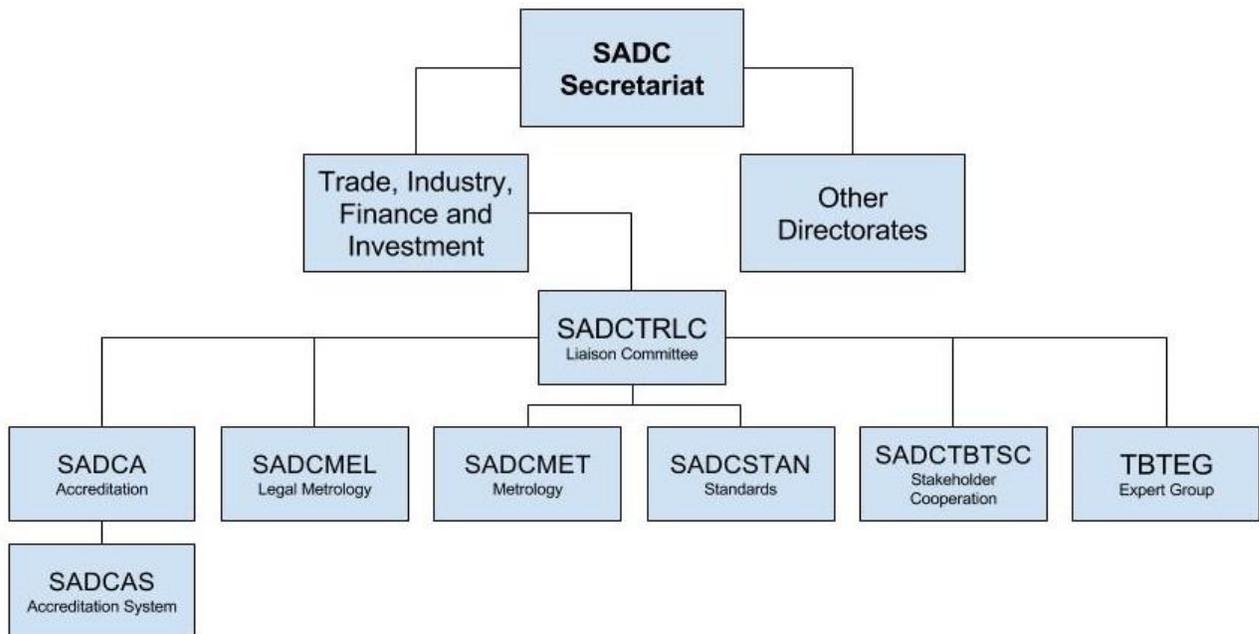
Mapping Southern Africa’s Technical Cooperation

National SQAM institutions form the backbone of the region’s technical infrastructure, but are complemented by an array of sub-regional, regional and global initiatives. While expanded capacity at national level is essential, these cross-border initiatives are a powerful driver of cooperation and a key route for interventions that aim to impact regional value chains. In the Southern African region, there are four levels of cross-border cooperation:

1. **Sub-regional:** Southern African Development Community (see Figure 4)
2. **Regional:** African Union SQAM Bodies (see Figure 5)
3. **Multilateral:** WTO, International Standards Organisation (ISO), global technical bodies (see Figure 6)
4. **Bi/Pluri-Lateral:** Tripartite Free Trade Area, European Union (EU)-Africa Economic Partnership Agreements

Sub-regional

Figure 4: SADC Standards, Quality, Accreditation, and Metrology (SQAM) Bodies



Source: SADC. “Technical Barriers to Trade (TBT) Annex to the SADC Protocol on Trade”, *Approved by the SADC Committee of Ministers of Trade on 12 July 2008, Lusaka, Zambia*

SADC has extensive cooperation on all aspects of technical regulations. This cooperation officially kicked off with the 2000 signing of a Memorandum of Understanding on SADC Standards, Quality, Accreditation

and Metrology – and was codified in the Technical Barrier to Trade annex of the 2008 Protocol on Trade⁹, which was later updated in 2014.¹⁰ A separate accord, the Sanitary and Phytosanitary Annex, covers SPS issues.

The annex achieved two outcomes. First, it created a number of general obligations on members to improve information sharing and alignment on technical regulations. Particularly, it commits member states to the “principles of non-discrimination, necessity, prevention of trade restrictiveness, proportionality, the use of equivalent and internationally harmonised measures, transparency and special and differential treatment.”¹¹ Second, it created or codified a range of SADC-level institutions and committees to assist in the various components of technical regulations, with the core of SADC SQAM work taking place across these bodies. These include:

1. **SADCTRLC** (SADC Technical Regulation Liaison Committee): An umbrella body which coordinates the regional technical barriers to trade activities of SQAM, in terms of the TBT Annex to the SADC Protocol on Trade.
2. **SADCSTAN** (Standards): Promotes the coordination of standardization activities and services in the region, with the purpose of achieving harmonization of standards and technical regulations, with the exception of Legal Metrology regulations, in support of the objectives of the SADC Trade Protocol.
3. **SADCA** (Accreditation): Facilitates the creation of a pool of internationally accepted accredited laboratories and certification bodies in the SADC region, and to provide member states with accreditation as a tool for the removal of TBTs in the regulatory area.
4. **SADCAS** (Accreditation Service): An accreditation body operating across all SADC countries that do not have domestic accreditation services
5. **SADCMET** (Measurement Traceability): Coordinates metrology activities and services in the region, in order to provide regional calibration and testing services, including regulatory bodies, with readily available traceability to the SI Units of measurement, through legally defined and regionally and internationally recognised national measurement standards.
6. **SADCMEL** (Legal Metrology): Facilitates the harmonisation of the National Legal Metrology Regulation of the member states and between SADC and other regional and international trading blocks.
7. **TBTEG** (Technical Barriers to Trade Expert Group): Offers support in an advisory capacity to the SADC Secretariat in regard to TBT matters not covered by other structures, or overlapping issues in both the voluntary and regulatory domain.
8. **SADCTBTSC** (SADC Technical Barriers to Trade Steering/Stakeholders Committee): Facilitates SADC stakeholder participation in SADC TBT matters in both the voluntary and regulatory domains.

The SPS agreement creates a related institution called the **SADC SPSCC** (SPS Coordinating Committee), which aims to promote transparency in the area of sanitary and phytosanitary measures.¹² Members of

⁹ SADC. “Technical Barriers to Trade (TBT) Annex to the SADC Protocol on Trade”, *Approved by the SADC Committee of Ministers of Trade on 12 July 2008, Lusaka, Zambia.*

¹⁰ SADC. “Technical Barriers to Trade (TBT) Annex to the SADC Protocol on Trade”, *Approved by the SADC Committee of Ministers of Trade on 17 July 2014, Gaborone, Botswana.*

¹¹ SADC TBT Annex.

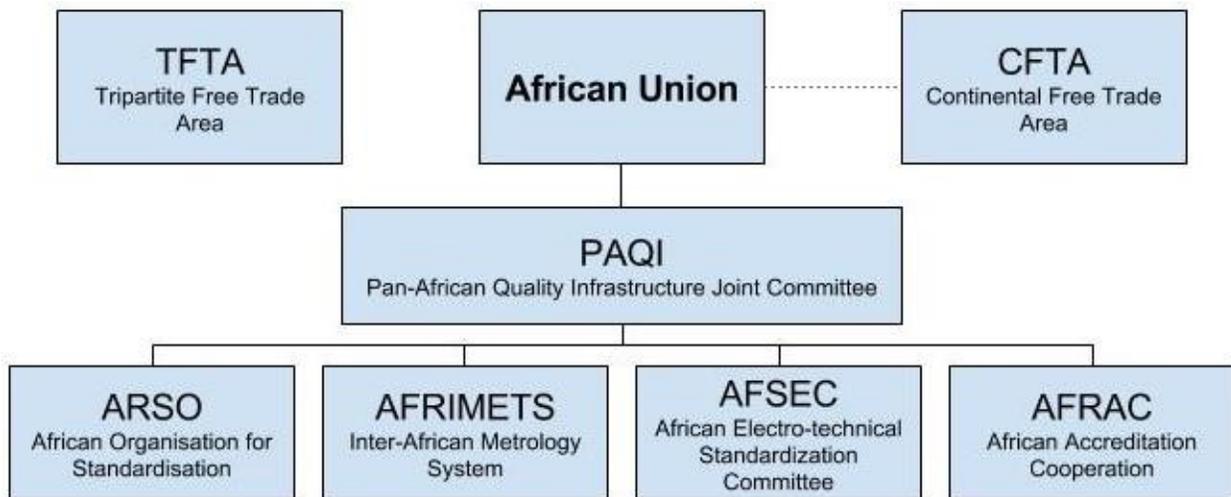
¹² SADC. “Sanitary and Phytosanitary (SPS) Annex to the SADC Protocol on Trade”, *Approved by the SADC Committee of Ministers of Trade on 17 July 2014, Gaborone, Botswana.*

this committee are representatives from the National Committee on SPS, which is required under the accord to be established in each member state.

Eight Southern African countries (Angola, DRC, Madagascar, Malawi, Mauritius, Swaziland, Zambia and Zimbabwe) are also party to the Common Market for Eastern and Southern Africa (COMESA), which has a set of similar initiatives, via the COMESA Committee on Standardization and Quality Assurance.¹³ COMESA has a number of innovative initiatives¹⁴ in the field of technical regulations, which SADC can learn from and leverage off, but which also sometimes complicate efforts at SADC level. The SADC-COMESA overlap problem is also exacerbated by further overlap with the East African Community (EAC)¹⁵, and is further deepened at the continental level.

Regional

Figure 5: Africa Continental Standards, Quality Assurance, and Metrology (SQAM) Bodies



Source: PAQI. 2013. "Pan-African Quality Infrastructure: Structure – Function – Impact." http://www.paqi.org/wp-content/uploads/2014/09/paqi_brochure_engl_web.pdf and author's additions

Similar cooperation takes place at the Africa regional level. The Organisation of African Unity began formal cooperation on technical regulations with the formation of the African Standards Organisation (ARSO) in 1977. Efforts were concentrated within in ARSO until 2006, when the African Metrology Organisation was formed, and continued as an independent accreditation (AFRAC) and electrotechnical (AFSEC) body were formed. From 2013, all four bodies have fallen under a new joint committee based at the African Union (AU), the Pan-African Quality Infrastructure committee. As with many trade functions on the continent, there is overlapping responsibility between the regional economic communities and continental

¹³ Common Market for Eastern and Southern Africa. "The COMESA Standards, Metrology, Conformity Assessment and Accreditation Policy." CS/IPPSD/SQA/4/POL/2, June 2009.

¹⁴ For example, the Green Pass initiative - which is effectively a regional mutual recognition agreement. Any product granted a green pass free to cross borders in the COMESA region.

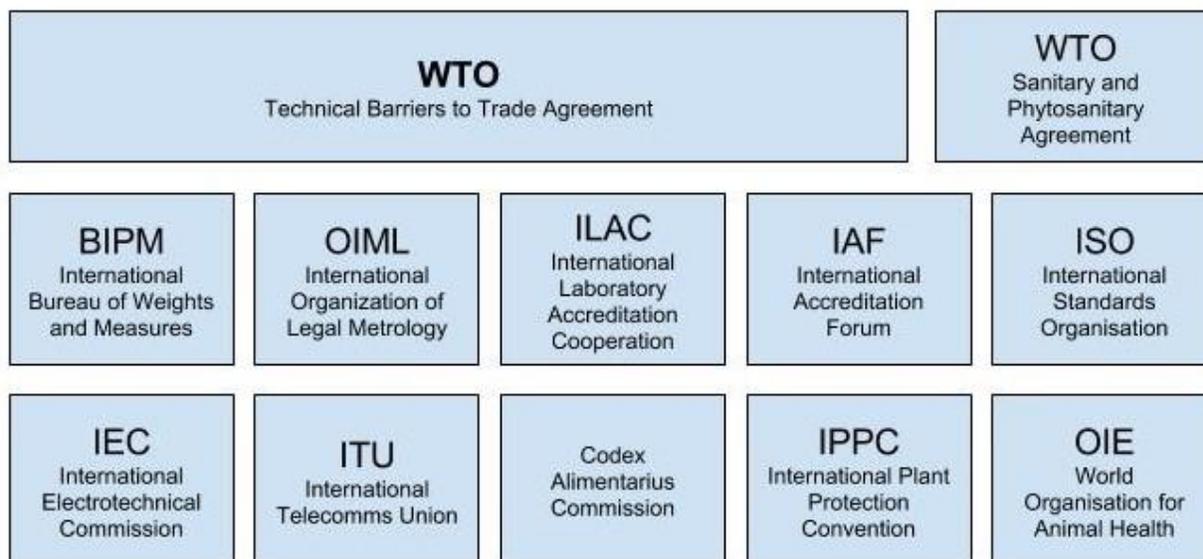
¹⁵ GIZ. "Harmonisation and Mutual Recognition of Regulations and Standards for Food Safety and Quality in Regional Economic Communities: The case of the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA)" BMZ German Ministry for Economic Cooperation and Development

initiatives, and with the distribution of responsibility differing for the various bodies. The Inter-African Phytosanitary Council (IAPSC) takes up SPS issues at the AU.

Beyond the AU, the TFTA – the 27 country agreement between COMESA, SADC and the EAC – has limited work on standards, but does include some innovative initiatives such as the non-tariff barrier reporting mechanism. The TFTA is a new agreement, and still in the process of being finalised, and so has potential to develop more in-depth cooperation in this area in the future. In addition, discussions have begun on a Continental Free Trade Area, and while this AU-driven initiative will likely defer technical issues to the PAQI bodies, there is still potential for further overlap.

Multilateral

Figure 6: Multilateral Standards, Quality Assurance, and Metrology (SQAM) Bodies



Source: Author

A multilateral agreement on technical barriers to trade was first agreed during the Tokyo round of the General Agreement on Tariffs and Trade, in 1979, as the Standards Code. This was later updated and replaced in 1995, on the foundation of the World Trade Organisation, with the Technical Barriers to Trade agreement.¹⁶ The TBT agreement is binding on all members, and requires adherence to a similar set of principles to that in the SADC agreement, with particular stress on non-discrimination and transparency. The latter requires that all members report potential technical barriers to trade to the WTO as part of the consultation process for these laws, and creates a TBT committee that facilitates engagement on the proposed legislation. Beyond that, many of the TBT measures are best endeavour clauses, promoting harmonisation and mutual recognition of technical regulations, and a more general commitment to smoothing the regulatory burden of complying with regulations.

Beyond the TBT agreement, there are a wide range of international cooperation bodies, comprising global bodies taking on specific SQAM functions (such as the ISO) and others focusing on specific sectors (such

¹⁶ World Trade Organisation. 1995. "Agreement on Technical Barriers to Trade" https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm.

as the International Electrotechnical Commission). And, finally, beyond these bodies, various Southern African states may have additional technical regulation commitment from bilateral and plurilateral agreements, such as the overlapping web of EU-African Economic Partnership Agreements¹⁷, or even some commitments from soft-pressure via unilateral agreements like the African Growth and Opportunity Act. Outside of the region, modern deep trade agreements often contain behind-the-border rules on issues like technical regulations, which further complicate the global picture.¹⁸

The framework for cooperation in technical regulation is thus clearly very complex, with numerous overlapping institutions, and fragmented roles and activities. This offers multiple avenues for potential interventions, but also requires any approaches to consider actions being taken in other forums. To simplify the technical infrastructure, this paper divides the institutions by function – looking at standards and requirements development, accreditation, and metrology. For each level, all national institutes are examined, while a single institute is chosen at sub-regional, regional, and international level.

Standards and Requirements Development

Figure 7: Standards Bodies in Southern Africa and linkages to cooperation structures



Source: Author

Domestic Infrastructure

Standards institutions are the workhorses of technical regulation work in the Southern African region (see Figure 7). While responsibilities for the different SQAM functions are usually split in more developed countries, the various functions – standards, accreditation, metrology, testing, and so on – tend to be

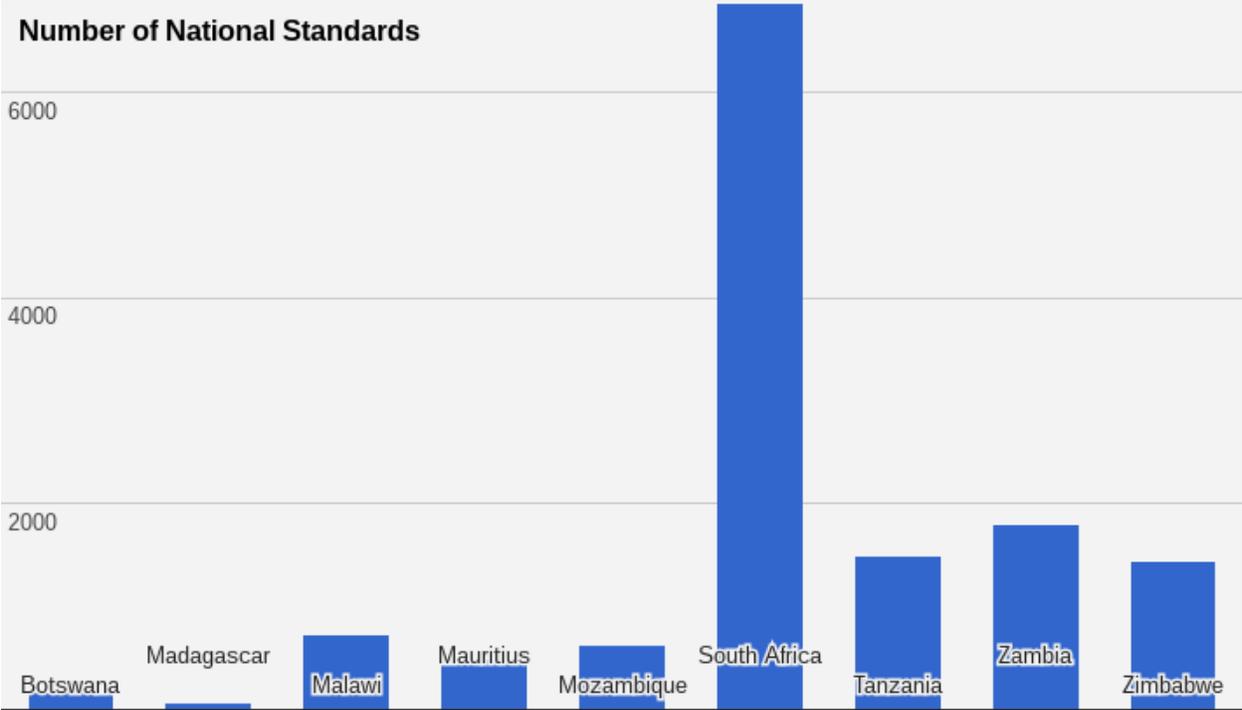
¹⁷ Prevost, D. 2010. "Sanitary, Phytosanitary and Technical Barriers to Trade in the Economic Partnership Agreements between the European Union and the ACP Countries" ICTSD EPAs and Regionalism Programme, Issue Paper No. 6.

¹⁸ Bruhn, D. 2014. "Global Value Chains and Deep Preferential Trade Agreements: Promoting Trade at the Cost of Domestic Policy Autonomy?" d.i.e Discussion Paper 23/2014.

concentrated in the standards institutions. Standards bodies are the national lead on all technical regulation functions in every Southern African country except Mauritius, Zimbabwe, and South Africa – and only South Africa has a standards body that is solely focused on standards.

Standards development is generally undertaken by technical committees – comprising scientific experts, business representatives, government, and other interested parties. The technical committees first consider international, regional, or foreign standards. If there is an appropriate existing standard, it is adopted or adapted to form the national standard. When international standards are not appropriate, a national standard is created from scratch or by adapting another standard to suit national purposes. Generally speaking, the overwhelming majority of standards in the region are based on international standards, with only a few bespoke national standards developed. Seemingly minor differences in the style of adoption of international standards can have large impacts on the use of those standards. Nevertheless, the widespread use of respected international standards means that the differences between standards in the region are not as stark as they might otherwise have been.

Figure 8: Number of National Standards in Select Southern African Countries



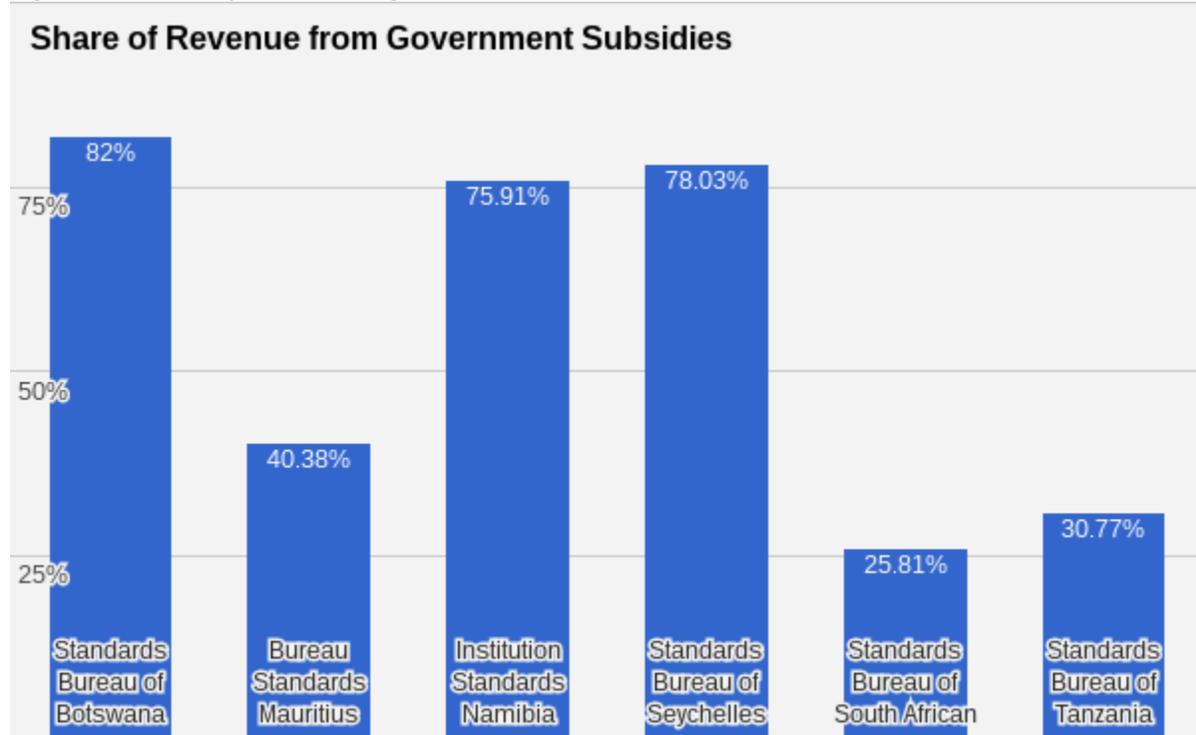
Source: Annual reports and websites of relevant standards bodies

With standards bodies sitting at the centre of the region’s technical infrastructure, their financial sustainability and capacity are essential. Standards bodies receive revenue from selling standards, performing testing, and from a few supplementary activities like training – but the bulk of their revenue comes from government subsidies, as can be seen in Figure 9. While this might be considered a risk, it is nevertheless the norm globally, with even more advanced standards bodies like the South African Bureau of Standards remaining reliant on government support. Extremely high dependency ratios are nevertheless concerning, with highly dependent bodies running the risk of exposure to shifting national priorities, that could see resources diverted away from their work. This dependency can’t be easily

corrected by changes in the organisation, but rather represents the nature of the market in which standards bodies work.

Smaller countries often have weak demand for standards, off the back of small economies, weak exports, and little interest in standards certification. Direct government support will need to continue.

