Rethinking health sector procurement as developmental linkages in East Africa

Maureen Mackintosh[a,*], Paula Tibandebage[b,1], Mercy Karimi Njeru[c], Joan Kariuki Kungu[d], Caroline Israel[b,2], Phares G.M. Mujinja[e]

[a] The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK
[b] REPOA, 157 Mgombani Street, Regent Estate, P.O. Box 33223, Dar es Salaam, Tanzania
[c] Kenya Medical Research Institute (KEMRI), Mbagathi Rd., P.O. Box 54840, Nairobi, Kenya
[d] African Centre for Technology Studies (ACTS), Gigiri Court 49, P.O. Box 45917-00100, Nairobi, Kenya
[e] Muhimbili University of Health and Allied Sciences, United Nations Road, P.O.Box 65001, Dar es Salaam, Tanzania

ARTICLE INFO

ABSTRACT

Health care forms a large economic sector in all countries, and procurement of medicines and other essential commodities necessarily creates economic linkages between a country's health sector and local and international industrial development. These procurement processes may be positive or negative in their effects on populations' access to appropriate treatment and on local industrial development, yet procurement in low and middle income countries (LMICs) remains under-studied: generally analysed, when addressed at all, as a public sector technical and organisational challenge rather than a social and economic element of health system governance shaping its links to the wider economy. This article uses fieldwork in Tanzania and Kenya in 2012–15 to analyse procurement of essential medicines and supplies as a governance process for the health system and its industrial links, drawing on aspects of global value chain theory. We describe procurement work processes as experienced by front line staff in public, faith-based and private sectors, linking these experiences to wholesale funding sources and purchasing practices, and examining their implications for medicines access and for local industrial development within these East African countries. We show that in a context of poor access to reliable medicines, extensive reliance on private medicines purchase, and increasing globalisation of procurement systems, domestic linkages between health and industrial sectors have been weakened, especially in Tanzania. We argue in consequence for a more developmental perspective on health sector procurement design, including closer policy attention to strengthening vertical and horizontal relational working within local health-industry value chains, in the interests of both wider access to treatment and improved industrial development in Africa.

1. Introduction

Despite a huge increase in development aid for health and a major improvement in access to treatment for HIV/AIDS and TB, access to essential medicines remains a crisis in Sub-Saharan Africa (WHO, 2011). Regular stock-outs in public sector facilities, and reliance on out-of-pocket purchase of medicines, continue to exclude low income populations from reliable access to essential medicines (Bigdeli et al., 2014; WHO, 2011; Ewen et al., 2017).

Donors' large scale international procurement of medicines aims to reduce prices and assure quality through pre-qualification of suppliers, international tendering, and pooled procurement processes (Global Fund, 2012; P4i initiative http://www.theglobalfund.org/en/p4i/). An acknowledged side-effect has been the by-passing of local procurement bodies or their reduction to logistics contractors, with, for some policy actors, the explicit objective of bypassing procurement corruption at national level (Huff-Rousselle, 2012).

There is however a long-standing theme in the literature that better local procurement processes are needed to improve access to medicines (Wang'Ombe and Mwabu, 1987; Waako et al., 2009; Wiedenmayer et al., 2015). International programmes including USAID/JSI DELIVER (http://deliver.jsi.com/dhome/), SIAPS (http://siapsprogram.org/),

---

and People that Deliver (http://www.peoplethatdeliver.org/) focus particularly on supporting local skills improvement in procurement. Using evidence from primary research on supply chains and industrial suppliers in Tanzania and Kenya, we argue here for an approach to procurement analysis and policy, employing aspects of global value chain (GVC) theory, that can that can identify and respond to the embeddedness of procurement processes in the governance of local health systems and their links to the wider local economy. We aim to contribute to research literature on health system strengthening including potential benefits in Africa of strengthening local industrial linkages (Sidibé et al., 2014; Massard da Fonseca, 2017).

Throughout this article, "procurement" is defined in a broad sense, to encompass the whole set of processes for ordering and purchasing at facility and shop level, for wholesale purchasing, and for distribution of manufactured commodities to public, faith-based and private health facilities, and to shops. This definition is in line with the usage of our interviewees.