Figure 9: Share of public funding for select National Standards Bodies



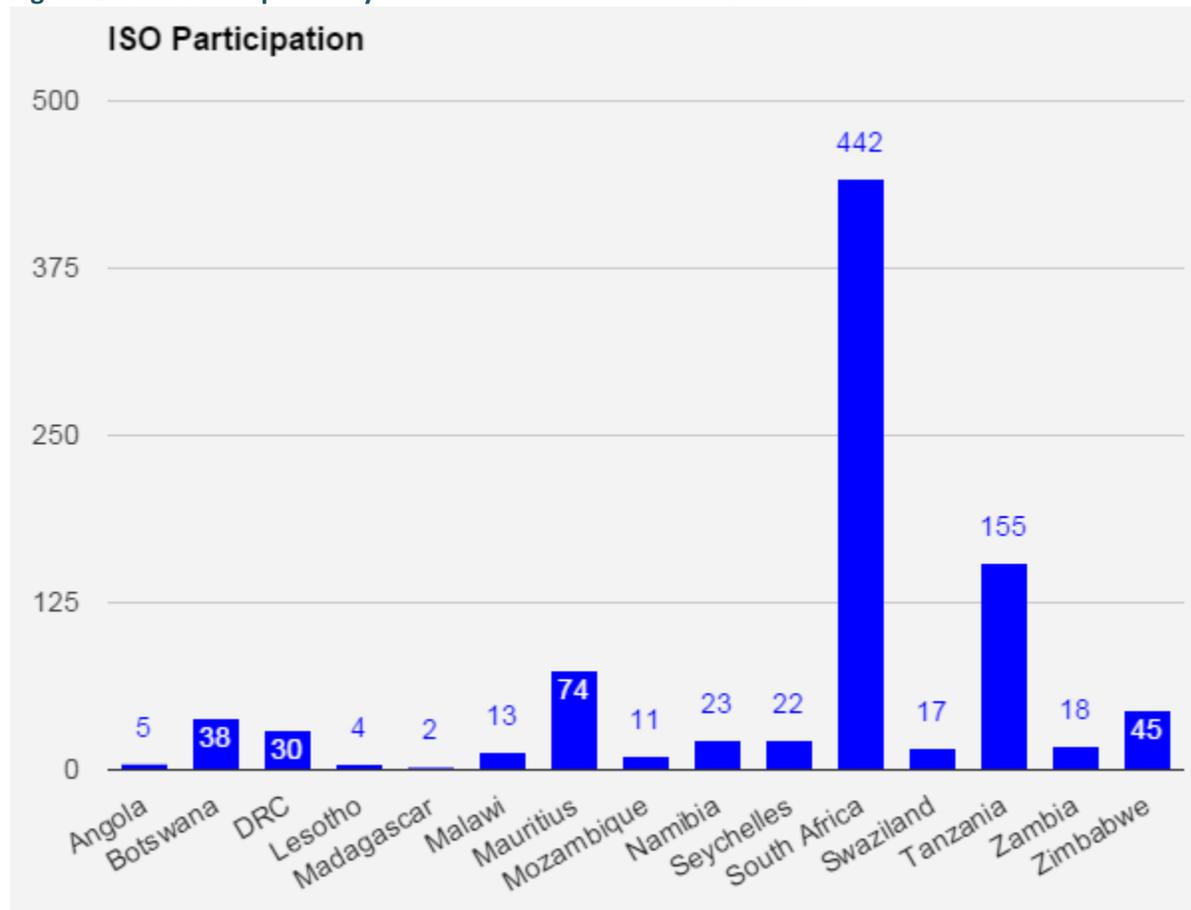
Source: Annual Reports

Outside of pure financial considerations, national standards bodies face a number of key capacity constraints. Skilled professionals are often difficult to find, and require substantial investment in training programmes by the bodies themselves. Standards bodies have to recruit highly skilled technical professionals in exactly the type of scientific professions that are often scarce in the region, meaning they must compete with both the private sector and with richer countries in the region.

Standards organisations often have limited additional capacity to work on regional and international cooperation efforts. Overwhelmingly, participation in regional workshops or meetings is donor funded, and thus unpredictable.

While many in the region are reliant on the standards produced by international bodies like ISO, few have the capacity to take part in ISO technical committees in any substantial way, meaning the region is effectively a norm-taker in the international field. This runs the risk of leaving SADC states exposed to norms that are not appropriate to the region, and the subsequent process of adopting those norms at national level could result in growing deharmonisation within in the region.

Figure 10: ISO Participation by Southern African Standards Bodies



Source: International Standards Organisations Members details, http://www.iso.org/iso/home/about/iso_members.htm

In almost all cases, standards bodies are also the central administrators of compulsory specifications. Compulsory specifications are generally first developed as national standards, and later given the designation of being compulsory.¹⁹ The rate at which standards are set as compulsory differs, with Zambia for example setting 51 of its 1800 standards as compulsory²⁰, while the rate is 29 of 490 in Mauritius. South Africa differs from the region in having a separate body – the National Regulator for Compulsory Specifications (NRCS) – that manages all statutory requirements. Even in the case of the NRCS, all compulsory specifications are legally required to be drawn from pre-existing South African National Standards²¹, and thus the actions of the Standards body are intimately intertwined with that of the regulator.

¹⁹ National standards refer to standards that are developed or incorporated locally, while compulsory specifications refer to those national standards that are not voluntary.

²⁰ "Standards Development", Zambia Bureau of Standards website, <http://www.zabs.org.zm/viewT5/standardsdevelopment>.

²¹ National Regulator for Compulsory Specifications Act in 2008 (Act 5 of 2008) - provision 13.

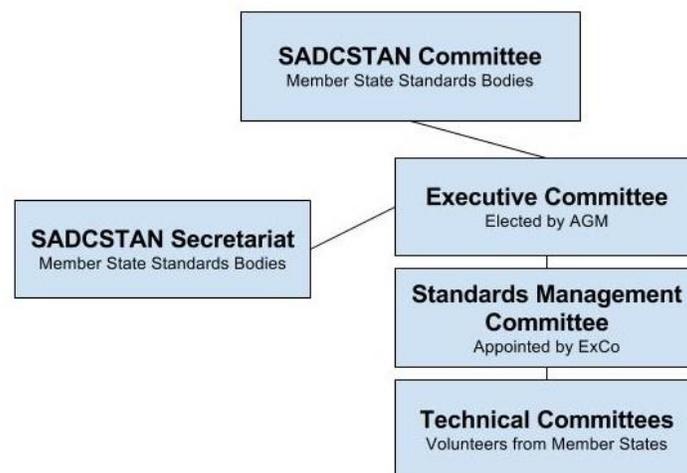
SADC Infrastructure

SADCSTAN is the primary forum through which the region’s standards activities are harmonised. More fully, SADCSTAN has 10 prescribed functions²²:

1. Develop and adopt mechanisms for the formulation of harmonised texts;
2. Develop mechanisms to facilitate the adoption of harmonised texts as national standards;
3. Examine the needs for and develop regional product specifications;
4. Consult with relevant TBT Cooperation Structures and with industry in the development of relevant harmonised texts;
5. Develop harmonised texts in support of equivalent technical regulations;
6. Coordinate inputs to and liaise with ISO, IEC, ARSO and similar regional and international standardisation organisations;
7. Provide technical assistance and training in the management and planning of standards development, as well as standards information services;
8. Devise means to disseminate standards information, whilst respecting and adhering to the intellectual property rights and obligations of International standards setting bodies and other National Standards Bodies;
9. Develop regional mechanisms to facilitate compliance with the WTO TBT Agreement requirements; and
10. Facilitate access to current databases of the Member States National Standards Bodies in respect of standards and draft standards.

SADCSTAN is overseen by a committee comprising of the various standards bodies from the member states, and is directly managed by an executive committee elected by the board, and supported by a very limited secretariat (see Figure 11).

Figure 11: Structure of SADCSTAN



Source: SADCSTAN Strategic Plan 2014-2016,

<http://www.sadcstan.org/clientdata/11155/uploads/documents/edited%20sadcstan%20strategic%20plan%202014%20-20161.pdf>

²² SADC. “Technical Barriers to Trade (TBT) Annex to the SADC Protocol on Trade”, *Approved by the SADC Committee of Ministers of Trade on 17 July 2014, Gaborone, Botswana.*

While there are a number of routes open when trying to smooth differences between standards – such as mutual recognition agreements, or the creation of new regional standards – SADCSTAN primarily focuses on a negotiated process of harmonisation. SADCSTAN technical committee review similar national standards and, when there is enough overlap between the standards, they attempt to harmonise them into a single SADC standard. Thus far, there are 56 common SADC standards. New standards can be approved by two thirds of members voting for the new standard, as long as 25% do not oppose it.

Table 1: SADCSTAN Technical Committees

TC Number	Sector	Secretariat Host
TC 1	Construction	Botswana
TC 2	Automotive and Transportation	Zimbabwe
TC 3	Foods and Agriculture	Mauritius
TC 3.1	Tobacco	Zimbabwe
TC 3.2	Fish and fishery products	Zambia
TC 4	Electro-technical	Mauritius
TC 5	Environmental	
TC 6	Health and Safety	Mauritius
TC 7	Packaged Goods	
TC 8	Hospitality and Tourism	Mauritius
TC 9	Non-destructive testing	
TC 10	CASCO (Committee on conformity assessment) documents	
TC 11	Management Systems and Conformity Assessment	Tanzania
TC 12	Metrology	
TC 13	Geographical Information Systems	
TC 14	Water	Malawi
TC 15	Chemicals & Chemical Products	South Africa
TC 18	African Traditional Medicine	South Africa

Source: Presentation on “Harmonising Standards”, by Justice Kobe, SADCSTAN Secretariat, and “Technical Committees”, SADCSTAN website, <http://www.sadcstan.org/page/technical-committees>

While some progress has been made by SADCSTAN, there are clear limitations. The challenges it faces are neatly summarised in the SWOT analysis in its Strategic Plan for 2014-2016 (see Table 2). Aside from capacity problems, the key challenge is a lack of commitment to achieving regional harmonisation when it comes into conflict with national interests. SADCSTAN can make a powerful contribution in aligning similar or uncontroversial standards, smoothing the regulatory complexity in the region without any of the member states having to make major compromises. But when it comes to tackling substantially misaligned or politically sensitive standards, there isn’t much evidence to indicate that the body can make a difference. And serious questions remain about the overlapping initiatives in bodies such as COMESA or

at ARSO. The distribution of activities between the various bodies isn't clear, nor is there any system of prioritisation for competing Regional Economic Communities. And with already severely scarce resources for member states, there simply isn't the capacity to attend multiple negotiating forums and multiple meetings. A streamlined system of dealing with overlapping responsibility would therefore assist with improved standards setting across the region.

Table 2: SADCSTAN SWOT Analysis

<p>Weaknesses</p> <ol style="list-style-type: none"> 1. Inadequate Funding 2. Low levels of participation amongst member states (public and private) 3. High-turnover of trained standardization personnel 4. Duplication of efforts at different continental platforms 5. Ineffective mechanisms to compel member states to adopt harmonized texts 6. Inadequate coordination amongst SQAM structures 7. Not being proactive in meeting trade needs of the region 8. Inadequate resources for translation services <p>Threats</p> <ul style="list-style-type: none"> Conflicting national and regional interest Dual membership of RECs by some member states
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Source: SADCSTAN Strategic Plan 2014-2016, <http://www.sadcstan.org/clientdata/11155/uploads/documents/edited%20sadcstan%20strategic%20plan%202014%20-20161.pdf>

Challenges and Opportunities

Standards organisations are the most developed pillar of the region's technical infrastructure, and carry a significant burden of hosting various other functions such as accreditation and testing. While the centrality of the standards bodies may help protect their sustainability, they do run the risk of bearing excessive strain from the breadth of activities they cover. This is compounded by questions of financial sustainability, particularly excessive reliance on state support for operations, and the low commercial viability of standards sales in a region that does not have a large pool of firms that are actively seeking standardisation. These capacity constraints are understandable and, in reality, are to be expected. They do pose challenges to standards development in the region, but more pressingly, they pose a serious challenge to secondary activities of standards bodies, which include the regionalisation of standards and efforts at SADC harmonisation.

In a domestically capacity constrained environment, in which standards organisations are heavily burdened by performing various essential services, there simply isn't the funding available to attend regional cooperation activities at SADCSTAN – never mind those efforts at organisations such as ARSO or ISO. Stakeholders in the region complain of excessive reliance on donor funding to simply get participants to events, never mind undertaking the complex work that SADCSTAN needs to continue its operations. Donor support has been forthcoming, particularly long-term support from Germany's Physikalisch-Technische Bundesanstalt. But a new funding model is needed to make efforts at standards harmonisation sustainable.

This is particularly pressing, because there are opportunities on offer in the underdeveloped nature of regional standards catalogues. The expansion of standards in the region has been largely driven by the adoption of international standards, which is good news for harmonisation efforts, because most nations are using similar baselines for their efforts. The use of international standards represents a need among standards bodies to find appropriate international baselines for their work, a need that SADCSTAN could fulfil, if it was more aggressive in the development of harmonised standards. This does, however, need to be balanced against the risk of adopting internationalised standards, which could encourage local firms to concentrate on foreign markets, rather than develop bespoke standards that could give rise to greater regional trade.

Accreditation

Figure 12: Accreditation Bodies in Southern Africa and linkages to cooperation structures

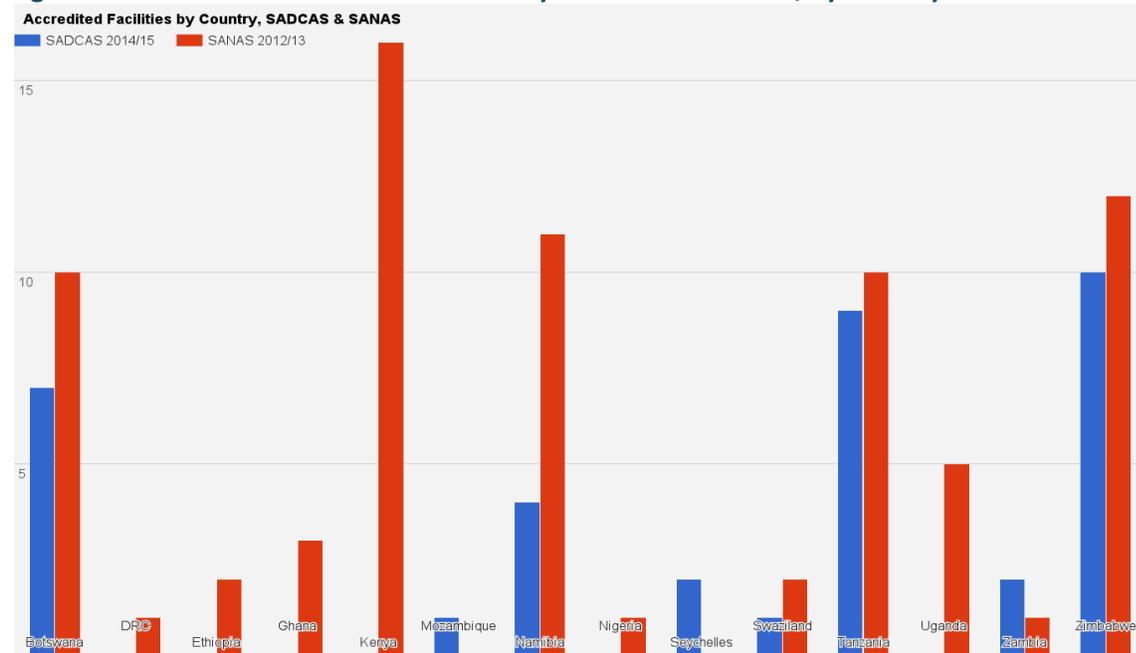


Source: Author

Domestic Infrastructure

Accreditation is easily the most regionally integrated of the various SQAM tasks, and potentially one of the most regionalised functions in SADC. Across the region, there are only two national accreditation bodies: the South African National Accreditation System (SANAS), and the Mauritius Accreditation Service (MAURITAS). SANAS in particular plays a vitally important regional role, and is often the first choice accreditation body for conformity assessment providers in the region. Nevertheless, both are highly capable institutions that are internationally recognised, and which need little additional institutional analysis.

Figure 13: Number of Facilities Accredited by SADCAS and SANAS, by Country



Source: SADCAS and SANAS Annual Reports

SADC Infrastructure

The more interesting avenue for potential interventions is SADCAS, the SADC Accreditation Service. SADCAS is charged with providing primary accreditation services to 13 of the 15 SADC member states. SADCAS has been operational since 2007, and was created by the SADC Memorandum of Understanding on SQAM. It is headquartered in Gaborone, and is registered as a non-profit in Botswana. SADCAS aims to:

1. Provide accreditation services to SADC member states that do not have a national accreditation body for their laboratories, certification and inspection bodies;
2. Provide accreditation services to Member States whose national accreditation body only services a limited scope of accreditation;
3. Provide international recognition of conformity assessment results produced by organizations accredited by it;
4. Provide accreditation service that promotes, develops and maintains good regulatory practices;
5. Provide an opportunity for SADC Member States to participate in multilateral arrangements for recognition of conformity assessment results;
6. Provide a database of organizations accredited by it;
7. Provide accreditation expertise, qualifying, registering and using experts from amongst SADC Member States; and
8. Facilitate a national accreditation focal point (NAFP) for those SADC Member States using its service.

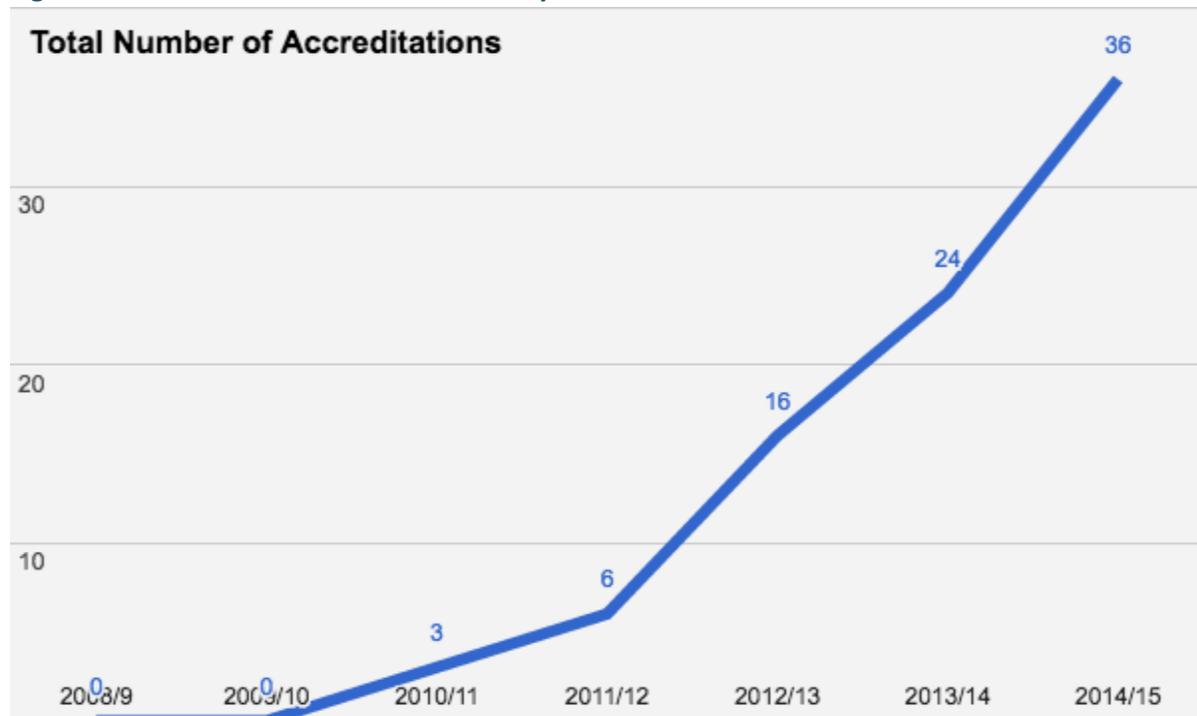
Developing an accreditation service from scratch is no small feat, requiring the recruitment of specialist staff, developing relevant institutional capacity for a range of certifications, and achieving the necessary international recognition to assure that SADCAS accredited labs are recognised globally. For the latter function, SADCAS initially developed a relationship with SANAS, through the signing of a Twinning

Partnership Agreement. The agreement meant that for every SADCAS accreditation, a SANAS certificate was also issued, providing international recognition through the South African certificate. SADCAS has been working hard to receive independent recognition, and has achieved as much in its Medical Laboratory Accreditation Programme (MLAP) and Inspection Bodies Accreditation Programme (IBAP).

Recognition is one of a number of impressive achievements SADCAS has managed in its short life. As can be seen in Figures 14 and 15, 36 conformity assessment providers have thus far received SADCAS accreditation, across a number of countries, with more having applied.

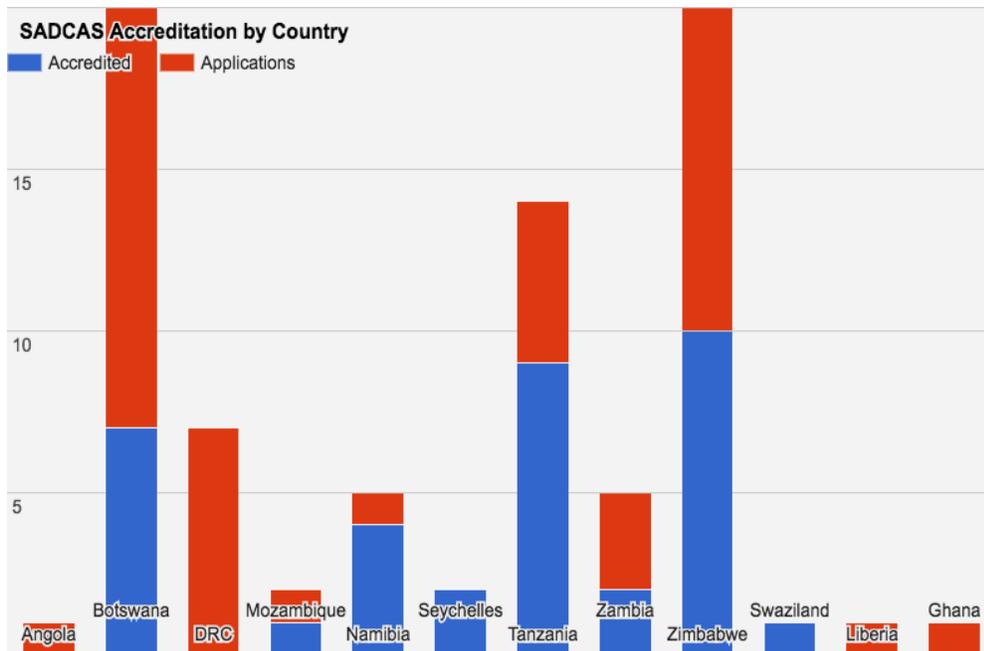
While this total is minor compared to the 1 507 accredited by SANAS, it nevertheless demonstrates growing institutional capacity, across a wide range of functions (as can be seen by Figure 16). These advances are underscored by good performance evaluations, with the most recent annual report showing universally positive feedback from clients (which are a combination of national and private testing labs).

Figure 14: Number of Facilities Accredited by SADCAS



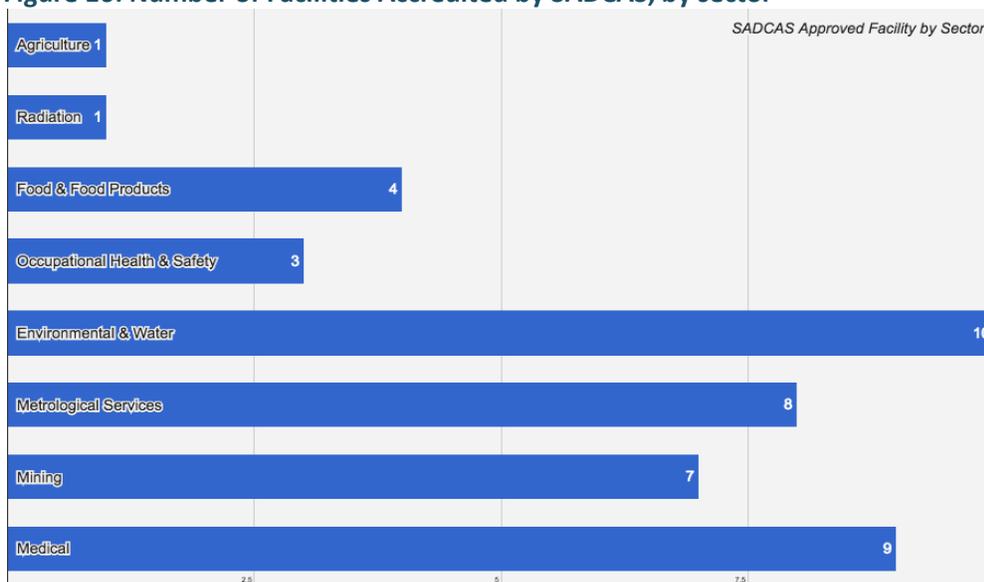
Source: SADCAS Annual Reports

Figure 15: Number of Facilities Accredited by SADCAS, by country



Source: SADCAS Annual Reports

Figure 16: Number of Facilities Accredited by SADCAS, by sector



Source: SADCAS Annual Reports

While SADCAS functions as an accreditation body in its own right, SADCA – SADC Accreditation – functions like SADCSTAN, providing a forum for cooperation and harmonisation between regional accreditation providers. It was one of the groups founded in the 2008 Technical Barriers to Trade Agreement, and aims to:

1. Develop and maintain mutual confidence among Accreditation Bodies in the SADC region and internationally;
2. Achieve and maintain uniformity of accreditation activities in the SADC region and internationally;

3. Promote and facilitate the use of accreditation as a tool for national governments in the removal of technical barriers to trade and protection of health, safety and the environment in both the voluntary and regulatory areas;
4. Promote consistent application of accreditation standards and facilitate their implementation;
5. Ensure the provision of regional accreditation cooperation services which are independent, impartial, transparent, non-discriminatory and achieve and maintain a high level of integrity and confidentiality whilst ensuring ethical operations;
6. Facilitate access to current databases of recognised Accreditation Bodies within the region and internationally.

While SADCA and SADCAS clearly perform different functions, it's not exactly clear whether SADCA is still as relevant as once envisioned. The body's main function is to coordinate various accreditation bodies, but with SADCAS serving this function for 13 of 15 member states, there are only three accreditation bodies that require coordination. And two of these – SADCAS and SANAS – already have extensive cooperation. Coordination between so few bodies could seemingly be achieved by integrating the two SADC bodies, and centralising the coordination function in SADCAS. While this isn't a priority, given that SADCA isn't a major draw on resources, it should perhaps be considered in future institutional rationalisation.

Challenges and Opportunities

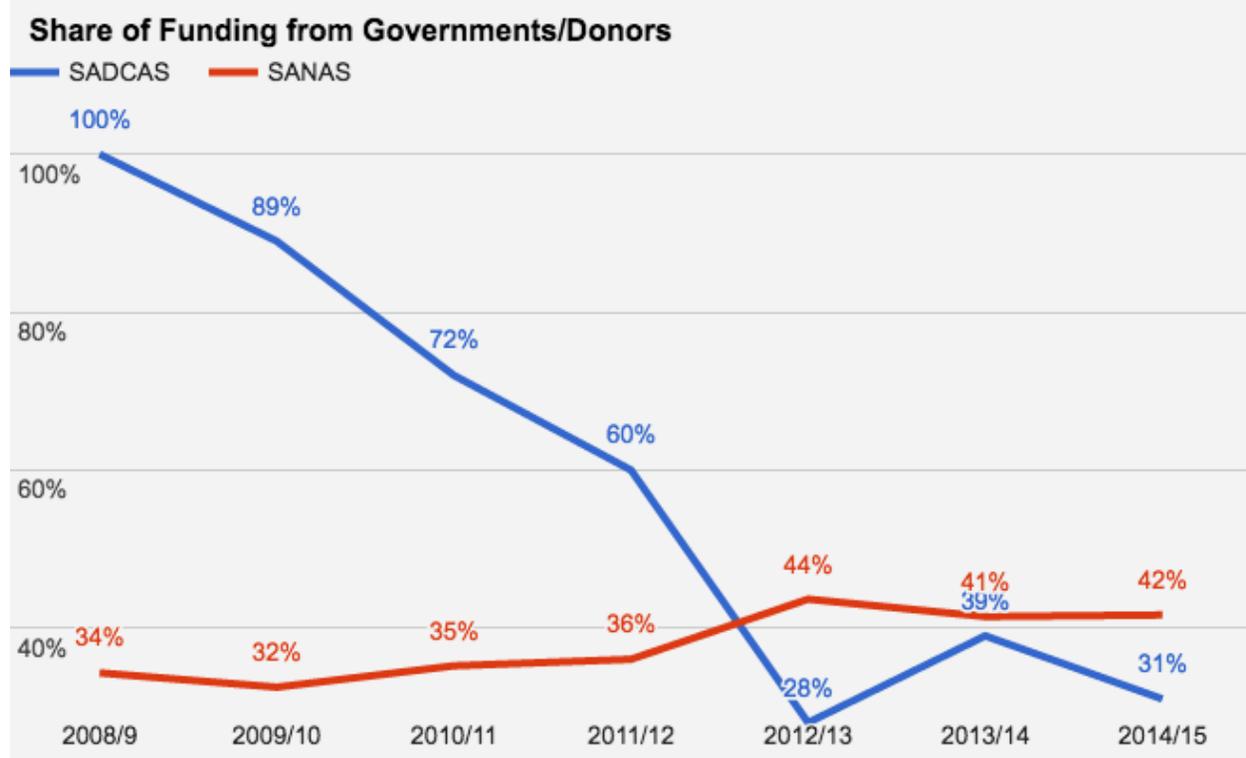
Despite the strong performance of SADCAS on paper, there are some causes for concern. Discussions with experts suggest that capacity at SADCAS is still a problem. It was noted that wait times for applications to SADCAS are very long, with some conformity assessment providers experiencing wait times of up to 18 months, a daunting proposition for new laboratories or those looking to expand capacity. This is partly due to institutional and financial restraints at SADCAS, but is also down to the limited pool of qualified assessors/auditors in the region. SADCAS tends to draw on the same professionals as SANAS, with an integrated pool of regional assessors, and thus faces competition from the more established and better capacitated South African partner for these scarce skills. While SADCAS runs various training programmes, skills shortages are nevertheless a hard barrier to the expansion of regional accreditation capacity.

More pressing, however, is the financial sustainability of SADCAS. As can be seen in Figure 17, the body's reliance on government and donor funding has been declining rapidly. The formation of SADCAS and the first six years of its operation were funded by the Norwegian government. When that funding ended in 2013/14, SADC member states approved funding support to bridge SADCAS's budget gap. This support, however, came with a fixed end date of March 2017, with SADC members making clear that they would not provide further funding, and that SADCAS had to be financially sustainable from then on.

This is an extremely demanding prospect. The scope for SADCAS to obtain funding is dependent on demand for accreditation, which is limited by the number of conformity assessment providers in the region. There is little evidence to suggest that there is an adequate supply of these providers to generate enough demand to keep costs low and accreditation accessible. SADCAS also faces challenges of institutional development for a still young organisation, and faces stiff competition from the likes of SANAS. Without supporting funding, it is likely that SADCAS can only remain financially sustainable by

either increasing the cost of its services (deterring accreditation and the development of more conformity assessment providers) or cutting vital secondary services like training. It is notable that SANAS’s budget has gone in the opposite direct to SADCAS, and has seen its government support increase in recent years, in recognition of the importance of accreditation within the broader technical infrastructure. Assuring the financial sustainability of SADCAS should be a priority for regional cooperation in technical regulation.

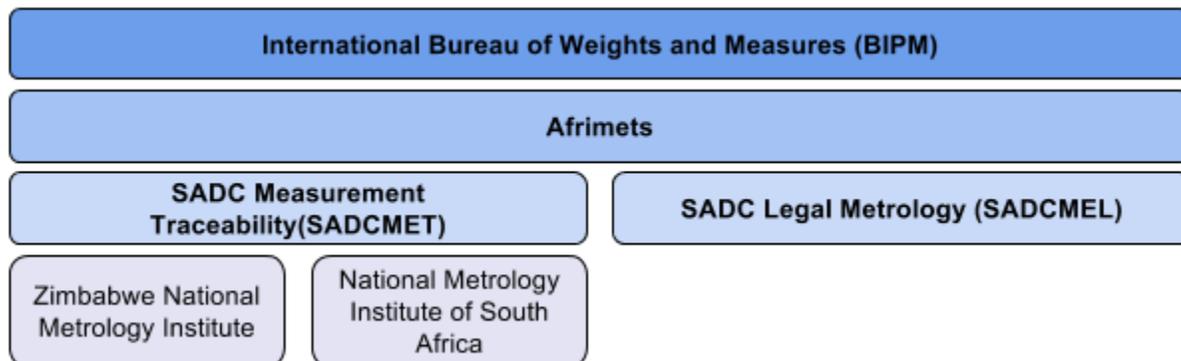
Figure 17: SADCAS/SANAS Share of Funding from Government/Donors



Source: SADCAS and SANAS Annual Reports

Metrology

Figure 18: Metrology Bodies in Southern Africa and linkages to cooperation structures



Source: Author

Metrology is concerned with maintaining the universality of certain metrics – such as weight, length, speed, and so on. For example, the kilogram as a universal measure is maintained by a system which traces the definition of the kilogram back to a single physical measure. This original kilogram is kept by the International Bureau of Weights and Measures, with metrology institutions maintaining weights based on that original, and then distributing those weights as a reference point for all other measurements throughout the country.

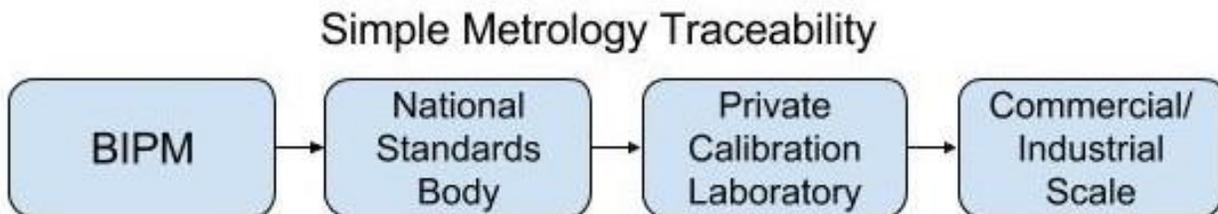
Metrology is vitally important to SQAM, because most standards are defined in terms of the measures maintained by metrology institutions. A standard that requires a structure to be a given length is not standard if our understanding of length varies. Nevertheless, metrology is not a function that has significant visible intersections with economic concerns or global value chains. Economic policy is unlikely to come into conflict with the length of a second and other measures but having these measures standardised serve an important economic function.

Domestic Infrastructure

Across the region, only South Africa and Zimbabwe have dedicated metrology bodies, the National Metrology Institute of South Africa (NMISA, hosted at the Council for Scientific and Industrial Research) and the Zimbabwe National Metrology Institute (ZNMI, hosted at the Scientific and Industrial Research and Development Centre). Metrology functions in all other member states are overseen by their respective standards bodies.

The linkages between the various international, regional and national bodies are essential in metrology, as the field is reliant on traceability. Every measure must be linked through a chain of accreditation back to BIPM. A typical traceability chain can be seen in Figure 19.

Figure 19: Typical Metrology Traceability



Source: Author

As one of the only BIPM certified bodies in the region, NMISA plays a vital role in creating linkages for the traceability. NMISA directly certifies many of the calibration laboratories in the region, while also providing traceability certification to national metrology units at the various standards bodies. While some metrology departments in the region do seek independent recognition for their measurements, the system of regional traceability through NMISA generally works well and presents no clear problems.

When traceability is in place, the core measure of a working regional metrology framework is the quality of measuring systems in various member countries, and the efficiency at which they can provide calibration services to testing laboratories. While capacity at metrology institutes is limited, there is also not a great deal of demand for calibration, due to the limited number of calibration laboratories in the region. While this means metrology calibration isn't a major concern currently, it does mean that greater

investment in metrology will be needed as broader testing capacity grows. Metrology, like all the pieces of the SQAM architecture, needs to develop in concert with the other functions.

SADC Infrastructure

SADCMET is the sub-regional metrology organisation, and conducts important work on cooperation between various metrology practitioners, and drives training and other campaigns in the region. SADCMET does not, however, serve as the Regional Metrology Organisation in charge of liaising with the BIPM. That function is served by AFRIMETS, which plays a core role in conducting the supplementary and key comparisons that develop the traceability chain. To an extent, this does seem to indicate that in the field of metrology there is great alignment of tasks between the sub regional and regional bodies, with SADCMET play a smaller role. Nevertheless, the organisation remains vitally important, particularly given that metrology is entirely dependent on regional cooperation to assure clear traceability and universal acceptability of regional measurements.

Challenges and Opportunities

While metrology faces certain challenges – such as a scarcity of scientific skills in the region, and the overreliance on NMISA – none of the challenges seem poised to threaten the continued viability of the system in the short term. The greater risk in the field of metrology is rather that it doesn't attract the same level of attention and investment as other SQAM functions. It is much harder for economic development departments to make a case for investing in metrology, compared to in standards or accreditation, because the economic benefits are much more indirect. Metrology equipment is generally extremely expensive, and requires sustained support for upkeep and maintenance. Concerns regarding underinvestment are particularly pressing because metrology functions are performed by standards bodies in most of the region, putting metrology in direct conflict with resources available to those other functions.

And yet the others parts of the system cannot function without coordinated investment in metrology. Regional cooperation efforts will need to find creative ways to promote investment in this field, and to use the resources available efficiently. The imbalances in the region, with capacity in South Africa far ahead of other countries, should be considered as potential areas for expertise, and leading countries should work hard to share skills and equipment. Failing to do so could undermine broader regional efforts to promote accreditation and standardisation.

Section 2: Technical Regulations

Technical regulations in the abstract are neither good nor bad. Some create benefits for society and businesses; others create costs for both; and some benefit one group but harm another. It is the job of a country or region's technical infrastructure to identify and address problem areas. This is a profoundly difficult proposition.

There can be hundreds or thousands of standards and regulations being overseen by a single standards body, all very complex, and each requiring specialist scientific and industry knowledge to understand and assess their economic impact. Most bodies use experts in the formulation of standards, but standards can rapidly become inappropriate as technology and the nature of business evolves. Numerous interviewees reported cases of standards still in development that were already out of date, as technology outpaced the development process. Even up-to-date standards can have serious unforeseen consequences, especially on the economy. While standards bodies engage extensively with technical experts, only one body in the region (South African Bureau of Standards, or SABS) has a dedicated economic impact assessment team, and even in SABS this is a new innovation.

Efforts to identify or monitor problem areas have often been frustrated by the extent of this complexity and by a lack of resources. More often than not, problems only come to light when they become serious enough to attract the attention of larger firms, influential lobby groups, or the media. This section explores the results of various monitoring exercises, focusing on four groups of studies:

1. **NTB Monitoring Mechanisms:** A review of reports from the Tripartite Free Trade Area non-tariff barrier monitoring mechanism, and similar global tools.
2. **WTO TBT IMS:** The World Trade Organisation Technical Barriers to Trade Information Management System (IMS), a reporting tool for new technical regulations.
3. **SADC Studies:** In particular, a large scale report undertaken by SADCSTAN.
4. **Import Rejection:** Data on products rejected as non-compliant with standards by the EU, US and Japan.

All of the monitoring tools available have serious limitations and do not accurately indicate which technical regulations are most challenging in the SADC region. However, the examination of the various monitoring tools directly contributes to one of the major recommendations of the study: the collection of import rejection data as a new, primary method of identify problems in technical regulation in the region.

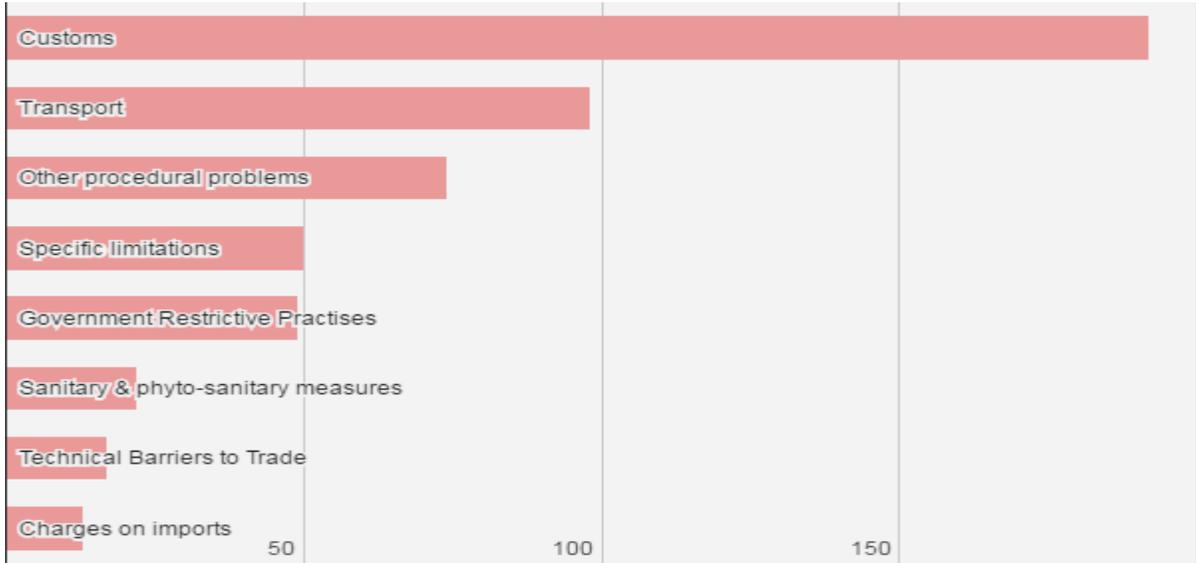
Studies and Monitoring Mechanisms

NTB Mechanisms

The Tripartite Free Trade Area non-tariff barrier reporting mechanism is a tool that allows traders to log complaints about barriers they encounter while trading in the SADC, COMESA, and EAC regions. The tool covers anything that might be broadly defined as an NTB – ranging from infrastructure to import certifications – and including technical barriers to trade.

Figure 20 shows various types of NTBs registered with the mechanism. Technical Barriers to Trade make up a tiny fraction of the whole, with the second least number of problems reported. This is partly because of a bias in the reporting – which is often done by transport companies which are more likely to experience problems at customs or on the roads – but it also reflects a reality in which technical regulations are (for the moment) less of a barrier than issues like cumbersome border posts and poor infrastructure.

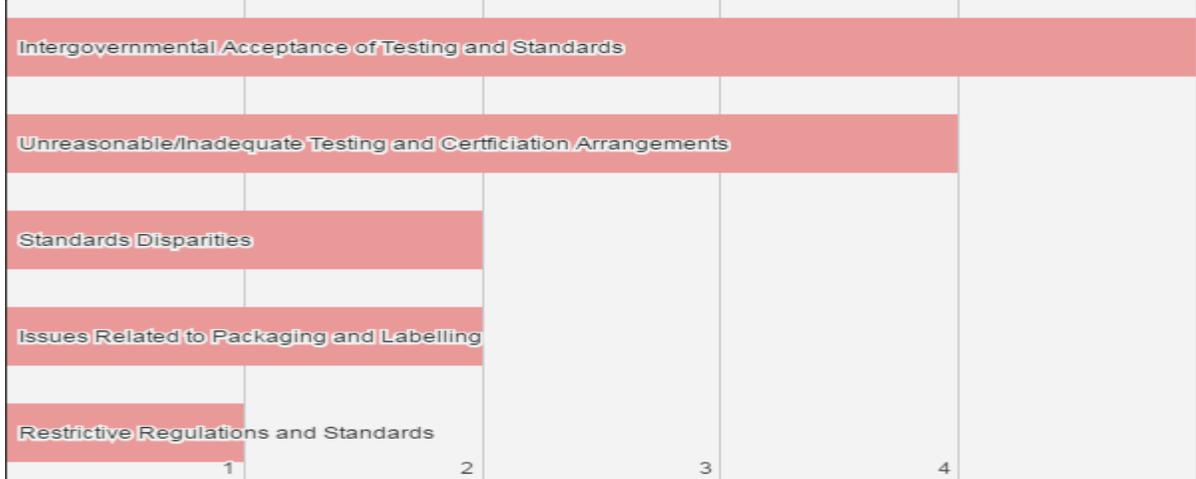
Figure 20: Non-Tariff Barriers reported to Tripartite Free Trade Agreement NTB Monitoring Mechanism



Source: Tripartite Free Trade Agreement Non-Tariff Barrier Mechanism, <http://www.tradebarriers.org/>

While the pool of registered complaints related to technical barriers to trade is too small to meaningfully draw conclusions from, complaints do match up with what has generally been reported by interviewees, namely that conformity assessment and mutual recognitions problems are more prominent than real differences or issues with the rules and standards themselves.

Figure 21: Technical Barriers to Trade reported to Tripartite Free Trade Agreement NTB Monitoring Mechanism



Source: Tripartite Free Trade Agreement Non-Tariff Barrier Mechanism, <http://www.tradebarriers.org/>

While the NTB mechanism is useful for putting technical regulations into perspective with the broader issues facing trade and value chain development in the region, it doesn't provide much information on the actual technical regulations that might cause problems.

WTO Information Management System

The World Trade Organisation agreement on technical barriers to trade requires that all member countries report new technical regulations under deliberation to the TBT committee, for discussion and engagement by other member states. All reported regulations are displayed on the TBT IMS.