2. Methods

This article presents evidence from a study of procurement of medicines and supplies in Tanzania and Kenya, and of related manufacturing-health sector linkages (see Acknowledgements). In a first stage (2012–13), a convergent mixed methods design (Ozawa and Pongpirul, 2013) used qualitative in-depth interviews to explore procurement processes and experience, in 42 health facilities, pharmacies and drug shops in Tanzania, and 55 in Kenya, alongside quantitative data capture of availability and source of a set of tracer essential medicines, supplies and equipment. The tracer commodities (listed in web-based supplementary material), similar but not identical in each country, were selected following advice from national clinical and regulatory experts, and encompass a range of essential generic medicines and basic medical equipment and supplies, laboratory supplies and other basics such as bed sheets and cleaning materials.

Table 1 shows interview distribution by sector. (The Accredited Drug Dispensing Outlets, ADDOs, are Tanzania's regulated drug shops). All tables and quotations are from authors' fieldwork unless otherwise indicated.

Facilities were purposively selected from public, faith-based/NGO and private sectors, spread geographically across four districts (Tanzania) or counties (Kenya). Locations were chosen to represent a wide range of geographical area, incomes, infrastructure and health outcomes. In Kenya they included two contrasting areas of Nairobi (one high-income, to capture supply chains to private sector facilities), and two rural counties, one on the coast and one in the Rift Valley bordering Tanzania. In Tanzania they included two urban districts, one in Dar es Salaam and one in Arusha region, plus two rural districts, one on the coast, and one towards the Kenyan border to capture cross-border supply chains. In all, 79 semi-structured interviews were conducted in Tanzania and 81 in Kenya, covering sources and procurement

processes, supply gaps and opinions on local *versus* imported supplies, for medicines, medical supplies and equipment, laboratory supplies and basics such as bed nets, sheets and cleaning materials. In Kenya these interviews were carried out before the decentralisation of public sector procurement to counties (KEMSA nd).

In a second stage in 2013–14, 15 interviews were conducted in Tanzania and 14 in Kenya with wholesalers, procurement agents, regulators, government officials and manufacturing associations. In Tanzania 11, and in Kenya 12, locally based manufacturers of medicines, medical and other supplies, and of inputs such as packaging, were also interviewed, on business history and strategy, production organisation and technology, domestic and export market access, experience of health sector procurement, and business challenges and constraints.

Quantitative data were analysed using Stata. Qualitative interviews, both transcribed recordings and verbatim notes, were entered into NVivo for coding and exploration of concepts and arguments. Data from different sources were triangulated, and interpretations discussed by the authors.

Ethical clearance was obtained from the Open University Human Research Ethics Committee in the UK, the Kenyatta National Hospital Ethical Review Board in Kenya, and the National Institute for Medical Research Ethics Review Committee in Tanzania. All participants had consented to the research, having been assured that participation was voluntary and that their anonymity would be preserved in published research findings.

3. Analysing procurement: a value chain governance framework

Current frameworks of analysis of health care procurement in Sub-Saharan Africa (SSA) are strongly influenced by linear supply-chain models of 'delivery' of medicines and other supplies from manufacturer to end-user. Yadav (2015) and Yadav et al. (2011) frame supply chains as technical logistical processes whereby products flow from manufacturers (the 'international' level) via warehousing, storage and transport, to clinics, health workers and drug shops (Yadav et al., 2011: 4). Reverse flows of information from effective 'quantification' at local level, and appropriate financing, are required for efficient supply and delivery. While problems arising from lack of competitive pressure are identified (Yadav, 2015), recommendations emphasise consolidation and simplification of linear supply chains (see also Huff-Rousselle, 2012).