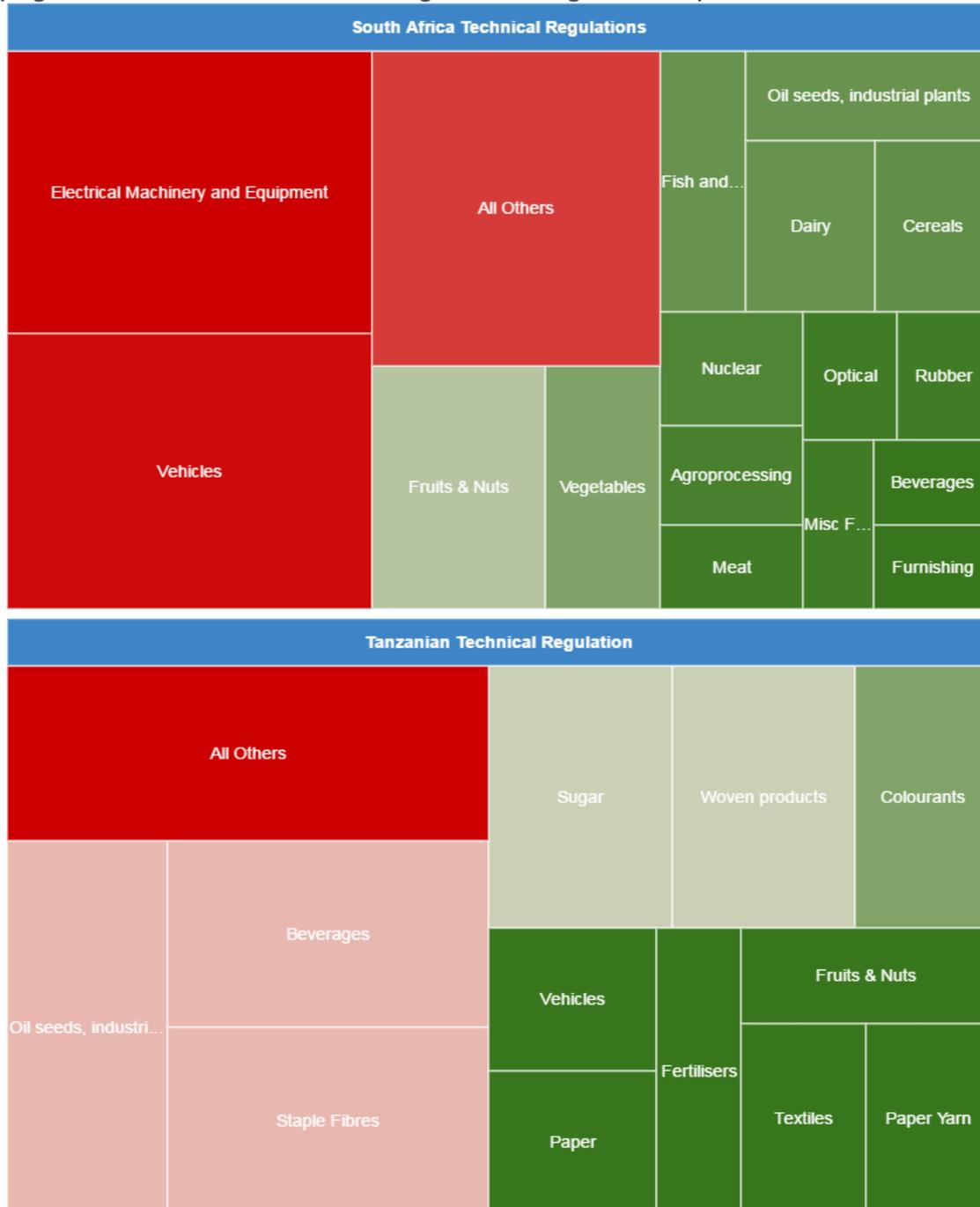
Table 3: SADC Technical Barriers to Trade registered with WTO, by product

Technical Barriers to Trade registered with WTO I-TIP, by product, SADC (excl Angola)	
Measures without HS code	14.37%
Machinery and electrical equipment	13.21%
Prepared foodstuff; beverages, spirits, vinegar; tobacco	12.77%
Vehicles, aircraft and vessels	9.43%
Vegetable products	9.14%
Live animals and products	6.24%
Resins, plastics and articles; rubber and articles	5.37%
Instruments, clocks, recorders and reproducers	4.35%
Miscellaneous manufactured articles	3.92%
Products of the chemical and allied industries	3.48%
Base metals and articles	3.48%
Articles of stone, plaster; ceramic prod.; glass	3.05%
Textiles and articles	2.76%
Animal and vegetable fats, oils and waxes	2.47%
Footwear, headgear; feathers, artif. flowers, fans	1.74%
Mineral products	1.45%
Paper, paperboard and articles	1.31%
Hides, skins and articles; saddlery and travel goods	0.58%
Wood, cork and articles; basketware	0.44%
Arms and ammunition	0.44%

Source: WTO Integrated Trade Information Portal, <https://i-tip.wto.org/goods/>

All SADC member states are party to the TBT Agreement, and thus the WTO system should ideally serve as a repository of all new technical regulations put in place since 1995. Unfortunately, building capacity to comply with the agreement's reporting requirements is a difficult process, and thus far only South Africa and Tanzania are active in reporting new technical regulations. Nevertheless, comparison of the reports of these two countries offers some interesting insights.

Figure 22: Breakdown of registered technical regulations, by product, South Africa and Tanzania (larger blocks refer to more technical regulations in a given sector)

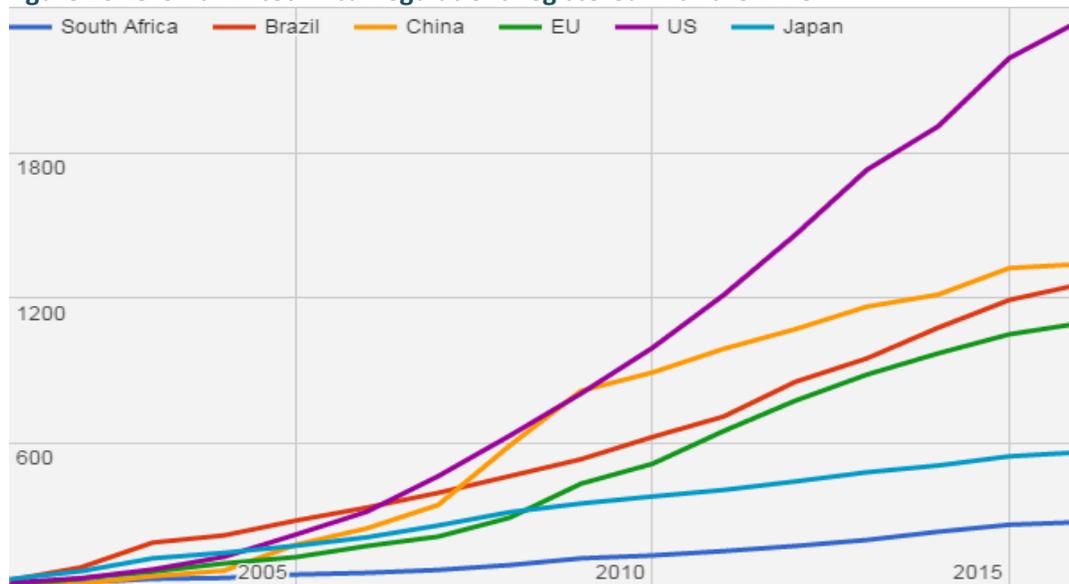


Source: WTO Technical Barriers to Trade Information Management System, <http://tbtims.wto.org/>

The different distribution of technical regulations represents two important distinctions that are typical between countries with more developed technical infrastructure (South Africa) and those with less developed technical infrastructure (Tanzania). First, South Africa has substantially more reported technical regulations than Tanzania, 273 to 45. While a lot of this gap could be accounted for by different

reporting regimes, it is also typical of the rapid pace of technical regulation growth in more advanced economies, as can be seen in Figure 23. Second, South Africa has substantially more reported regulations in more technical areas – such as electronics and vehicles – while Tanzania has more developed regulations in agricultural goods and consumer products.

Figure 23: Growth in technical regulations registered with the WTO



Source: WTO Technical Barriers to Trade Information Management System, <http://tbtims.wto.org/>

Again, while many of these distinctions are perhaps idiosyncratic to the differences between South Africa and Tanzania, and their respective reporting regimes, they nevertheless do seem to reflect real differences that reappear in other cases. This is a challenge to regional value chain development, as more advanced lead countries like South Africa are essential drivers of these value chains, and yet pose the greatest level of complexity to enter. This complexity is compounded by the less developed standards systems in smaller countries, which makes it difficult for firms in those countries to achieve the level of comfort with standards that might be necessary to enter value chains.

While the WTO reporting system gives an overview of where technical regulations are clusters, and is a useful check against regulations being used for protectionist measures, it has strict limitations. Trade professionals in the WTO TBT committee often have limited technical knowledge of the regulations being presented, and have had to grapple with more than 1 000 notifications a year since 2007.²³ The resultant database can show what regulations have been notified, but can't distinguish between harmless regulatory standards (like what type of plug a country uses) and more damaging or protectionist measures. Transparency in the form of the publication of standards catalogues provides more information, but in the case in which there are so many standards, the result is a flood of information that is difficult to meaningfully use.

SADC Studies

The SADC Technical Regulation bodies have long sought to identify priority technical barriers to trade, and then to seek to harmonise them. Unfortunately, the body has come up against many of the similar

²³ Number of TBT notifications graph

problems as others in this area, struggling to sift through the vast pool of technical regulations and find the problem areas. Indeed, an initial 2013 effort, in which a private consulting firm collaborated with member states, struggled to identify any problem areas, and was ultimately rejected by the SADC Technical Regulation Liaison Committee. After the failure of that exercise, the SADCTRLC undertook its own study, training national officers in seven member states to identify and report on the top five potential technical barriers to trade in the region. Of the seven member states, five responded, namely: Botswana, Lesotho, Mauritius, Swaziland, and Zambia. The barriers identified are listed in Table 4.

Table 4: Identified Technical Regulations Hindering Trade in SADC

Botswana	Lesotho	Swaziland	Mauritius	Zambia
Standard Import Inspection Regulation	Medicine and Related Substances Regulations	Biosafety Regulation	Basmati Rice Control of Sales Regulations	Road Tank Vehicles for Petroleum-Based Flammable Liquids regulations
Pre-packaged labeling regulations		Second Hand Car Regulations	Toy safety Regulations	Food and Drug Act
Kimberley Process Regulations			Electric Cable control of import regulation	National Biosafety Act – Marketing Authorisation of Medicines
			Electric Water Heaters	Medicines and Allied substances Regulations - Import/Export of Medicines
			LPG Regulators control of import regulation	Medicines and Allied substances Regulations – Pharmaceutical Licensing
			Fireworks control of import regulation	
			Motorcycle Helmets control of import regulation	
			Portland Cement control of import regulation	
			Consumer Protection control of import regulations generally	
			Export/Import of fish and fish products	
			Energy efficiency labelling requirements for household appliances	

Source: SADC. 2015. "Identification of Technical Regulations Hindering Trade in the SADC Region: A Summary Report of Five Member States (Botswana, Lesotho, Mauritius, Swaziland, Zambia)". SADC Technical Regulation Liaison Committee (SADCTRLC)

Beyond the identified barriers themselves, the exercise seems to raise a number of questions on the technical infrastructure in the region. First, it's notable that even when this list was compiled by an embedded government official, three of the five countries failed to find five technical regulations to identify. This highlights the difficulty in identifying these regulations, even among dedicated officials.

Second, where regulations were identified, they are often incredibly broad. Making changes to broad catch-all regulations on issues like medicine and biosafety are complex propositions, as each law would cover any number of rules and processes, many of which would not be barriers to trade. Sifting through large regulations to find problems would require dedicated work within each country.

Third, while the identified regulations do probably slow trade, it's not at all clear whether the regulations are a problem – that is, it's not clear whether slightly easier trade creates more benefits than the law does. Something like the Kimberly Process (which certifies diamonds as not being conflict diamonds) does probably slow the Botswana diamond trade a little, but it's almost certainly a worthwhile piece of regulation, from both an economic perspective (giving Botswana access to global diamond markets) and a basic humanitarian perspective. This problem is likely true of most technical barriers to trade: they are part of a regulation that was made for a reason (including broader public interest reasons), and more often than not that reason is deemed to be fair even if the regulation slows trade.

Nevertheless, resolving some of the regulations identified would be useful in smoothing regional trade and value chains. For instance, a lack of harmonisation of Zambian axle-load limits for fuel tankers has long been identified as a clear technical barrier to trade, often requiring that transporters change trucks at the border, and the inclusion of regulations for fuel tankers might be related to that debate.

The SADC study represents perhaps the central initiative within the SADC technical infrastructure to identify problem areas for harmonisation. The initiative will now be rolled out to additional countries, while identified regulations will be further examined. The core initiative – of embedding local experts who can work to find problems – seems very positive, but there are clear limitations. The identified regulations are not clearly problematic, and even if they are, creating change would likely be difficult. Regulations have their own logic, and smoothing trade and value chains has to respect the benefits identified in that logic. Failure to do so could result in any number of lists of problem areas being created, without any real change happening.

Rejected Product Data

Thus far, none of the monitoring mechanisms have successfully been able to identify potential problem areas in technical regulations. The only set of data that seems to achieve this is import rejection data (also called border rejection data). Import rejection data is a record of any import that has been turned away at the border for failing to meet appropriate standards. This record isn't a perfect indication of difficult technical regulations – products could be rejected for legitimate reasons like the contamination of a container, and the most difficult regulations could mean that exporters don't bother to send their products to the border in the first place – but it is closer than the others, in that it identifies specific products that have struggled to comply with compulsory specifications. Clusters of problems for specific products or exporters can be easily identified within the data, and used by governments to either offer assistance to the exporter or request consultations with their partner government on issues with the regulation in question.

Unfortunately, no data of this sort is publicly available for the SADC region. Data is, however, available for the United States, European Union and Japan. These markets have some of the strictest technical rules in the world, and are vital export markets for African products. As such, an examination of technical barriers to trade for these countries could offer some insights for SADC.

The most significantly affected products can be found below.

Some clusters of problems – such as labelling, salmonella contamination, aflatoxins – are immediately apparent, and offer an avenue to advance efforts to reduce technical regulation. While some of these specific problems are examined in Section 3 below, the more general lesson from this evidence is that import rejection data is potentially extremely helpful to government officials working in the area of technical regulation. As such, it is recommended that SADC states attempt to collect and collate exactly this data as a way of smoothing technical regulations for value chain development (see Recommendation 1 for further information).

Table 5: Import Rejection Data, SADC Trade with US, Europe and Japan

Japan				United States			
Product	Reason	Origin	Rejections	Product	Reason	Origin	Rejections
Peanuts	Aflatoxins	South Africa	17	Raisins	Pesticide Contamination, Decomposing Food	South Africa	37
Seesame Seeds	Imidacloprid	Tanzania	9	Confectionaries	Labeling, Unsafe Colorant	South Africa	22
Coffee beans	Mold and General Deterioration	Tanzania	4	Patent Medicines	Unapproved Drug, Labeling	South Africa	20
Grapefruit	Unspecified (Imazalil)	South Africa	4	Personal Care Products	Unapproved Drug	South Africa, DRC	17
Raisins	Sulfur Dioxide	South Africa	2	Vitamins	Unapproved Drug, Labeling	South Africa	16
Rooibos	Coliform, Packaging	South Africa	2	Tableware	Unsafe Additive (Lead?)	South Africa	16
Seasoning	TBHQ (tert-Butylhydroquinone)	South Africa	2	Vegetables	Labeling, Pesticide Contamination	South Africa, Madagascar	13
Sesame seeds	2,4-D	Mozambique	1	Pharmaceuticals	Unapproved Drug	South Africa	12
Marule (Processed)	Sodium Pyrosulfite	Botswana	1	Tea & Herbal Products	Unapproved Drug, Salmonella, Labeling	South Africa	12
			42	Non-alcoholic Beverages	Labeling, Unsafe Colorant	South Africa	11
				Nuts (Cashews)	Pesticide Contamination	Tanzania	9
				Other Processed Food	Labeling	South Africa	8
				Medical Products & Devices	Unapproved Device	South Africa	6
				Seasoning & Condiments	Manufacturer's Failure, Labeling	South Africa	6
				Fruit	Labeling, Unsafe Colorant	South Africa	5

EU Non-Food				EU Food			
Product	Reason	Origin	Rejections	Product	Reason	Origin	Rejections
Skin Lightening Product	Hydroquinone	DRC	24	Fish and Fish Products	Mercury, Temperature Control, Enterobacteriaceae, Histamine, Salmonella	Namibia, South Africa, Seychelles	192
Automobiles	No common reason: airbags, seatbelt clasp, brake calliper bolts, steering shaft bolt, rear diff specification, electrical connection	South Africa	6	Nut, Nut Products, and Seeds	Aflatoxins	South Africa, Malawi, Mozambique	141
Hair Dye	Phenylenediamine	South Africa	3	Meat (not Poultry)	Salmonella, E.coli	Botswana, Namibia, South Africa	77
				Fruit & Vegetables	Various	South Africa, Madagascar, Mauritius	67
				Crustaceans	Temperature Control, Sulphite Content	Mozambique, Angola, Madagascar	63
				Herbs & Spices	Unauthorised Colour Sudan 1, Various	South Africa, Mauritius, Tanzania	31
				Feed	Dioxins, Aflatoxins, Salmonella	South Africa, Mauritius, Madagascar	26
				Food Supplement	Various	South Africa, Mauritius, DRC	25
				Other	Chloramphenicol	South Africa, DRC, Tanzania	17
				Cocoa, Coffee, Tea	Ochratoxin A, Plastic Fragments	Tanzania, DRC, Angola	16
				Milk	Listeria monocytogenes, E.Coli	South Africa, Mauritius	15
				Cereal	Various	South Africa, Angola	14

Source: US Food and Drug Administration (FDA) Import Refusal Reports, <http://www.accessdata.fda.gov/scripts/importrefusals/>, European Union Rapid Alert System for dangerous non-food products, http://ec.europa.eu/consumers/consumers_safety/safety_products/rapex/index_en.htm, European Union Rapid Alert System for Food and Feed, http://ec.europa.eu/food/safety/rasff/index_en.htm, Japan Ministry of Health, Labour and Welfare Imported Foods Inspection Services, <http://www.mhlw.go.jp/english/topics/importedfoods/>

Section 3: Conformity Assessment

Most firms will not have direct contact with the core public institutions of the technical infrastructure. Their experience will be directly with the conformity assessment providers – those laboratories and assessors that certify products, processes and firms as compliant with given standards. While many of these functions will be run by public conformity assessment bodies – with labs in standards bodies playing a vital role across Southern Africa – the burden of this function tends to fall on private providers. Even if the public aspect of the technical infrastructure is perfectly set up, an inadequate supply of both public and private conformity assessment bodies will undermine the effectiveness of the entire domestic system.

A successful system of conformity assessment will meet three criteria:

1. **Accessibility:** Conformity Assessment facilities are available, appropriate to the demands of firms, charge reasonable prices, and are (ideally) located within the region.
2. **Firm Commitment:** Firms know about the value of accreditation and are committed to attaining it.
3. **Recognition:** Certification from local conformity assessment bodies is recognised globally, meeting the ‘one product, one test, accepted everywhere’ standards.

While conformity assessment has widely been recognised as essential to technical regulation, there are very few studies or resources that examine the state of the field in Southern Africa. It is far more common for sectoral studies to examine the availability of facilities for the specific functions needed by that sector, but this sectoral approach makes it hard to access the strengths and weaknesses of the broader conformity assessment landscape.

The availability of conformity assessment providers is difficult to gauge. There is limited information directly available on the conformity assessment process, the availability of appropriate facilities, and the matching of available facilities with the demands of firms. This section therefore focuses on looking at what certifications firms seek and what resources are currently available – and attempting to understand whether these two match – while also examining factors that might motivate firms to seek certification and how they experience the certification process.

Priority Certifications

Survey data for South Africa^{24 25}, and surveys conducted by ISO²⁶ and the International Accreditation Forum (IAF)²⁷ for the rest of the region, give some indication of which certifications firms are most likely to seek. While product certification is vitally important for many in the region, a variety of quality management system certifications rank as the most important, with ISO 9000/1 standing out (see Figure 24). This is perhaps a bit misleading. Since any sector would benefit from quality controls, ISO 9000 may seem disproportionately popular versus other requirements, which would be specific for

²⁴ Koch, S. & Peet, M. 2007. “Non-tariff barriers faced by South African firms: Are there any lessons?” SAJEMS NS 10 (2007) No 4, Pgs 520-543.

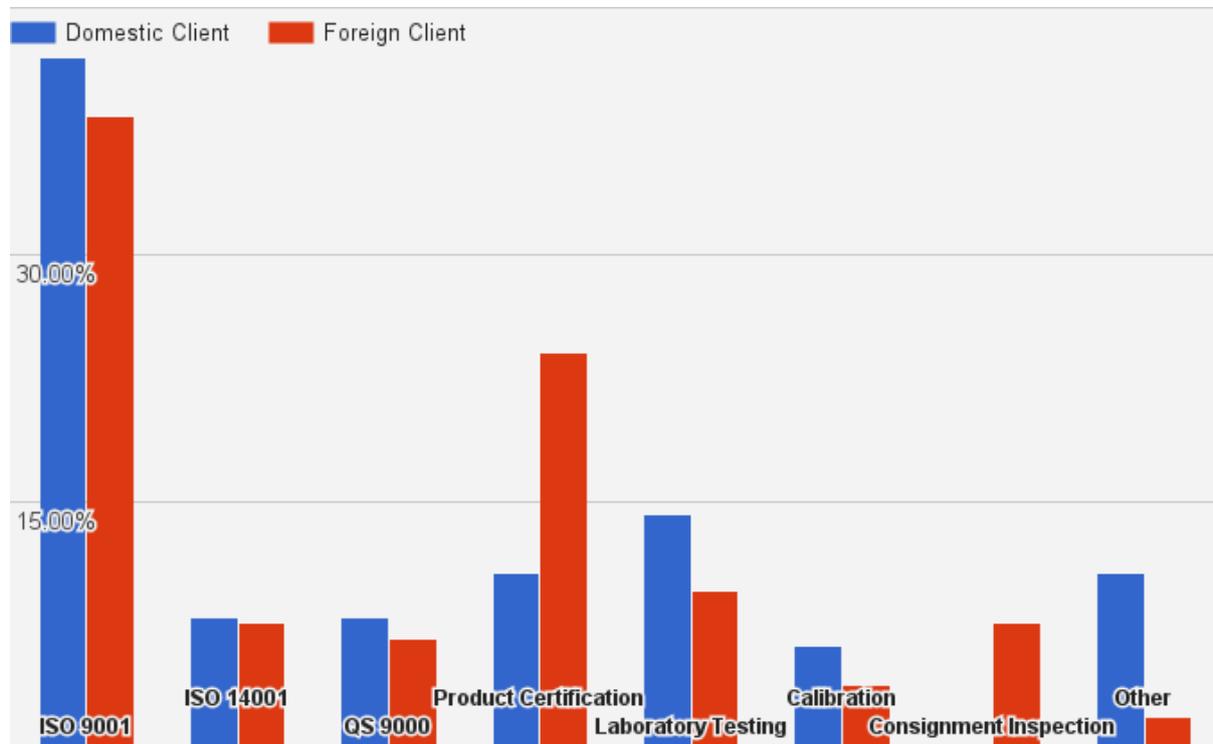
²⁵ Koch, S. & Peet, M. 2007. “Technical Barriers to Trade faced by South African SMME’s.” Pretoria: University of Pretoria.

²⁶ ISO. 2014. “The ISO Survey of Management System Standard Certifications – 2014”. Geneva: International Standards Organisation. <http://www.iso.org/iso/iso-survey>.

²⁷ IAF. 2012. “The value of accredited certification: Survey Report.” Quebec: International Accreditation Forum.

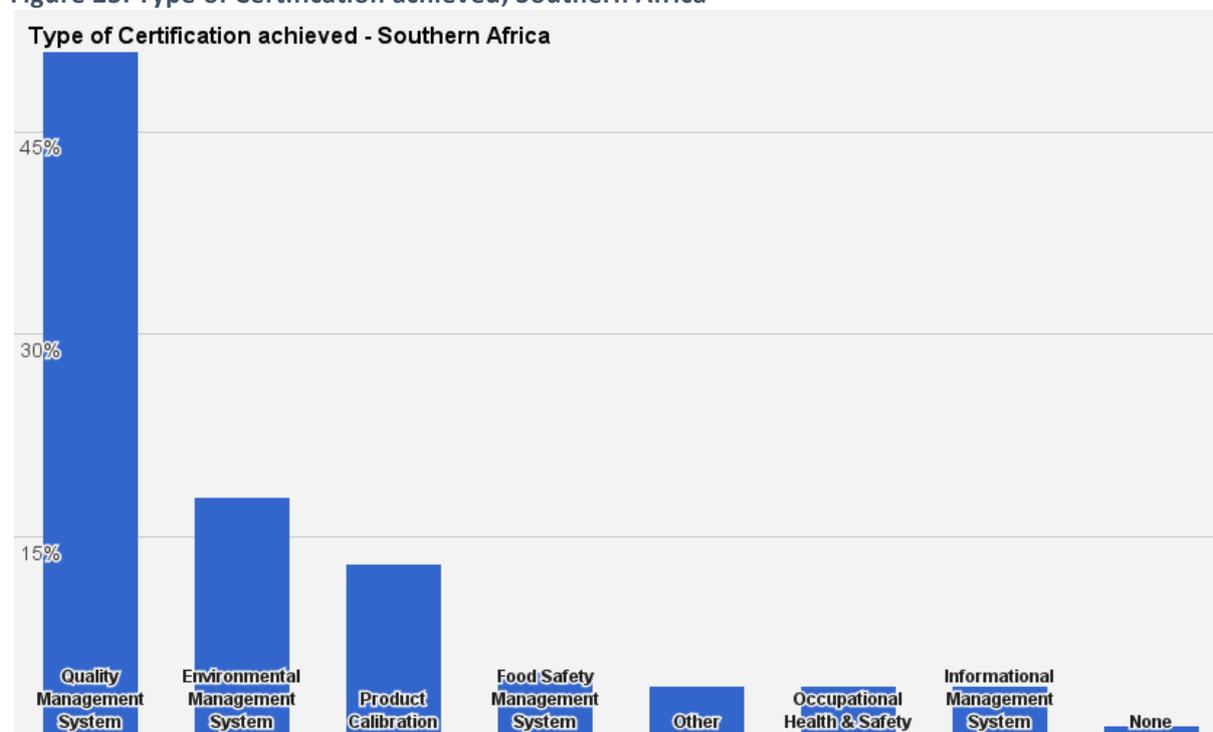
different sectors. But it does also reflect the fundamental attractiveness of the certification, and its wide international recognition.

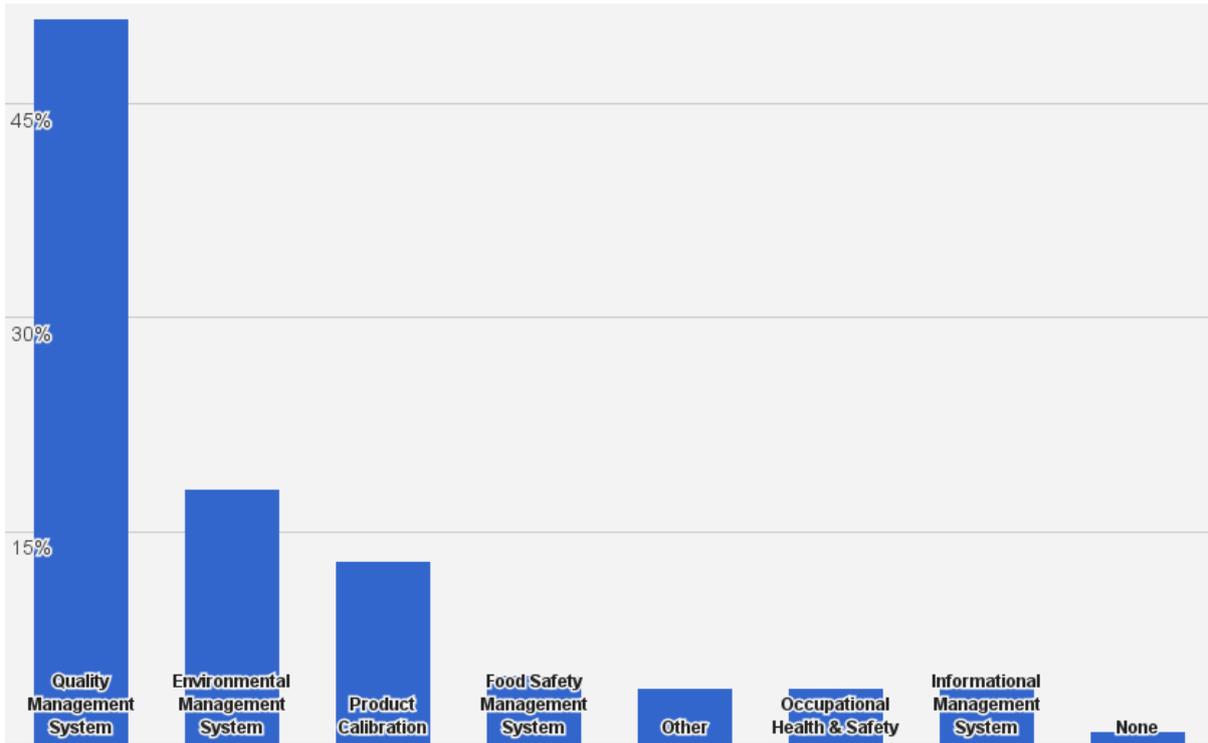
Figure 24: Most Important Conformity Assessment Services, South Africa



Source: Koch, S. & Peet, M. 2007. "Non-tariff barriers faced by South African firms: Are there any lessons?" SAJEMS NS 10 (2007) No 4, Pgs 520-543

Figure 25: Type of Certification achieved, Southern Africa

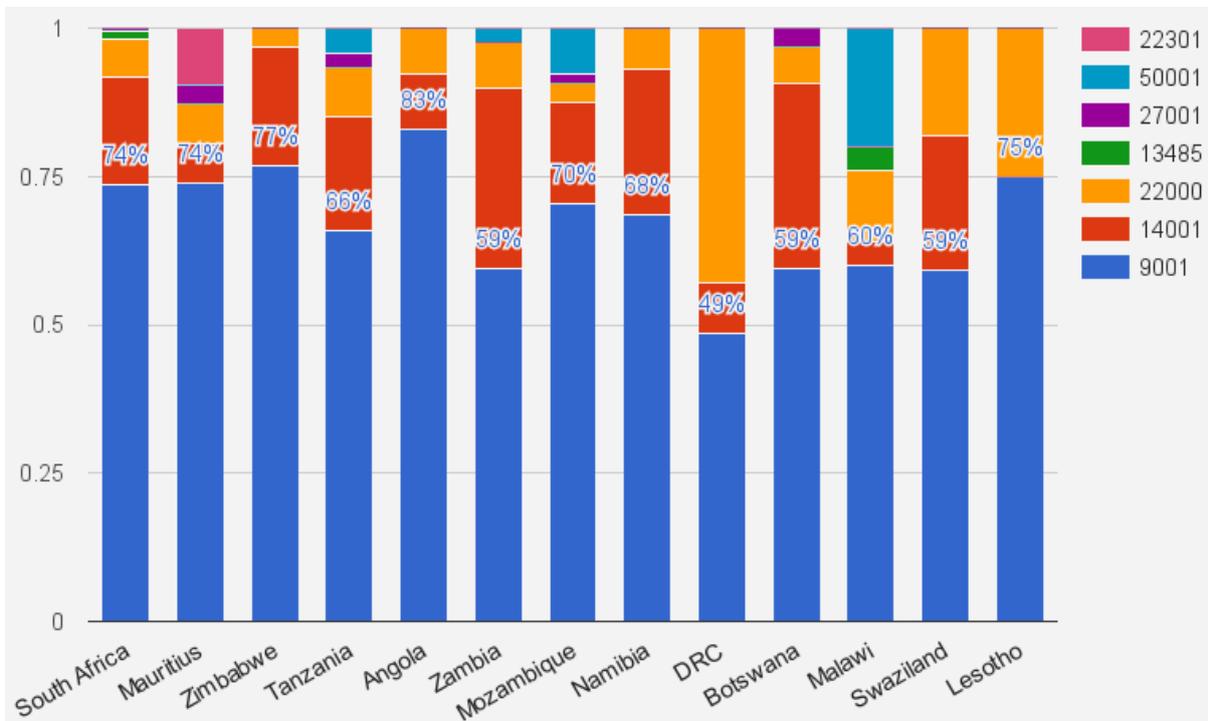




Source: ISO. 2014. "The ISO Survey of Management System Standard Certifications – 2014". Geneva: International Standards Organisation. <http://www.iso.org/iso/iso-survey>

As can be seen in Figures 25 and 26, quality management systems are the most popular certifications in both South Africa and the surrounding region, with the ISO 9001 quality management system forming a commanding majority of total ISO certifications in all countries except the DRC.

Figure 26: Type of Certification achieved by country



Source: ISO. 2014. "The ISO Survey of Management System Standard Certifications – 2014". Geneva: International Standards Organisation. <http://www.iso.org/iso/iso-survey>

ISO 9000 remains popular across sectors, although which standards firms identify shifts depending on the sector, with manufacturing for example stressing the role of both environmental standards and consignment inspection.

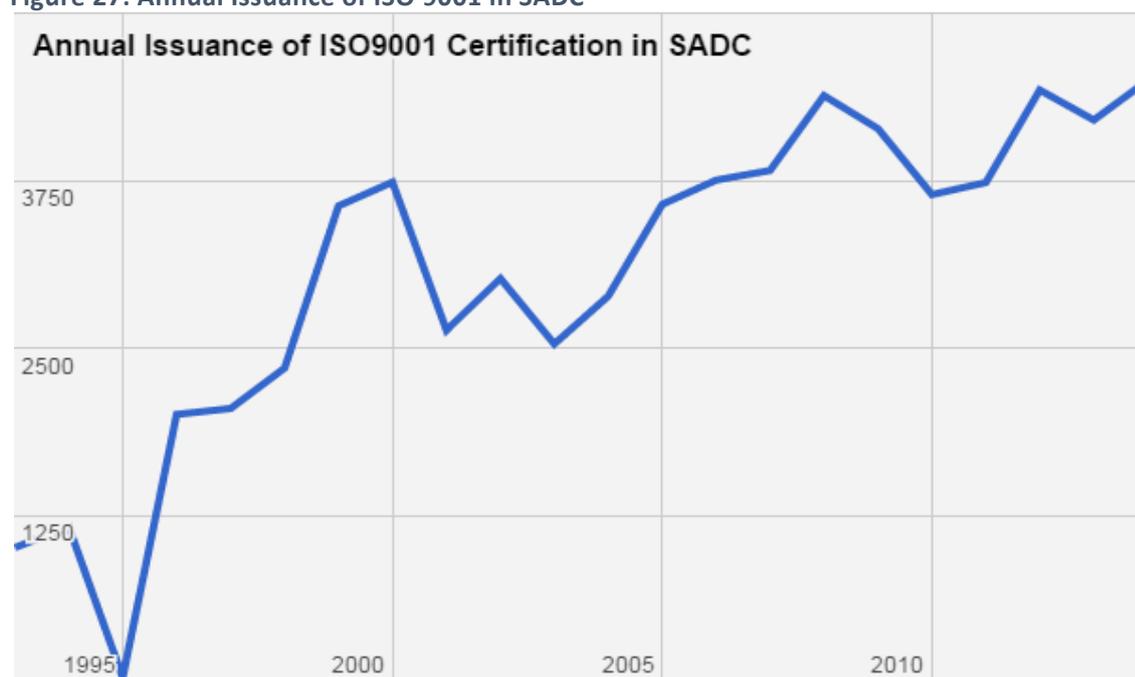
Table 6: Likelihood of standards being identified as “Most Important”

Standard	Agriculture and agro-processing		Manufacturing		Other	
	Non-Exporters	Exporters	Non-Exporters	Exporters	Non-Exporters	Exporters
ISO 14000	14.20%	12.70%	71.80%	28.90%	22.10%	8.60%
QS 9000	12.60%	13.40%	29.10%	11.80%	19.70%	9.60%
VDA 6	17.30%	16.30%	28.80%	6.90%	25.90%	23.40%
Consignment Inspection	10.20%	9.10%	84.20%	51.50%	13.70%	17.10%

Source: Koch, S. & Pete, M. 2007. “Non-tariff barriers faced by South African firms: Are there any lessons?” SAJEMS NS 10 (2007) No 4

Finally, the primacy of ISO 9000 certifications can be seen in the pure growth of the number of certifications granted, with annual issuance rising continuously in SADC since 1995 (see Figure 27).

Figure 27: Annual Issuance of ISO 9001 in SADC



Source: ISO. 2014. “The ISO Survey of Management System Standard Certifications – 2014”. Geneva: International Standards Organisation. <http://www.iso.org/iso/iso-survey>

Within the constraint of the limited data available, and the potential distortions from using ISO data, a number of lessons can be drawn.

First, quality management systems, particularly ISO 9000, seem extremely popular. Details on motivation (below) indicate that this is driven by a mix of internal motivations and demands by regulators and export clients. It is likely that ISO is particularly attractive in Southern Africa because of its wide international recognition, which can help overcome concerns by quality-conscious foreign

trading partners which have little experience in dealing with African firms. This was a strategy used by China during the early phase of its industrial boom, where it actively sought certifications like ISO 9000 to combat false perceptions of the low quality of manufactured goods. As is discussed below, ISO 9000 and other quality management systems also might be sought as a means to build the controls necessary to meet other private standards or compulsory specifications.

Second, in the case of South Africa, product inspection is notably more important for exporters than for those producing for the local market. This seems to highlight the importance these particular standards as potential barriers to trade. In general, however, it is perhaps surprising that product standards don't feature as more important to firms, given the prominence given to these standards in the technical barriers to trade literature and in discussions with respondents during this research. The low response rate might be because of some combinations of factors that include: the use of declarations of conformity for products that don't require full testing and certifications, the low rate of export focus for the firms in question, the assumption of these standards as simply part of the business process rather than an additional certification, or simply the concentration of problems only in certain sectors (it is unsurprising that retail firms, for example value ISO 9000 over product testing, given they don't make products).

Third, while ISO 22000 is popular across the continent, it is particularly so in countries with disproportionately large agricultural industries. ISO 22000 is a Food Safety Management System, and codifies many of the controls that are necessary to meet strict SPS standards. Given the priority given to the development of agroprocessing in both SADC Industrial Policy and in IPAP, early adoption of ISO 22000 might help smooth export-focused development of agricultural firms as the sector develops.

Facilities Available

On balance, it seems Southern African firms prioritise a mix of quality, environmental and food safety management systems; alongside an extremely disaggregated selection of product certifications.

Local firms can seek these certifications from foreign conformity assessment providers, from local providers that are accredited by foreign associations, or from conformity assessment bodies accredited by the three local accreditation bodies – with data being available for the last group in particular. There are 1 586 bodies that have been accredited by SANAS, MAURITAS or SADCAS, as can be seen in Table 7.

Table 7 Facilities accredited by SADC Accreditation bodies

SADCAS		SANAS		MAURITAS	
Agriculture	1	Chem & Micr Test	233	Chemical & Biological	11
Radiation	1	Mechanical & Phys	91	Environmental	4
Food & Food Products	4	Medical	311	Textiles and Garments	1
Occupational Health & Safety	3	Veterinary	22	Mechanical	1
Environmental & Water	10	B-BBEE (Broad Based Black Economic Empowerment)	52	Food Testing	5
Meteorological Services	8	Verification	152	Biological	4
Mining	7	Calibration	214	Construction Materials	1
Medical	9	Inspection	198	Forensic	1

		Pharmaceutical	4	Medical	5
		Blood Transfusion Services	183	Metrology	2
		Forensics	2	Quality Management & Other	1
		Good Laboratory Practise	6		
		Certified Reference Materials	2		
		Proficiency Testing	6		
		Certification	31		

Source: SADCAS. 2015. "Annual Report 2014/15". Gaborone: SADCAS; SANAS. 2015. "Annual Report 2014/15: Towards Global Trust". Pretoria: SANAS; MAURITAS website, "List of accredited entities", <http://www.mauritas.org/entities.php>

Comparing the various types of accredited facilities is tricky because many cover multiple functions, and many of the classifications change across countries and among the various bodies. Nevertheless, there does seem to be an imbalance. Whereas most firms identify quality management as most important, and laboratory testing and product certification as less important, the conformity assessment landscape is heavily skewed towards more technical testing. This is potentially due to quality management assessors receiving their accreditation from foreign bodies, or due to the concentration in the market for quality management assessors – but the reasons for the discrepancy are not definitively clear from the available data.

The bias towards technical testing is not necessarily a problem. It likely indicates the extreme diversity of testing functions that are needed within product certification, and actually seems to indicate that these crucial functions are well developed. However, it does pose a challenge for product certification facilities. With highly disaggregated demand for product certification and highly disaggregated facilities offering the many services needed, and considering the very high cost of testing equipment, there is a risk that each facility's client base remains too small to benefit from economies of scale and keep costs low. Understanding that dynamic certainly requires more research, but it should be closely monitored as a potential risk to the expansion of certification to those less able to afford it. It also has implications for specialisation by individual testing facilities with possibilities to achieve lower cost structures through improved co-ordination and collaboration by testing facilities across the region.

Finally, it is notable that SADCAS certifications are skewed in unexpected directions, with water management, medical, and metrology leading the way. This might simply be a symptom of the relatively small sample of facilities SADCAS has thus far accredited, but it seems to indicate that SADCAS is primarily being used by public sector institutions, which are more likely to be working in those areas. There is therefore a need for SADCAS and local governments to more actively support the conformity assessment functions needed by the private sector.

Drivers of Assessment

Firm motivations for conformity assessment differ widely, and will vary based on what sector the firm is in, whether they are importers or exporters, and which certification they are seeking. In general, however, firms seem to most often seek certification to improve their internal business operations, indicating some level of respect for the quality of the standards beyond simple recognition from exterior forces like exports or regulations (see Table 8). This

aligns with the research on the impacts of standards such as ISO 9001, which indicates that they can have positive impacts on management, quality and sales.²⁸

Table 8: Reasons for Firms Seeking Certification

Driver for Seeking Certification	
Internal Business Improvement	47%
Customer Requirement	32%
Regulatory Compliance	13%
Other	7%
Competitive Advantage	1%

Source: Kofi Aba, E. & Affan Badar, M. 2013. "A Review of the Impact of ISO 9000 and ISO 14000 Certifications." *The Journal of Technology Studies*, Vol. 39, No. 1/2 (Spring/Fall 2013), pp. 42-50

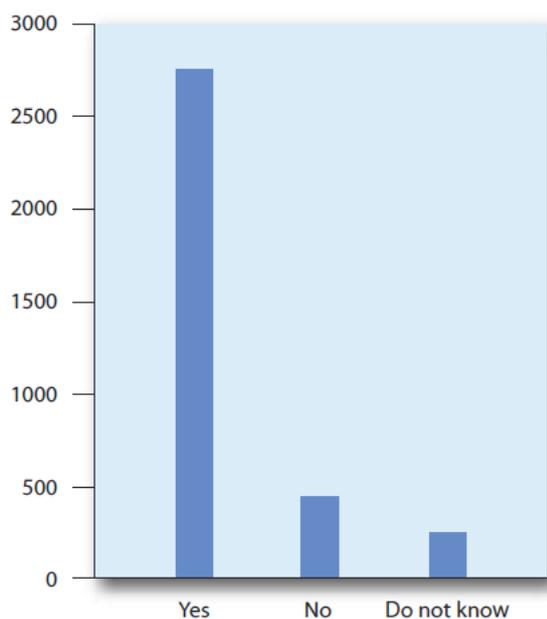
When external factors did play a role, customer requirements (or private standards) were twice as likely to be a driver of certification than regulatory compliance – confirming the oft-stated view that with value chains, private standards are often more important than regulation. The picture, overall, is one in which fixing regulations is not adequate to empower firms to grapple with the challenges of standardisation. The key standards for many firms are going to be private or internally driven. Interventions therefore need to be calibrated to help firms meet standards beyond those developed by public institutions.

Notably, the ISO survey indicates that many firms note that public or international standards have helped them meet regulations. This is notable because, while some regulations, such as procurement, might insist on ISO standards, this is likely still a rare requirement. Obtaining some other standard therefore seem to be helpful in improving the capacity of firms to meet regulations, indicating that promotion of these strategic standards can play a capacity building function that is essential for equipping firms to grapple with technical regulations. Capacity development through public standards seems primed to be a fundamental tenant of standards development in a world of value chains.

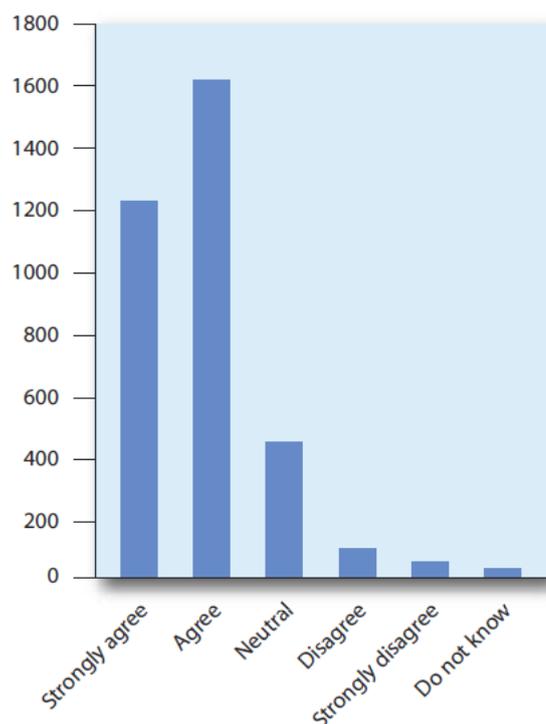
Figure 28: Importance of certification to regulators and customers

²⁸ Kofi Aba, E. & Affan Badar, M. 2013. "A Review of the Impact of ISO 9000 and ISO 14000 Certifications." *The Journal of Technology Studies*, Vol. 39, No. 1/2 (Spring/Fall 2013), pp. 42-50.

Has certification helped to meet the requirements of Regulators?



Is certification important to your customers?



Source: IAF. 2012. "The value of accredited certification: Survey Report." Quebec: International Accreditation Forum

ISO regulations tend to be more common in export sectors, but many purely domestic sectors – such as wholesale and retail trade – are still motivated to obtain the standards. On balance, there is no clear picture of broad standards by sector, with a wide variety of sectors seeking certification (see Table 9).

Table 9: Sector share of certification of quality management systems

Rank of Sectors by Certification, ISO Survey 2014			
SADC, other than South Africa		South Africa	
Food products, beverage and tobacco	11.08%	Basic metal & fabricated metal products	18.84%
Transport, storage and communication	9.75%	Chemicals, chemical products & fibres	8.57%
Wholesale retail trade, repairs of motor vehicles	7.83%	Other Services	8.45%
Other Services	7.68%	Electrical and optical equipment	7.96%
Chemicals, chemical products & fibres	7.09%	Machinery and equipment	5.80%
Basic metal & fabricated metal products	4.87%	Transport, storage and communication	5.75%
Public administration	4.73%	Rubber and plastic products	5.08%
Rubber and plastic products	4.43%	Food products, beverage and tobacco	3.75%
Construction	3.99%	Engineering services	3.73%

Financial intermediation, real estate, renting	3.99%	Wholesale Retail trade, repairs of motor vehicles	3.66%
<i>Certification covers ISO 9001, 14001, 27001, 22301</i>			

Source: ISO. 2014. "The ISO Survey of Management System Standard Certifications – 2014". Geneva: International Standards Organisation. <http://www.iso.org/iso/iso-survey>

Process of Conformity Assessment

Understanding the process of achieving conformity assessment – how long it takes, how accessible assessment bodies are, and how much it costs – is probably the most important factor for conformity assessment. But it's also the portion that is most difficult to assess. There is remarkably little data available on these issues, and more information should certainly be gathered in this area. However, some limited data from a 2007 survey of small businesses can offer insights for South Africa.

For South African firms, reputation is by far the most important factor when choosing a conformity assessment provider (see Table 10). This is reflected in two factors – reputation and SANAS accreditation. Interestingly, SANAS accreditation is less important than pure reputation, with only three respondents seeing an overlap between those two categories. Pricing was not a prominent criteria, although payment was noted as an important difficulty encountered by firms when undertaking conformity assessment activities.