This supply chain management focus on logistics and quantification is a strength. However, 'mapping' of SSA supply chains has demonstrated their complexity. "Spaghetti"-like patterns of overlapping and multiplying supply chains have been largely driven by donors' independent procurement for vertical programmes in public and NGO sectors (Yadav et al., 2011:6, MoHSW, 2008: 23 http://www.who.int/medicines/areas/coordination/tanzania_mapping_supply.pdf; KEMSA Task Force, 2008: 28 http://pdf.usaid.gov/pdf_docs/Pnadn474.pdf). This complexity operates alongside (poorly documented) private sector importing, wholesaling and retailing of at least half of medicines consumed in Tanzania and Kenya (MSD 2013; MoMS & MPHS 2010).

While 'deliver' frameworks focus on logistics, health system-based frameworks tend to overlook procurement. Analysis of medicines in health systems has so far paid little attention to procurement processes (e.g. Bigdeli et al., 2014). People-centred health systems analyses similarly tend to omit procurement activity (e.g. Abimola et al., 2014) despite recognising the necessarily polycentric nature of health care governance.

We analyse procurement in this article as a governance process for health systems and their industrial linkages, drawing on aspects of GVC theory. Sourcing of medicines and health sector supplies for East Africa is largely international, despite a long-standing local pharmaceutical industry (Banda et al., 2016). GVC analysis directs attention to links between demand, purchasing and production networks, and interconnections between power relations, market structures, labour

Table 1
Facilities and shops in which interviews conducted, number by sector and country.

Type of facility/shop	Tanzania			Kenya		
	Public	FBO/NGO	Private	Public	FBO/NGO	Private
Hospital	4	2	1	3	3	6
Health centre/clinic	6	2		7	3	4
Dispensary	8	3	6	4	4	
Pharmacy			3			13
Drug shop/ADDO			7			8
Total	18	7	17	14	10	31

Note: FBO/NGO = Faith-based and non-governmental organisation ownership. Private = privately owned for-profit.

processes, and consumption of commodities in markets that cross national borders (Gereffi et al., 2005; Flecker et al., 2013). We examine health sector procurement as a social and economic activity, including complex front line labour processes and their implications for access to treatment; wholesaling and related global trading and funding relationships; and the impacts on local industrial development.

GVC analysis links governance of value chains to the type of item traded and the complexity of transactions (Gereffi et al., 2005). While the bulk of essential items purchased by the Kenyan and Tanzanian health sectors are standard commodities, two major characteristics of the production and distribution of essential medicines and supplies differ from standard commodity chains. The first is the importance of *quality* of medicines and medical supplies (Höllein et al., 2016). Asymmetry of information, where quality cannot easily be judged by users, implies central importance for regulation and quality assurance, which in turn, we argue below, depends on effective relational working at all levels. The second characteristic is *need*: given current international policy emphasis on moving towards universal access to appropriate treatment, essential medicines and supplies should be analysed for policy purposes as inputs to this movement.

This article therefore explores procurement as a key governance aspect of value chains linking industrial development, in East Africa and abroad, to (potential) universal access to competent treatment. The perspective of front line procurement staff identifies incentives and constraints that shape local procurement rules and norms, drawing methodologically on Abimola et al.'s (2014) investigation of local rule-setting and multi-level governance. We then investigate institutional changes in wholesale procurement for commercial and non-commercial use, focussing on organisational inter-linkages, governance structures and the leverage exercised by purchasing functions (Kaplinsky and Morris, 2001). Finally, we investigate the impact of these procurement trends and structures on locally based manufacturers' market access. The discussion reflects on the implications for a more developmental approach to procurement design.

4. Findings

4.1. Domestic supply chains: segmentation and interactions

Our quantitative data on wholesale sources of supplies by health facility sector understate the complexity of sectoral interactions in governance of access to supplies. Table 2 shows, for each facility sector, the wholesale sector from which available tracer medicines and supplies had been sourced. The "public" wholesale sector encompasses tax- and donor-funded public procurement by the large public wholesaler (KEMSA in Kenya, MSD in Tanzania), plus most of the vertical programme supplies distributed by those wholesalers or through district

and city authorities. "Donations" were predominantly direct donations of equipment to facilities. In Kenya, "FBO/NGO" wholesaling refers to the Mission for Essential Drugs and Supplies (MEDS): a large Christian-based non-profit wholesaler established in 1986 to improve supplies to non-profit health facilities. Faith-based wholesalers in Tanzania exist but were too small to register in these data. Table 2 shows that most public facilities' available medicines and a smaller majority of supplies came from the public wholesale sector, while the FBO facilities relied mainly on private and NGO sources, and private facilities sourced from private wholesalers.