Table 10: Criteria for choosing Conformity Assessment Provider among South African SMMEs

Criteria for Choosing Conformity Assessment Service Provider	Responses	Percentage
Word of Mouth	9	15.00%
Reputation	28	46.67%
Pricing	7	11.67%
SANAS Accreditation	16	26.67%

Source: Koch, S. & Peet, M. 2007. "Technical Barriers to Trade faced by South African SMME's." Pretoria: University of Pretoria

For small business exporters, access to conformity assessment for foreign markets wasn't noted as a significant problem, with 73% able to access service providers in South Africa who supplied them with the required international assessment, which is in line with the 80% figure found by Wilson and Otsuki.²⁹ Only 17% regarded conformity assessment for export as expensive.

Table 11: Most difficult aspects of conformity assessment among South African SMMEs

Most Difficult Aspects of Conformity Assessment	Responses	Percentage
Understand Requirements	18	21.43%
Comply with Requirements	28	33.33%
Payment	23	27.38%
Finding Good Service Provider	15	17.86%

Source: Koch, S. & Peet, M. 2007. "Technical Barriers to Trade faced by South African SMME's." Pretoria: University of Pretoria

²⁹ Wilson and Otsuki in Koch, S. & Peet, M. 2007. "Technical Barriers to Trade faced by South African SMME's." Pretoria: University of Pretoria.

Conclusion

There are two broad options for interventions aimed at improving conformity assessment. The first is to intervene to aid the development of conformity assessment bodies themselves. This is likely a rich area for potential policy, particularly in the region, where there is a scarcity of testing bodies. Developing testing bodies can also help the certifications they issue gain more international recognition, and prevent costly double testing in export markets. Unfortunately, however, it is difficult to identify interventions directly on the side of the conformity assessment bodies, because data on their operations is so scarce. While anecdotal interview responses indicates some problems with costs, access to equipment, and backlogs in testing requests, there isn't enough information available to guide policy and is an area for possible further research.

Interventions might therefore be better targeted at a second option: developing firm capacity to deal with conformity assessment processes. A firm that knows how the systems work is better equipped to deal with whatever structural problems may exist. This support can come in numerous forms: providing financing for certification, promoting awareness of conformity assessment and the benefits of certification, equipping Special Economic Zones and Industrial Parks with advisory capacity for standards, or lead initiatives to expand certifications to small and medium enterprises (which are widely recognised as being less likely to achieve certification).

A particularly useful intervention may, however, be the use of leading standards. Evidence from around the world indicates that conformity assessment benefits from learning-by-doing: a firm that has one standard finds it much easier to get another. This is partly because firms become acquainted with the assessment process, and partly because any form of certification requires the development of monitoring and control mechanisms that allow firms to meet requirements.

A rollout of the standard consistently mentioned throughout all the evidence available – ISO 9000 – could thus offer four benefits. First, it assists firms in obtaining a standard many already identify as very important. Second, it helps firms put in place the type of quality management controls that make meeting other standards easier. Third, it familiarise firms with the process of conformity assessment, making it easier to deal with the bureaucracy involved in other certifications. Fourth, it comes with a range of additional benefits, such as signalling quality to export markets and improving the quality of firm's production processes. Full recommendations on the use of ISO 9000 as a leading standard can be found in the recommendations below.

Conclusion and Recommendations

Technical regulations in Southern Africa are complicated, with various overlapping institutions, thousands of standards and regulations, and a conformity assessment system that remains limited and of uncertain efficiency. The region is marked by immense diversity in institutions and standards, which makes interventions that benefit the entire system a complex proposition.

As such, the recommendations contained here do not follow these traditional interventions, but rather attempts to make practical, supporting interventions that are specifically needed by the unique conditions of the SADC technical infrastructure.

PRIORITY INTEVENTION

Recommendation 1: Creation of a System of Registering and Sharing Import Refusal Data

Technical regulation is often discussed in the singular, as an area to improve. But in reality is incredibly fragmented, with thousands of regulations, dozens of processes, and numerous actors across many countries. While the SADC technical infrastructure has achieved a great deal, it is unrealistic to expect any structures to sift through the immense complexity of technical regulations and detect problems before they occur, unless they are appropriately equipped with tools to detect problem areas.

The primary monitoring tool currently used is a system of registering any technical rules under discussion with the WTO. While this is an important resource, its usefulness is limited, because it only identifies the existence of regulations, with very little capacity to specifically identify which of those regulations are problematic. Some emerging monitoring tools being developed by SADC, such as assigning individuals in national technical bodies with identifying problem areas, seem more promising – but they are limited by capacity and conflicts of interest. It is unreasonable to expect policymakers to read every new standard advanced by all of their export partners, and then complete the extensive research required to understand how that technical area may impact industry. Capacity for this is simply not available in any of the region’s technical bodies, nor in the SADC cooperation structures.

Because of this, a new tool is required that is better equipped to identify problem areas. This study recommends the creation of a database of rejected products. This would list any products that are turned away at the border of a Southern African country, for reasons of technical non-compliance or SPS violations. The list would need to be compiled by customs officials, and collected in a database that could be coordinated by either the relevant SADC technical structures or even South Africa’s technical infrastructure institutions. Given the existence of incentives that would seemingly encourage non-reporting, declaration of rejected product data would have to be compulsory. The data should include details of the product, the reasons for rejection, and (ideally) the company involved. Similar databases already exist in other parts of the world, notably in the United States ([FDA Import Refusal Reports](#)) and European Union (Rapid Alert System for [Food and Feed Safety](#), and for [Dangerous non-Food Products](#)).

The benefits of the database is that it would be a central place where policymakers could find information on trade that is being hindered by technical regulation, and would be instrumental in guiding efforts towards harmonization and mutual recognition. It would not be able to provide information on regulations that discourage firms from even attempting to export, but nevertheless would offer a more complete picture than current systems allow. The creation of the reporting system that would inform the database would be challenging, given that it would have to be completed by customs officials that are already under immense strain. Significant political will would be needed to establish the reporting system. Once it is established, the maintenance of the database should be feasible at minimal cost and effort.

SHORT-TERM INTEVENTIONS

Recommendation 2: Promote ISO9000 Certification as a Leading Standard

Having technical infrastructure only creates benefits if firms have the capacity and desire to seek certification. Smaller and less developed firms in the region often lack knowledge of standards and the benefits they offer, are unsure of the procedures involved, or lack the internal controls necessary to comply with standards. All of these barriers could be smoothed by regional efforts to promote ISO 9000 standards as a leading-standard - a standard that can have a catalytic effect in promoting greater compliance with technical regulations.

ISO 9000 refers to a family of international quality management standards. They specify a set of core management principles and control systems that should allow firms to manage the quality of their

outputs. ISO9000 is perhaps the best known global standard, and is widely recognised, but beyond the merit of the standard itself, it offers four key benefits as a leading standard.

First, ISO 9000 sets up the controls needed to comply with other standards and regulations. A functional quality control system makes it easier to meet whatever requirements a firm might face, whether complex regulations or private standards, and cuts across multiple sectors and products. Second, the procedure for obtaining the standard familiarises firms with the process of certification, and helps develop relationships with standards bodies and certifications agencies. With a greater understanding of the certification process and better networks with relevant bodies, the subsequent costs of further certification should decline. Third, the region is well suited to offer ISO 9000 certification, with a strong preexisting network of assessors and professionals that can guide firms through the process. This is because ISO 9000 is already by far the most popular certification amongst firms in the region. For South Africa (where data is more readily available) ISO 9000 was identified as the most important certification for both exporters and local manufacturers; while 9000 was also by far the most popular of all international standards issued in the region, as can be seen below.

ISO 9000 makes firms more competitive, better able to gain other accreditation, and can be rolled out relatively efficiently and effectively. While there is already widespread demand for ISO 9000, targeted rollout of the standards to small and medium enterprises, which tend to be much less likely to achieve any form of certification, can improve the region's capacity to meet technical regulations.

Recommendation 3: Ensure the Financial Sustainability of SADCAS

Efforts to encourage firms to obtain accreditation are closely linked to the availability of a strong network of regional testing laboratories, which are in turn closely dependent on a functional and well respected accreditation system. SADCAS, the SADC Accreditation System, is the agency responsible for accreditation amongst 13 of SADC's 15 member states. It has made significant strides since its foundation in 2008, including achieving international recognition by the International Laboratory Accreditation Cooperation. SADCAS holds the potential to make a powerful contribution to promoting efficient technical infrastructure in SADC, and is perfectly primed to target the most vulnerable member states in the region.

But it is under immense threat. The current financing model for SADCAS is not sustainable. The organisation currently receives two financing streams. First is payment for accreditation services. Given that the supply of laboratories in the region is severely limited, and many of these labs would be discouraged from accreditation if the costs involved were too high, there are very real constraints on how much money SADCAS can raise from clients. Even SANAS, a far more established body that does not face these challenges to the same extent, is reliant on government funding for 31% of its revenue. Second is from member state contributions, but this is a currently a short-term arrangement. The current funding system was put in place as a short-term arrangement in 2014, and will end in 2017. When the SADC ministers were petitioned for this assistance, they insisted that the organisation would be financially sustainable after that period. This will not happen and a case needs to be made to extend support by member states for SADCAS in the long term.

The cost and risks of not funding SADCAS are high. Without the organisation, member states will face either much higher accreditation costs for vital national laboratories, are reliant on South Africa, or they will face a situation in which the institutions that are already in place collapse or become irrelevant because they are not appropriately accredited. The impact is that in future a system of national accreditation systems would again need to be built from scratch.

Recommendation 4: Support the Establishment of a SADC Metrology Instrument Bank

Technical regulations are vital to trade and value chain development, but are often difficult for smaller SADC states to prioritise, given the many pressing developmental challenges and scarce resources they face. Vital functions like metrology seem like abstract concepts that don't easily link to the urgent need for growth and development, and are thus a low priority for investment. And yet substantial investment is needed, with metrology using very expensive technologies that require constant maintenance and calibration. The risk that all of the technical infrastructure – but particularly metrology – runs, is that underinvestment in one key part of the broader infrastructure can undermine efforts to develop the rest of the system. As such, any low-cost ways to expand capability need to be seized on.

Metrology features such opportunities, which are largely created by the level of divergence in capabilities in the region. Larger countries, in particular South Africa, have a far longer history of metrology and other testing functions, and a pool of older, but still functional, equipment. This equipment could play a vital role in other economy's metrology infrastructure, and could be used for testing and training purposes. SADC MET is currently in the process of developing such a sharing mechanism, names the SADC Metrology Instrument Bank. While limited information is available on the project, it is described as entailing the "identification and use of instruments that are no longer used by larger NMIs but still in good condition to be used by less developing NMIs which have need for such instruments."³⁰

A SADC Metrology Instrument Bank has the potential to leverage the heterogeneity to craft a low-cost path for the development of metrology capabilities in less developed countries – and is deserving of support.

Recommendation 5: Support the development of linkages between SADC TBT SC and Regional Business Organisations

The SADC Technical Barriers to Trade Stakeholder Committee is meant to facilitate ongoing engagement between the private sector and technical professionals, and has the potential to make a contribution to identifying problem areas, and promoting firm buy-in for new standards and regulations. Currently, however, the body is not functional, and struggles with identifying relevant interested private sector parties, and finding funding. While the TBTSC won't be transformative in the technical regulation space, both these problems can be overcome relatively cheaply and easily, and thus getting the body working represents a good 'easy win' for a programme of interventions in the space. In particular, facilitating linkages between the TBTSC and local chambers of commerce and regional business bodies (such as the nascent SADC Chamber of Commerce at the NEPAD Business Foundation) could have a lasting positive impact without ongoing costs. Small initial investment in the hosting of TBTSC meetings or joint workshops with business groups could facilitate these linkages, which would hopefully remain self-funding if the business community finds the engagement worthwhile.

LONG-TERM INTERVENTIONS

Recommendation 6: Strengthening Coordination of Donor Engagement

Technical cooperation in the region remains heavily donor dependant. This brings with it the typical challenges of donor reliance – such as unpredictability, lack of control of the agenda, short planning horizons, and so on – but also introduces unique problems for the technical regulation space. Because

³⁰ Presentation entitled "SADCMET", by Donald Masuku, <http://www.afrimets.org/AfrimetsGA/Working%20Groups/AFRIMETS%20GA%202015%20Presentations/AFRIMETS%202015%20-%20SADCMET%20Report.pptx>.

the technical infrastructure is fragmented, both in terms of functions and institutions, it requires constant coordination to assure resources are distributed fairly among the various component parts (standards, accreditation, metrology, conformity assessment). Failure to do so could see progress in one area stifled by a lack of progress in another. Donor funding, however, tends to be structured as investment in specific projects or functions, and not in the system as a whole. The continued use of this funding model requires improved coordination on the part of SADC, to be sure that resources are being distributed in the most efficient manner possible.

To achieve this, the regional should consider the creation of a single point of contact for donor activities. This would ideally be placed in the SADC Secretariat, to best facilitate ongoing-engagement and active management of donor activities. This unified funding channel would increase the ease of support for donors, while also empowering SADC to assign funds according to its own optimal distribution. Centralising the distribution of these funds would act as an important check on imbalance development of technical functions, and a more efficient needs-based distribution of resources. In the long-term, however, the region will need to seriously consider reducing its technical infrastructure's reliance on donor funding. The lack of core resources was consistently identified as a barrier to developing technical cooperation, getting in the way of simple activities like organising flights to regional meetings. A mixed donor-member state funding model needs to be considered as cooperation is deepened.

Recommendation 7: Skills Creation and Auditors

While SADCAS remains a vital organisation, accreditation processes remain very slow in the region. While this is disputed by official reports, some respondents noted that laboratory accreditation through SADCAS can take up to 18 months. While a portion of this delay is due to the abovementioned financial constraints at SADCAS, a larger portion is due to the severe shortage of qualified assessors in the region.

Assessors are highly technically skilled professionals, and are very specialised, with an assessor that can accredit an electro technical laboratory not necessarily able to accredit a chemical laboratory. Assessors often work for multiple institutions - including SANAS, SADCAS, and the various conformity assessment bodies - meaning there is effectively an integrated regional market for assessors, and the shortage impacts the entire region. There is no easy solution to this shortage.

No single intervention can resolve this, and forms part of the broader need to improve skills in science, technology, engineering and mathematics. A scatter-shot of programmes will most likely be needed. A recommendation is to create or expand scholarship programmes that require graduates to work in the technical regulation space on graduation. This approach has proved useful in closing skills gaps in the private sector, and has the added benefit of building crucial STEM skills while simultaneously improving the region's technical infrastructure. Other solutions could include retraining of otherwise qualified professionals, to encourage them to become assessors, and the addition of skills related to the technical infrastructure to qualifying scarce-skill visa programmes.

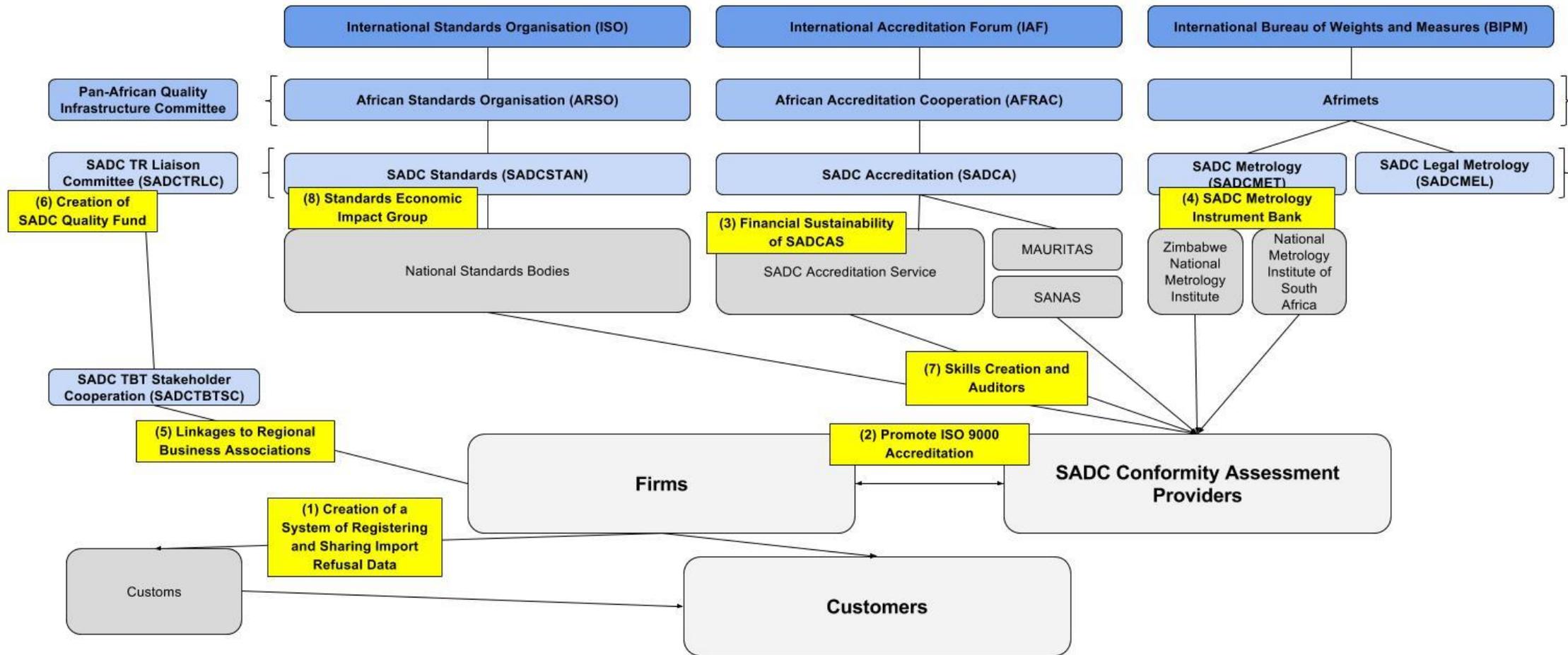
Recommendation 8: Support the Development of Standards Economic Impact assessment capacity in SADC Standards Institutions

While standards development continues apace across the region - at national, SADC-regional, Africa-regional, and multilateral levels - these standards are generally not constructed with specific economic ends in mind. Of the 16 standards organisations in the region (including SADCSTAN), only South Africa has a team specially designated to assess the likely economic impact of standards, and even that is a recent development. Others are reliant on technical

committees which, while extremely technically capable, are likely to prioritise scientific and engineering issues, and industry best-practise, over explicitly economic priorities.

Embedding economic considerations into the assessment of regional standards development is essential to building safeguards against technically standards being developed without references to economic wellbeing. Mainstreaming economic logic to technical institutions will require developing the capacity for standards experts to engage with trade, industrial policy, and economic development. Capacity building for these institutions could help embed this logic. Doing so would also offer learning opportunities to SABS's new assessment unit, assisting in bolstering an understanding of neighbouring SQAM systems, and embedding a regional logic into the development of standards.

Figure 29: Map of Key Interventions

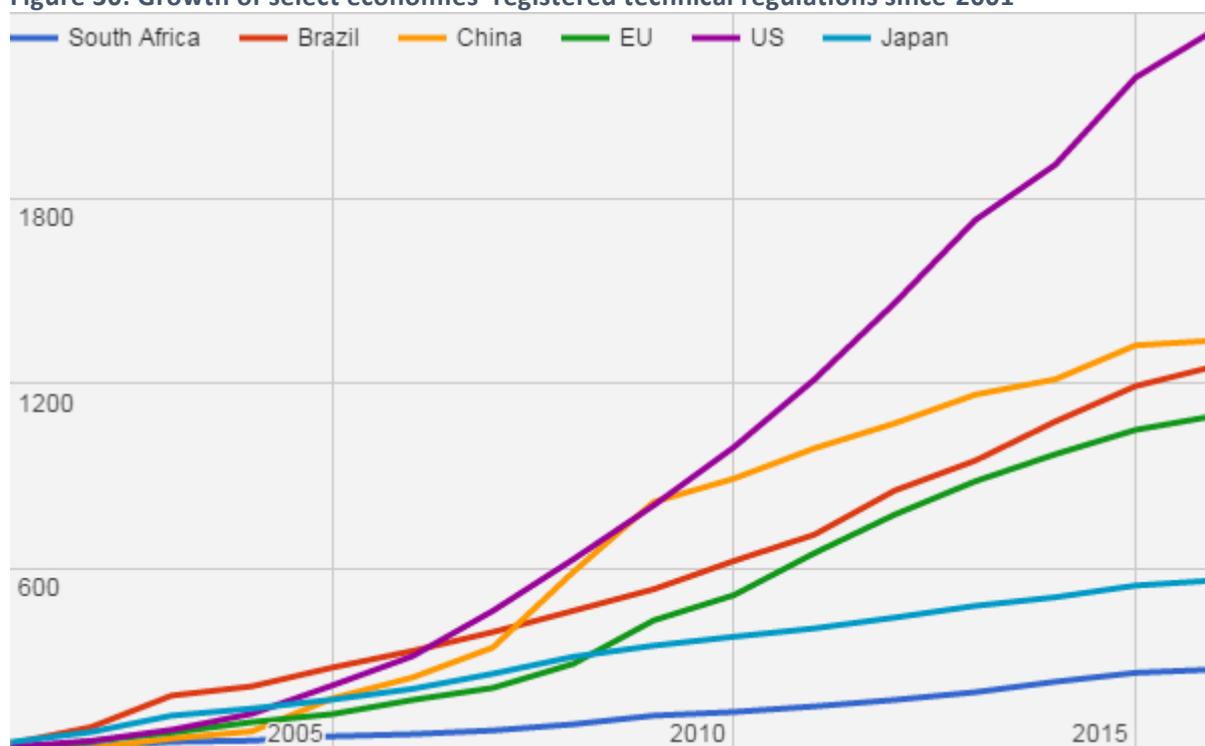


Annex 1: Literature Review

Trends in Technical Regulations

The number and complexity of technical regulations have expanded rapidly over the last decade. Member countries of the World Trade Organisation are required by the Technical Barriers to Trade agreement to register all new technical regulations with the WTO. Many countries, including most in Southern Africa, have not yet achieved compliance with this requirement, but even with a partial group the numbers are extremely high. Globally, the number of technical barriers to trade registered with the WTO has grown 453% between 1995 and 2013.³¹ Figure 30 shows the growth of registered technical regulations since 2001 among select BRICS (Brazil, Russia, India, China and South Africa) and developed economies, which shows the particularly rapid growth of rules among larger economies.

Figure 30: Growth of select economies' registered technical regulations since 2001



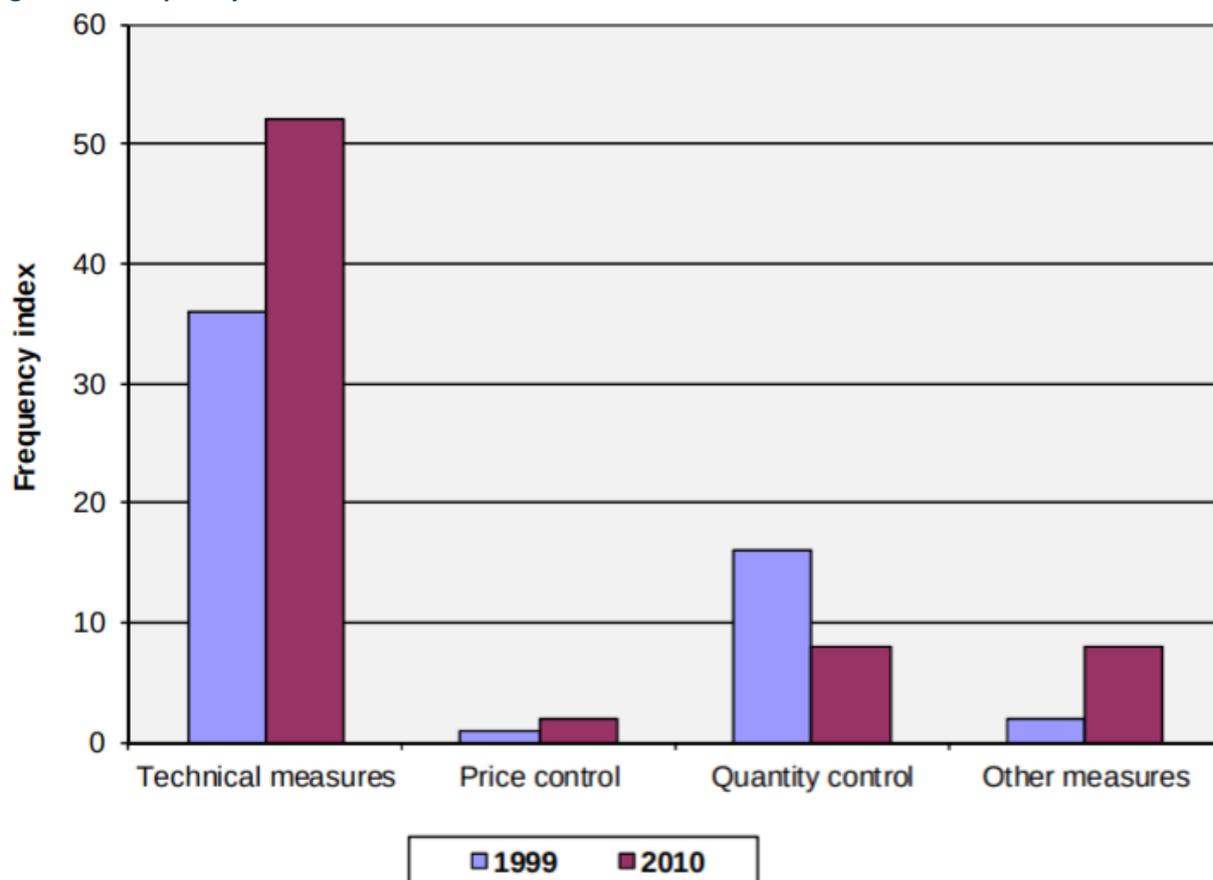
Source: World Trade Organisation, Technical Barriers to Trade Information Management System, <http://tbtims.wto.org/>

Technical barriers have seemingly emerged as among the most prominent of non-tariff barriers, as can be seen in Figure 31. Much of this has coincided with the reduction in formal tariff barriers, with some suggesting that part of the rapid expansion can be attributed to countries increasing the complexity of their rules to act as a form of de facto protectionism. Identifying when a regulation is being used for protectionist measures and when it is legitimate is complex. The general standard applied for legitimacy is the presence of a sound scientific basis, but with legitimate scientific disagreements and an inherent amount of uncertainty in product specifications, there is always a grey area. Piermartini (2009) provides an example of a regulation that looks like protectionism, nothing that the United States puts higher size standards on vine-ripened tomatoes, which are grown in

³¹ United States Trade Representative. 2014. "2014 Report on Technical Barriers to Trade." Washington, DC: USTR.

Mexico, to those of green tomatoes, which are grown domestically - a double standard that has no clear scientific basis, but an apparent protectionist element.³²

Figure 31: Frequency of Non-Tariff Barriers



Source: Nicita, A. & Gourdon, J. 2013. "A Preliminary Analysis on Newly Collected Data on non-tariff Measures." Policy Issues in International Trade and Commodity Study Series no 53. Geneva: UNCTAD

Others see the rise of technical regulation as a natural result of the rise of emerging economies, which are likely to see an expansion technical regulations as their technical infrastructure develops and their export and industrial base expands.

Impact of Technical Regulations

Technical regulations create benefits and come with costs. The benefits include the protection of consumers, the protection of local firms from unfair competition from substandard goods, encouraging upgrading by domestic firms, and enabling access to value chains. The costs include the challenge of compliance (particularly for small firms), the risk of regulations being used as de facto import protection, and the risk of excessive regulatory burdens, particularly in the sum total of regulations along the value chain. Understanding the balance of costs and benefits is complicated by methodological limitations, and by numerous approaches containing inherent ideological biases, that mean any estimate should be approached with caution.³³

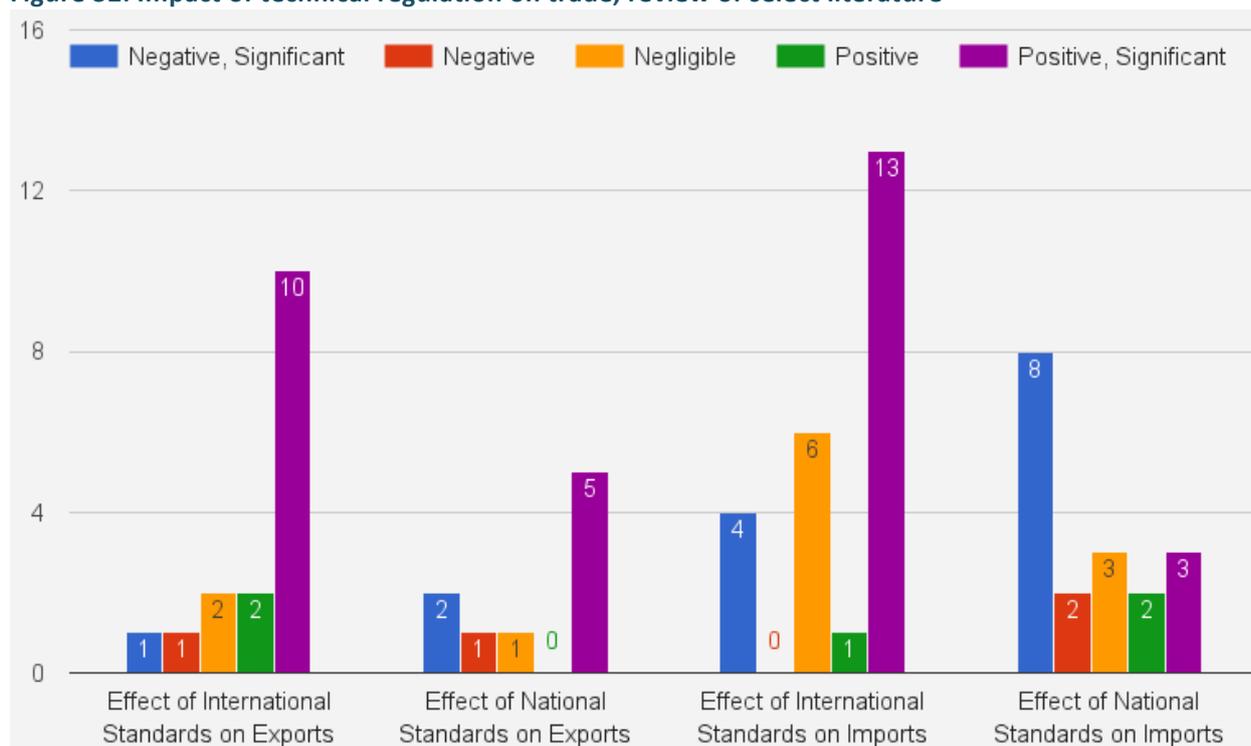
³² Piermartini, R. 2009. "A mapping of regional rules on technical barriers to trade" Regional Rules in the Global Trading System. Edited by Antoni Estevadeordal, Kati Suominen, Robert Teh.

³³ For discussions on methodology in calculating the impact of TBTs and NTBs, see: Fugazza, M. (2013); Maskus, K., Wilson, J. & Otsuki, T. (1999); Looi Kee, H., Nicita, A. & Olarreaga, M. (2009); and Chen, N. & Novy, D. (2012).

Numerous studies focus on understanding the general balance of impact for technical regulations, and while results vary considerably with the regulation and country in question, the general consensus is that technical regulations are trade promoting.

A comprehensive review of the literature on the impact of technical regulations up until 2009 was conducted by the OECD³⁴, with the results summarised in Figure 32, and details provided in Annex 2. The dominant consensus is that both international and domestic standards tend to boost exports, while national standards have the added impact of potentially reducing imports. Studies examined after 2009 maintain this consensus.

Figure 32: Impact of technical regulation on trade, review of select literature



Source: Swann, G. P. (2010), "International Standards and Trade: A Review of the Empirical Literature", OECD Trade Policy Working Papers, No. 97. Paris: OECD

The mechanisms by which these benefits accrue is discussed in the next section, but the general consensus is that the existence of a domestic quality infrastructure helps firms with upgrading their own performance and in helping to meet foreign standards, both of which improve export competitiveness.

A different picture emerges with studies that use computational general equilibrium (CGE) models to understand the impact of technical regulations. In virtually all cases, CGE models find that technical regulations add costs to trade, and that harmonisation of standards is beneficial to reduce these costs. While harmonisation does seem to have benefits, these studies are poor guides to the impact of technical regulations more generally, as CGE models generally assume that technical regulations generate costs without benefits. The models are thus not very helpful in understanding the real impact of such regulations, but only help understand the cumulative costs involved in complying with regulations.

³⁴ Swann, G. P. (2010), "International Standards and Trade: A Review of the Empirical Literature", OECD Trade Policy Working Papers, No. 97. Paris: OECD.

Similarly, surveys indicate that firms often view standards as technical barriers to trade. The largest survey on the subject, the World Bank Technical Barriers to Trade survey³⁵, conducted in 2007, examined 689 firms in 20 countries, including 70 in South Africa and 10 in Mozambique. 46% of non-exporting South African firms listed testing/certification costs as important barriers to export, while technical regulations were sighted as important when attempting to expand sales amongst 45% of respondents targeting domestic sales, and 72% targeting international sales. Foreign regulations were cited as a bigger challenge than domestic regulations for all African firms. Table 12 shows the relative cost of compliance with domestic and foreign regulations for South African firms. Foreign regulations often require significant additional work even for those firms that comply with domestic regulations, with 45% of South African respondents claiming they had to completely duplicate their product testing (ie, perform an additional test), and 29% requiring significant duplication. This is despite 24% of domestic rules aligning with ISO standards.

Table 12: Costs of regulation, Foreign vs Domestic

Regulation Type	Foreign Regulations Are...			
	More Expensive	About the Same	Less Expensive	N/A
Performance	23	27	18	32
Product Quality	18	34	15	32
Certification	23	25	18	34
Consumer Safety	21	35	11	32
Labelling	25	30	13	32
Health/Environment	23	30	13	35

Source: Wilson, J. & Otsuki, T. 2004. "Standards and Technical Regulations and Firms in Developing Countries: New Evidence from a World Bank Technical Barriers to Trade Survey." Washington, DC: World Bank

All studies demonstrate that the nature of the impact varies depending on a number of factors: including the countries, sectors, and firm sizes involved; the nature of the regulations; and a wide variety of other issues.

Generally speaking, developing countries tend to suffer greater costs from complying with technical regulations, and in terms of the costs of exclusion from trade as a result of non-compliance. This raises the risk of developing countries suffering from competitive disadvantages through the impact of standards and technical regulations. Disider, et al (2008), for example, indicate that agricultural exports from non-OECD countries to the OECD are significantly impacted by technical regulations, but that those same standards do not affect trade between OECD countries.³⁶ This is particularly worrying given the rise of the inclusion of technical barriers to trade clauses in North-South agreements, which Disdier, et al (2012) argue could undermine efforts to boost South-South trade, and reinforce the hub-and-spoke relationship between developing and developed economies.³⁷

³⁵ Wilson, J. & Otsuki, T. 2004. "Standards and Technical Regulations and Firms in Developing Countries: New Evidence from a World Bank Technical Barriers to Trade Survey." Washington, DC: World Bank.

³⁶ Disider, A., Fontagne, L. & Mimouni, M. 2008. "The Impact of Regulations on Agricultural Trade: Evidence from the SPS and TBT Agreements." *American Journal of Agricultural Economics* Vol. 90, No. 2 (May, 2008), pp. 336-350.

³⁷ Disdier, A., Fontagne, L. & Cadot, O. 2012. "Standards Harmonisation and South-South Trade" In *Non-Tariff Measures – A Fresh Look at Trade Policy's New Frontier*, by Cadot, O. & Malouche, M. (eds).

The same bias towards benefiting advanced countries is apparent in regional trade among developing states, with Keane, et al (2010) indicating that when a Southern African country introduces a new technical barrier to trade, the growth of that country's imports from SADC slows 8.7 times faster than imports from non-SADC countries.³⁸ While the magnitude of those figures are uncertain, it is clear that there is a substitution effect towards imports from outside the region as local technical regulations develop. The opposite is also true, with deeper integration sometimes sparking a move towards regional trading partners. Reyes (2011), for example, shows that US exports to the EU decreased as standards harmonisation proceeded,³⁹ while Ramel, et al (2015) show that the development of 'Factory Europe' sped up during the same process.⁴⁰ Nevertheless, other studies show that the gains from reductions in non-tariff barriers, such as TBTs, are unevenly distributed, with South Africa gaining more than neighbouring countries.⁴¹ This imbalance might at least partially explain why there hasn't been a particularly rapid uptake for harmonisation in the region.

Finally, there is a general consensus that standards are more important when looking at global value chains than bilateral trade.⁴² Inability to meet standards can mean firms are blocked from entering global value chains, and can undermine regional value chains in cases where the region's lead economy has strict regulation or is supplying to global value chains. As Kaplinsky notes: "Without the capacity to meet the growing body of standards, producers may either have difficulty in entering global markets, or be relegated to unprofitable and low-margin niches."⁴³

Mechanics of Impact

Understanding what drives the costs and benefits of individual regulations is more complex.

Customers (whether firms or consumers) benefit from quality controls and increased information on the product.⁴⁴ Blind (2004)⁴⁵ and Thilmany & Barrett (1997)⁴⁶ argue that standards, in increasing consumer information, create both inherent benefits to the consumer, but might also boost demand for that product, as customer's grow more confident in the quality and safety of the item in question.⁴⁷

The impact of improved consumer knowledge and faith in the product can drive improvements in exports for destinations that are less well known or that have a reputation for poor quality. The most famous example of this was China's aggressive pursuit of quality standards to counteract long-

³⁸ Keane, J., Cali, M. & Kennan, J. 2010 "Impediments to Intra-Regional Trade in Sub-Saharan Africa" Overseas Development Institute, prepared for the Commonwealth Secretariat

³⁹ Reyes 2011. "International harmonization of product standards and firm heterogeneity in international trade" World Bank Policy Research Working Paper #5677

⁴⁰ Ramel, F., Mangelsdorf, A. & Blind, K. 2015. "The Effects of Standards on Value Chains and Trade in Europe"

⁴¹ Vanzetti, D, Peters, R. & Knebel, C forthcoming "Sand in the Wheels: Non-Tariff Measures and Regional Integration in SADC" UNCTAD/GIZ

⁴² See, for example: Ramel, F., Mangelsdorf, A. & Blind, K. 2015. "The Effects of Standards on Value Chains and Trade in Europe".

⁴³ Kaplinsky, R. 2010. "The Role of Standards in Global Value Chains" Policy Research Working Paper 5396. The World Bank Poverty Reduction and Economic Management Network International Trade Department

⁴⁴ David, P. & Greenstein, S. 1990. "The Economics of Compatibility Standards: An Introduction to Recent Research." *Economics of Innovation and New Technologies*..

⁴⁵ Blind, K. 2004. "The Economics of Standards: Theory, Evidence, Policy." Cheltenham, UK, Northampton, MA, USA: Edward Elgar.

⁴⁶ Thilmany D and Barrett C. 1997. Regulatory barriers in an integrating world food market. *Review of Agricultural Economics*. 19(1):91-107.

⁴⁷ Jones, P. & J. Hudson. 1996. "Standardization and the Costs of Assessing Quality," *European Journal of Political Economy*, 12.

established perceptions of the country producing low quality goods. Both Mangelsdorf, et al (2012)⁴⁸ and Sun & Ouyang (2014)⁴⁹, along with a range of other studies on the issue, argue that standards helped support China's immense export growth. Similarly, Farina & Reardon (2000) argue that the survival of agricultural firms in Argentina, Brazil and Chile was aided by a threefold approach of cutting costs, differentiating products, and setting stringent quality and safety requirements.⁵⁰ Even in the case of exporters grappling with particularly stringent standards, their impact is mixed. Martens & Swinnen (2007) find that Senegalese farmers saw increasing exports to the EU, and increasing income and poverty effects, despite increasing standards in the EU.⁵¹

This reputation effect – where standards can help develop a reputation for safety and quality – can also act as a barrier, with exports from countries with a good reputation for quality often facing less stringent monitoring than those from countries with a poorer reputation. Jouanjean, et al (2012) find that the odds of an import being rejected increased by more than 300% if there was a rejection in the previous year, even when controlling for other factors.⁵² This is worrying both for the fairness of standards, and for states, which risk locking themselves into cycles of rejection if a rejection occurs early on.

The primary mechanism by which technical regulations can be harmful is through compliance costs. These costs may be driven by a number of more specific factors – such as a lack of appropriate testing facilities, issues in standards alignment, or product specification issues – but presumably all of these could be overcome if a firm could spend infinitely.

Maskus, et al⁵³ examines both fixed costs (changing production process to comply with regulations) and variable costs (the sustained cost of these initial changes). Using data from the World Bank TBT survey, they find that every 1% increase in fixed costs (the initial cost of compliance) leads to an increase in variable costs by 0.058%, with labour costs increasing by 0.060% and capital costs increasing by 0.056%. These variable costs are added to already steep compliance costs which, for their sample, can add up to about \$425 000 per firm, or 4.7% of value added. This suggests that, while the majority of regulatory costs come from frequent changes to regulations and the need to adapt to these new rules, there is still a long-term observed cost for the regulations examined here. This needn't necessarily be the case, as presumably changes to regulations could also reduce costs, but in these cases the trend seems to be in the opposite direction. Other specifications of their model reveal much higher costs.

⁴⁸ Mangelsdorf, A., Portugal-Perez, A. & Wilson, J. 2012. "Food Standards and Exports: Evidence from China" *World Trade Review*, 11(3), pp 1–20

⁴⁹ Sun, Y. & Ouyang, W. 2014. "International Standards For Exporting Firms: Evidence From China." *The Journal of Applied Business Research* – November/December 2014 Volume 30, Number 6

⁵⁰ Farina, E. & Reardon, T. 2000. "Agrifood grades and standards in the extended Mercosur: their role in the changing agrifood system" Paper for presentation at the Annual Meetings of the American Agricultural Economics Association, Tampa, Florida, 1 August 2000

⁵¹ Maertens, M. & Swinnen, J. 2007. "Trade, Standards and Poverty: Evidence from Senegal " Paper to be presented at the Centre for the Study of African Economies Conference 2007 on "Economic Development in Africa", March 19-20, 2007, Oxford, UK.

⁵² Jouanjean, M., Maur, J. & Sheperd, B. 2012. "Reputation Matters: Spillover Effects in the Enforcement of US SPS Measures" Policy Research Working Paper 5935

⁵³ Maskus, K., Otsuji, T. & J. Wilson. 2005. "The Cost of Compliance with Product Standards for firms in Developing Countries: An Econometric Study." *World Bank Policy Research Working Paper 3590*, May 2005. Washington, DC: World Bank.

Chen, et al⁵⁴ (2006) attempt to disaggregate this impact by understanding the contribution to costs of five technical regulation aspects – standards themselves, testing procedures, labeling requirements, information inquiry difficulty, and inspection time. Of these, testing procedures have the greatest impact, reducing exports by 9%, while long inspection times were the second biggest impact, reducing exports by an average of 3% (although this reaches 18% in some cases) – and both risked discouraging exporting altogether, and putting particularly strain on firms that outsource, a concern for the creation of value chains. Labelling requirements and standards themselves, however, have an ambiguous impact, arguably because of the spillover benefits provided in signalling the quality of the goods.

Costs differ according to a number of firm characteristics. Chen, et al (2006)⁵⁵ find that manufacturing firms primarily struggle with “informational inquiry difficulty” (the sourcing of relevant information on standards and regulations), while more time sensitive perishable producers in the agriculture space primarily struggle with “testing procedures” and “inspection time”. The same study indicates that domestic firms tend to struggle with international regulations more than foreign owned firms, an intuitive result which is supported by their findings that local firms may struggle to find information on technical regulations and suitable testing facilities could inhibit local operations attempts to export.

Finally, it is worth noting that in extreme situations, very strict regulations can be devastating for exports from vulnerable economies. This fact has been clearly highlighted by recent debates over aflatoxins, the carcinogenic chemical residues that are produced by moulds on various agricultural products. Aflatoxin regulations have long been strict in the European Union, with some estimates showing that South Africa’s agricultural exports would have been \$69 million higher per year between 1995 and 1999, if the EU had applied the globally recognised aflatoxin standards detailed in the CODEX Alimentarius.⁵⁶ This was before the changes that were originally scheduled for implementation in 2002, which arbitrarily raised the minimum allowed threshold for the presence of aflatoxins. The change seems to have no clear basis in science or health, and was estimated to save only an additional 1.4 extra lives a year among every billion people. The costs, however, would have been devastating for Africa’s economies, reducing agricultural exports to the European Union by a staggering 64%, or US\$670 million.⁵⁷ A combination of lobby pressure against the regulations and efforts to improve aflatoxin controls on the continent held off this disaster, but it was a keen reminder of how small technical regulations can have incredibly large impacts on the world’s most vulnerable.

Firm Responses

Firms have three core responses in the face of stringent technical regulations, which go beyond the obvious choice to simply bear the costs of the new standard:

1. Avoid or reduce exports
2. Diversify: New export markets, products
3. Consolidate

⁵⁴ Chen, M., Otsuki, T. & Wilson, J. 2006. “Do Standards Matter for Export Success?” World Bank Policy Research Working Paper 3809.

⁵⁵ Chen, M., Otsuki, T. & Wilson, J. 2006. “Do Standards Matter for Export Success?” World Bank Policy Research Working Paper 3809.

⁵⁶ Gebrehiwet, Y., Ngqangweni, S. & Kirsten, J. 2007. "Quantifying the Trade Effect of Sanitary and Phytosanitary Regulations of OECD Countries on South African Food Exports " *Agrekon*, Vol 46, No 1 (March 2007).

⁵⁷ Otsuki, T., Wilson, J. & Sewadeh, M. 2001. "Saving Two in a Billion: Quantifying the Trade Effect of European Food Safety Standards on African Exports" *Food Policy* 26 (2001) 495–514.

Firms that cannot comply may be forced to avoid or reduce exports. Chen, et al (2006)⁵⁸ find that difficult testing procedures can reduce exports by 9%, while lengthy inspection procedures reduce exports by 3%.⁵⁹ They also find that some firms respond by narrowing their export focus, with the likelihood of firms exporting to more than three markets reducing by 7% if standards impede their trade. This is supported by a wide range of studies that argue that high costs associated with a standard can prevent or slow trade, with these including Mangelsdorf (2011)⁶⁰, Monius (2004)⁶¹, and many of the papers reviewed by Swann (2010)⁶² and summarised in Annex 2 below.

For firms that wish to maintain exports but cannot directly comply with the standards, or find them generally unattractive, the main response is to change the nature of their trade. This could mean changing the products they export, changing their export destinations, or diversifying the mix of these factors in their export bundle. While this is the generally predicted response, some studies find little evidence that it actually occurs, with both Besedine (2015)⁶³ and Agosin, et al (2011)⁶⁴ finding no statistically significant evidence of a change in trading patterns resulting from the introduction of new technical regulations. On the other hand, Parteka & Tamberi (2011)⁶⁵ and Balavac (2012)⁶⁶ find that export diversification does occur as trade costs associated with technical regulations increase, albeit with interactions with country size and proximity. Similarly, Shepard (2007) shows that EU product categories with more standards have a smaller number of varieties of goods exported by partner countries.⁶⁷

The need to diversify into markets and sectors with low regulatory burdens is particularly common in poorer countries, where capacity to meet stringent regulations is weak, and can reinforce firm's positions at the lower end of the value chain.⁶⁸ In two cases examined by Kaplinsky⁶⁹ both Thai cassava firms and Gabonese timber firms opted to shift exports away from the EU, which has extremely stringent entry requirements, and towards China, where technical regulations are much less onerous. Chen, et al (2006)⁷⁰ find quantitative evidence of this geographic specialisation. They found that a firm that manages to overcome compliance costs to export to one country may sacrifice resources

⁵⁸ Chen, M., Otsuki, T. & Wilson, J. 2006. "Do Standards Matter for Export Success?" World Bank Policy Research Working Paper 3809.

⁵⁹ Chen, M., Otsuki, T. & Wilson, J. 2006. "Do Standards Matter for Export Success?" World Bank Policy Research Working Paper 3809, January 2006.

⁶⁰ Mangelsdorf, A. 2011. "The role of technical standards for trade between China and the European Union" *Technology Analysis & Strategic Management* 23 (7): 725–43.

⁶¹ Monius, J. 2004. "Information versus Product Adaptation: The Role of Standards in Trade."

⁶² Swann, P. 2010. "International Standards and Trade: A Review of the Empirical Literature." OECD Trade Policy Working Papers 97.

⁶³ Besedine, E. 2015. "Technical barriers to trade and SPS measures and export dynamics" NUPI Working Paper 842. Norwegian Institute of International Affairs.

⁶⁴ Agosin, M. R., R. Alvarez and C. Bravo-Ortega 2011 "Determinants of Export Diversification around the World: 1962 – 2000" Central Bank of Chile Working Paper #605.

⁶⁵ Parteka, A. and M. Tamberi 2011 "Export Diversification and Development – Empirical Assessment" Università Politecnica delle Marche, Dipartimento di Scienze Economiche e Sociali. Quaderni di Ricerca n.359.

⁶⁶ Balavac, M. 2012. "Determinants of Export Diversification at the Export Margins: Reference to Transition Economies" ETSG 2012 Annual conference paper.

⁶⁷ Shepard 2007. "Product Standards, Harmonization, and Trade: Evidence from the Extensive Margin" World Bank Policy Research Working Paper #4390.

⁶⁸ Essaji, A. . "Technical Regulations and Specialization in International Trade".

⁶⁹ Kaplinsky, R. 2010. "The Role of Standards in Global Value Chains" Policy Research Working Paper 5396. The World Bank Poverty Reduction and Economic Management Network International Trade Department.

⁷⁰ Chen, M., Otsuki, T. & Wilson, J. 2006. "Do Standards Matter for Export Success?" World Bank Policy Research Working Paper 3809.

that would allow them to comply with another country's regulations. This is seemingly a risk in the case of developing Southern African value chains, as one could postulate that if producers are forced to select compliance with a limited number of markets, they would focus on large export markets like the EU and US, while not favouring underdeveloped regional markets – and being excluded from the regional market.

Firms that are unable to comply or avoid regulations sometimes restructure to cope. Maertens and Swinnen (2009)⁷¹ find that Senegalese fruit and vegetable exporters underwent substantial consolidation and vertical integration, or undertook major cooperation initiatives, as a result of standards imposed by the EU. In this case, the consolidation effect led to an increase in exports even as technical costs rose, but the restructuring is likely to have uncertain distributional consequences resulting from a move to households operating as producers to households operating as labourers.

Standards are particularly difficult for smaller firms and farmers, who often have neither the spare financial capacity nor the technical controls needed to meet regulations.⁷² This has been particularly worrying for smallholder farmers, who face challenges when trying to meet private standards⁷³ and formal regulations. The implementation of strict quality standards in Argentina, Brazil and Chile, for example, helped protect the overall export market, but also led to the exclusion of smaller farmers and processors.⁷⁴

Technical Regulation and Africa

Issues of technical regulations in Africa are touched on throughout the analysis above, but three key stylised facts should be noted here.

First, despite the prominent role they play in discussions of African non-tariff barriers, technical regulations do not seem to be a major barrier for inter-Africa trade. Non-tariff barriers more generally are extremely important constraints on regional integration, but these tend to be clustered in issues like transport infrastructure, customs procedures, or – on the similar technical side – rules of origin. Figure 33 shows the leading complaints registered under the Tripartite Free Trade Area's non-tariff barrier reporting mechanism. While these figures may be slightly biased, because the majority of complaints are registered by freight operators, there is nevertheless little indication that technical regulations are a major barrier. This is possible because technical rules in the region are underdeveloped, and often not as stringent as those found in the rest of the world. It is also possibly indicative of the low levels of trade in the region, particularly for the type of advanced manufactured goods that are most likely to attract barriers.

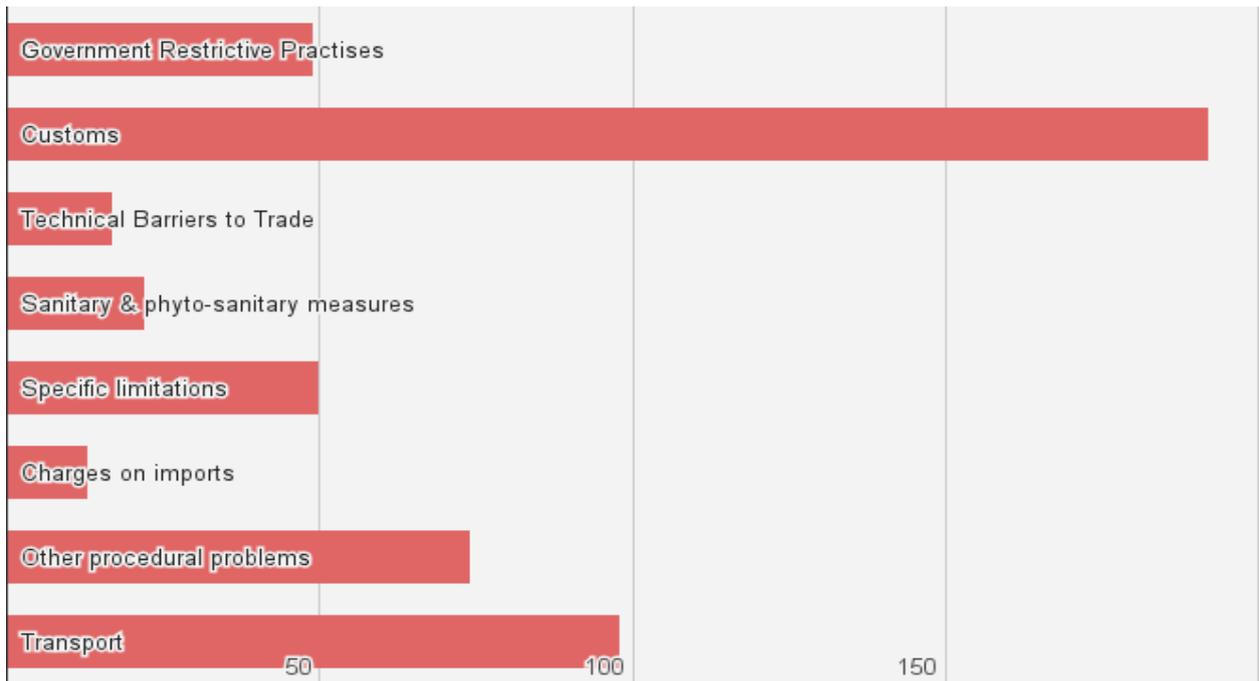
Figure 33: Non-Tariff Barriers in SADC, COMESA, EAC

⁷¹ Maertens, M. and J. F. M. Swinnen, (2009), "Trade, Standards and Poverty: Evidence from Senegal", *World Development* 37(1): 161-178.

⁷² See a number of studies cited in Maertens & Swinnen 2009; Reardon et al, 2003; Key and Runsten, 1999; Gibbon, 2003; Weatherspoon and Reardon, 2003; Kherallah, 2000.

⁷³ Lee, J., Gereff, G. & Beauvais, J. 2012. "Global value chains and agrifood standards: Challenges and possibilities for smallholders in developing countries" *PNAS* vol. 109, no. 31.

⁷⁴ Farina, E. & Reardon, T. 2000. "Agrifood grades and standards in the extended Mercosur: their role in the changing agrifood system" Paper for presentation at the Annual Meetings of the American Agricultural Economics Association, Tampa, Florida, 1 August 2000.



Source: Tripartite Free Trade Agreement Non-Tariff Barrier Mechanism, <http://www.tradebarriers.org/>

Survey data confirms these findings, with Peet and Kock (2007) showing that, while South African firms may face barriers to exporting to developed countries and non-SADC Africa, exports to the Southern African region face few technical barriers.⁷⁵

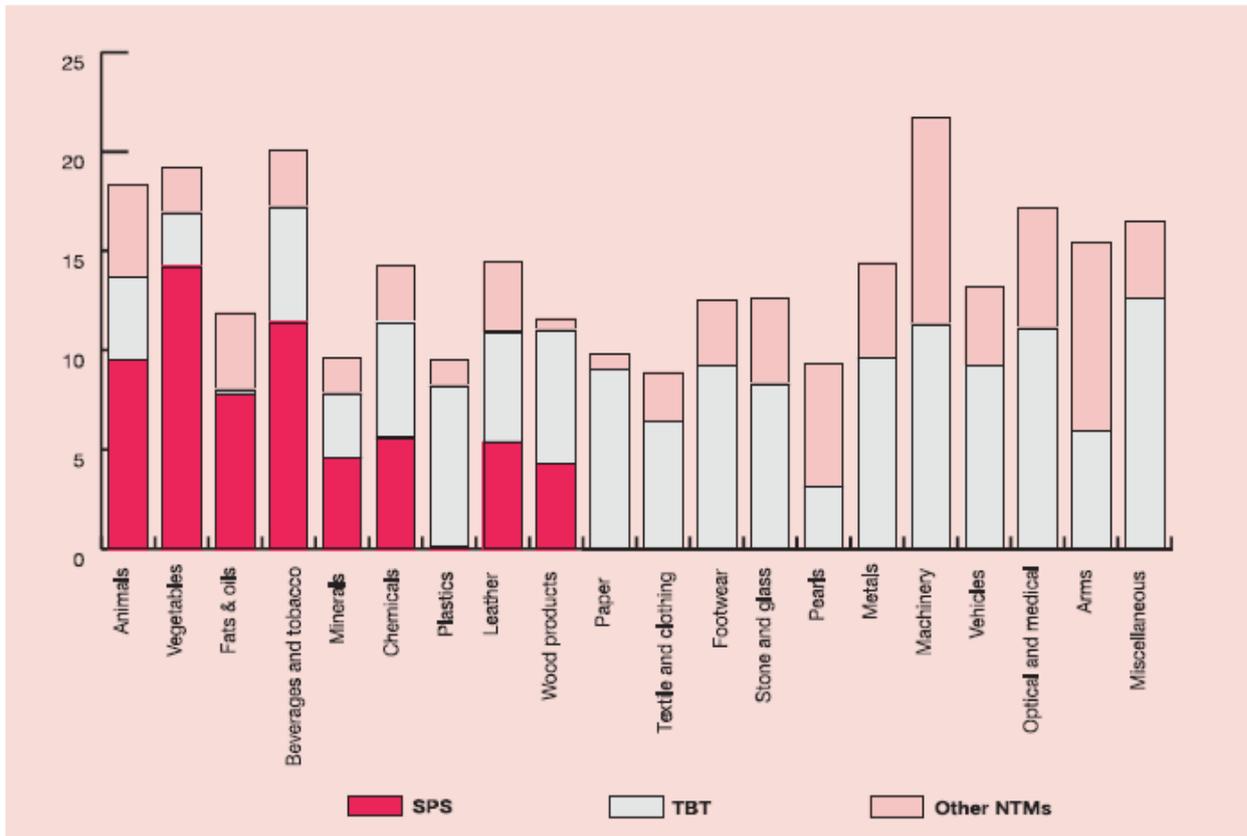
Some studies differ with this finding. Cadot, et al (2015) calculate ad valorem tariff equivalents for a range of non-tariff measures, and find technical barriers to trade to be the largest of the group, as can be seen in Figure 34.⁷⁶ Such results are, however, often driven by the fact that TBTs are by far the most registered barrier registered in the World Trade Organisation’s Integrated Trade Intelligence Portal, comprising just under 50% of all non-tariff measures registered worldwide between 2002 and 2011.⁷⁷ The discrepancy is, however, largely driven by reporting discrepancies. Any new technical regulation must be reported to the WTO, whereas only specifically trade inhibiting measures are reported in other categories. In addition, the number of barriers is not indicative of the scale of the barrier – one large customs border blockage, for example, will have far more impact than basic regulations for the shape of a plug.

Figure 34: NTM ad valorem equivalents for Africa, by industry

⁷⁵ Koch, S. & Pete, M. 2007. “Non-tariff barriers faced by South African firms: Are there any lessons?” SAJEMS NS 10 (2007) No 4.

⁷⁶ As quoted in Erasmus, G., Viljoen, W., Knebel, C. & Peters, R. 2014. “Non-Tariff Measures and Regional Integration in the Southern African Development Community” UNCTAD/DITC/TAB/2014/5.

⁷⁷ See, for example, the methodology of Grubler, J., Ghodsi, M. & Stehrer, R. 2016. “Assessing the Impact of Non-Tariff Measures on Imports.” The Vienna Institute for International Economic Studies (wiiw).



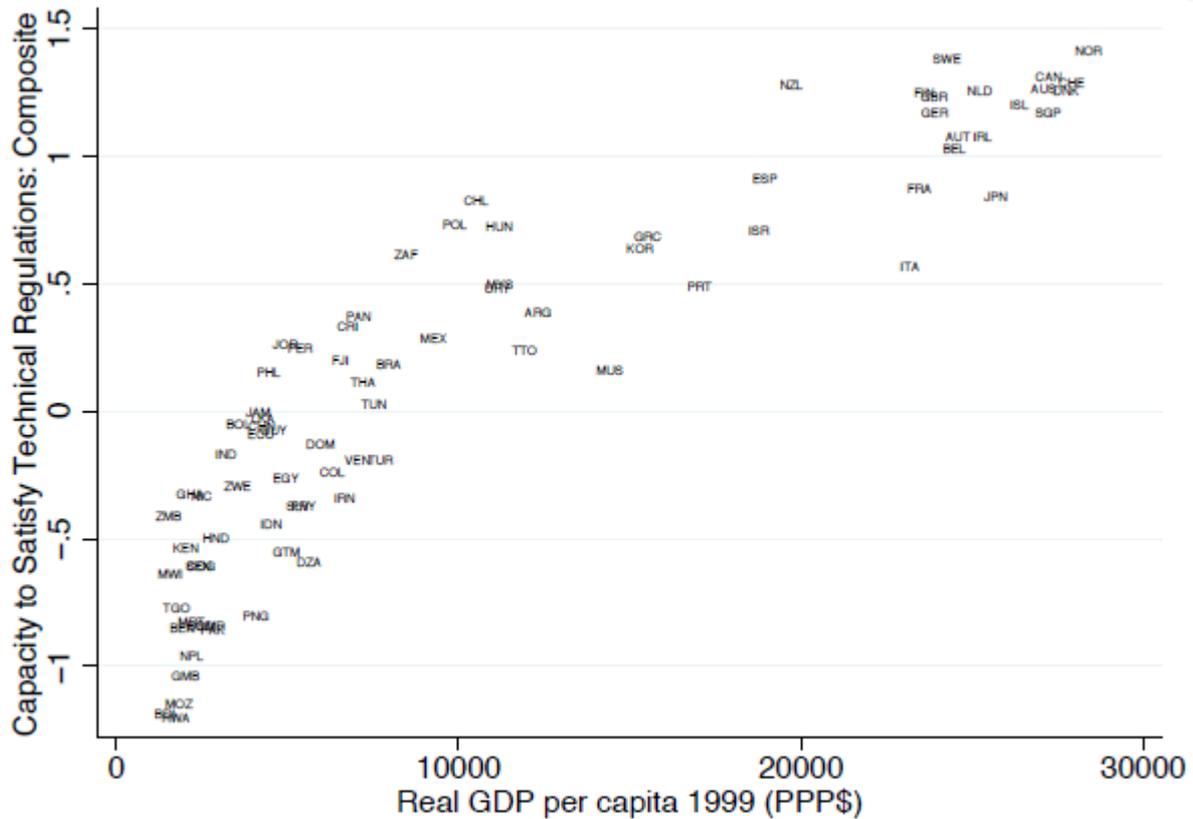
Source: As quoted in Erasmus, G., Viljoen, W., Knebel, C. & Peters, R. 2014. "Non-Tariff Measures and Regional Integration in the Southern African Development Community" UNCTAD/DITC/TAB/2014/5

Second, entry by African firms into the developed markets – such as the EU, US, and Japan – is extremely challenging. These regions have extensive rules and regulations, many of which are calibrated for market conditions that simply don't exist in Africa. For example, rules that compel growers of roses in greenhouses (a common method in Europe) rather than open fields (as is more viable in parts of Africa) have been shown to increase production costs ten-fold in Kenya. Firms often have weak capacity to meet these challenges, with little knowledge of foreign rules, little cash on hand to pay for compliance procedures, or flexibility to substantially change production methods. Testing facilities in Africa are often not certified to approve foreign standards, requiring foreign testing, which is expensive and exposed to currency volatility.

Figure 35⁷⁸ shows that, unsurprisingly, firm capacity to deal with technical regulations declines in countries with lower GDP, posing a direct challenge to Africa, but also meaning that higher-income countries may set technical rules that their firms can easily grapple with, but which are prohibitive for firm in poorer countries.

Figure 35: Capacity to satisfy technical regulations vs GDP per capita

⁷⁸ Essaji, A. 2008. "Technical Regulations and Specialization in International Trade" Journal of International Economics, Volume 76, Issue 2, December 2008, Pages 166–176



Source: Essaji, A. 2008. "Technical Regulations and Specialization in International Trade" Journal of International Economics, Volume 76, Issue 2, December 2008, Pages 166–176

Third, African firms seem to face far steeper challenges in sanitary and phytosanitary measures than they do for compulsory standards in other areas. This seems to be for three reasons. First is purely because a given African economy is currently far more likely to export agriculture products than manufactured goods, and thus is more likely to encounter agriculture-specific SPS rules. Second, SPS rules are often simply more difficult to meet, requiring complex chemical analysis and careful control of good over their very long production cycle. Because they're directly linked to food safety and health concerns, they are controlled far more stringently than simple quality or compatibility measures. Third, adapting to new regulations is far easier in manufacturing than agriculture. This is because agriculture has much longer production cycles: a faulty component can be changed easily, but non-compliant fertilizer used on a field can only be corrected after the harvest. An agricultural firm that has put in quality control measures might only feel the benefit years later, whereas a manufacturing firm will benefit from those changes almost immediately.

Annex 2: Overview of Key Studies on the Impact of Technical Regulations

Adapted from Swann, G. 2010. "International Standards and Trade: A Review of the Empirical Literature" OECD Trade Policy Working Papers, No. 97, OECD Publishing. Available at <https://search.oecd.org/trade/benefitlib/45500791.pdf>.

Author(s)	Date	Standards or Regulations	Data	Trade Effect	Countries
Swann, et al.	1996	Standards	Perinorm	Trade creating, especially national standards	UK
Temple & Urga	1997	Standards	Perinorm	No evidence of trade creating	UK
Blind	2000	Standards	Perinorm	Trade-creating or neutral	9 OECD Countries
Blind & Jungmittag	2001	Standards	Perinorm	International standards are trade-creating, national standards are trade-reducing	Germany, UK
Blind & Jungmittag	2002	Standards	Perinorm	International standards increase imports, but play no role in exports	Germany, France
Blind	2001	Standards	Perinorm	Trade-promoting	Switzerland, Germany, France, UK
Moenius	2004	Standards	Perinorm	Trade-creating, but with some sectoral differences	12 OECD Countries
Moenius	2006a	Standards	Perinorm	National standards do not always block trade, harmonisation does not always increase trade	14 OECD Countries
Moenius	2006b	Standards	Perinorm	Trade-creating	(1) 159 Countries; (2) 14 OECD Countries
Czubala, et al.	2007	Standards	Perinorm	Unharmonised standards are trade-barriers	EU-15 and 47 sub-Saharan countries
Shepard	2007	Standards	Perinorm	International standards in the importing country increase partner country's export variety	Approx. 200 countries
Grajek	2004	Standards	ISO-9000 Compliance	Standards increase exports and reduce imports (except in OECD countries, which increase imports)	101 countries
Clougherty & Grajek	2008	Standards	ISO-9000 Compliance	No impact on developed countries, enhance exports for developing countries	52 countries
Kim & Reinert	2009	Standards	ISO-9000 Compliance	Helps overcoming trade barriers	30 developing and 22 developed countries

Chen & Matoo	2004	Both	RTAs	Harmonisation is export-promoting for developed countries outside the Regional Trade Agreement, but not developing countries outside the RTA. Mutual Recognition Agreements are uniformly trade promoting unless they contain restrictive rules of origin	28 OECD and 14 non-OECD countries
Vancauteran & Weiserbs	2005	Regulations	RTAs	Harmonisation is trade-creating	10 importing and 14 exporting countries from the EU
Henry de Frahan & Vancauteran	2006	Regulations	RTAs	Harmonisation is trade-creating	10 importing and 14 exporting countries from the EU
Baller	2007	Both	RTAs	MRAs are trade-creating. Harmonisation is beneficial for OECD exporters, but not non-OECD exporters	26 OECD and 22 non-OECD countries
Disdier, et al.	2007	Regulations	TBT Notifications	Regulations deter exports from developing to developed countries, but not developed to developed exports	154 importing and 183 exporting countries
Fontagne, et al.	2005	Regulations	TBT Notifications	Negative impact in agriculture, but neutral or positive for manufacturing	61 importing and 114 exporting countries
Van Beers & Van de Bergh.	1997	Regulations	Regulations	Environmental regulations damage trade	21 OECD countries
Wilson, et al.	2002	Regulations	Regulations	Environmental regulations damage trade	6 OECD and 18 non-OECD countries
Michalek, et al.	2005	Both	Regulations	Harmonisation is trade-creating, MRAs reduce trade	EU
Chen, et al.	2006	Both	Regulations	Some standards reduce exports and diversification	17 developing country exporters; EU, USA, Canada, Japan, Australia as importers
Sanchez, et al.	2008	Both	Regulations	Large reduction in exports from Argentina to OECD	Argentina as exporter, OECD as importers
US International Trade Commission	1998	Both	Survey	Main concern is duplication of conformity assessment	USA, Europe, Asia and Latin America

OECD	1999	Both	Survey	Conformity assessment costs biggest concern, mandatory technical requirements are minor concern, and standards can be equally worrying.	USA, UK, Germany and Japan
DIN (Germany Institute for Standardization)	2000	Standards	Survey	Common standards lower trade costs and promote trade	Germany, Austria, Switzerland
Wilson & Otsuki	2004	Regulations	Survey	Standards and technical regulations discourage exports to the EU and US, although in some cases technical regulations can reduce production costs.	17 developing countries
National Institute of Standards and Technology	2004	Both	Survey	Some regulations affect ability of firms to export	US
Michalek, et al.	2005	Both	Survey	Harmonization and MRA viewed favourably, but only major problems in agriculture	Poland and Israel

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https://www.ansi.org/standards_activities/domestic_programs/overview.aspx?menuid=3
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http://ec.europa.eu/consumers/consumers_safety/safety_products/rapex/index_en.htm
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http://ec.europa.eu/food/safety/rasff/index_en.htm
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GIZ . "Harmonisation and Mutual Recognition of Regulations and Standards for Food Safety and Quality in Regional Economic Communities: The case of the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA)" BMZ German Ministry for Economic Cooperation and Development

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