The cross-overs between sectors identified in Table 2 include vertical programme supplies from the public sector to the faith-based, NGO and private facilities, and public sector "gap filling" from private suppliers as described below. However Table 2 substantially underestimates inter-sectoral supply chain interactions, because public sector treatment access also relies extensively on patients' private out-of-pocket purchase of medicines and supplies from private shops.

4.2. Norms and relationships in front-line procurement

Health services' quality depends, as Abimola et al. (2014: ii23) argue, on the strength and nature of working practices. Described as "operational governance", these are the norms and relationships that shape day to day decisions, and are particularly influential where formal governance of systems is weak or displays gaps. Medicines and supplies are, for health facility staff, essential inputs to treatment, and the procurement routines and norms of behaviour of interviewees reflected that needs-based perspective. Thus, when asked about procurement activities and experience, those responsible in facilities did not stop at the technical aspects of stock auditing and order form filling. Facility-level procurement staff in all sectors ordered and purchased from wholesalers as well as from district authorities and local shops. Their detailed accounts included systematic ways of addressing the daily constraints they faced: procurement strategies and routines that were notably relational and local in nature.

Health facilities were generally severely cash-constrained and lacked market and institutional power: only a few private hospitals serving insured patients reported some market leverage over choice of supplies. Public facilities in both countries reported recurrent and often severe supply shortages, while faith-based and private facilities struggled with pricing and cash flow constraints in a context of low ability to pay. Adding to the lack of front line leverage over suppliers was the fact that procurement was largely non-professionalised: in Tanzania, 59% of facility interviewees actively engaged in procurement were doctors, nurses or clinical officers, and in Kenya 41% (Table 3). Respondents with formal procurement and supply management qualifications were concentrated in hospitals. Over 20% of Tanzanian respondents were at assistant or attendant level, but only 6% of Kenyan interviewees, while

Table 2

Tanzania and Kenya: wholesale source of tracer medicines and supplies in health facilities (percentages by facility sector).

Health facility sector	Tanzania			Kenya			
	Wholesale source sector			Wholesale source sector			
	Public	Donation	Private	Public	FBO/NGO	Donation	Private
Medicines							
Public	98	1	2	90	2	1	7
FBO/NGO	16	2	83	22	47	4	27
Private	6		94	1			99
Supplies							
Public	86	11	4	64	1	15	20
FBO/NGO	20	19	61	20	37	9	35
Private	11	9	80	4		5	92

Note: totals may not add to 100 because of rounding.

Table 3

Qualifications of health facility procurement interviewees, by country and level of facility (percentages by column).

Qualification	Tanzania		Kenya	
	Hospital	Lower level	Hospital	Lower level
Procurement/supply management	14	2	22	
Medical doctor/Assistant MO	10	9	4	4
Clinical officer/nurse	14	50	19	37
Pharmacist	19	5	19	22
Pharmacy/laboratory technician/technologist	19	5	33	22
Nursing/pharmacy/laboratory assistant/attendant	14	24		9
Public health/administration/other	10	5	4	6
Total	100	100	100	100

proportionately more Kenyan than Tanzanian interviewees had pharmacy or laboratory training including stock management and ordering (Table 3). In all, 53% of Kenyan and 73% of Tanzanian health facility interviewees had no procurement training, short courses included.

Procurement work was therefore an element in a multi-tasking facility work process, squeezed into busy working days by clinicians, laboratory and dispensing staff. The rules and practices of procurement were embedded in the broader facility culture and subject to clinical pressures. While procurement training addressed important skills of stock control and timely, accurate form-filling, effective procurement was seen on the front line as dependent also on strong 'horizontal' working relationships within local areas, given the lack of power exercised in 'vertical' relations with wholesalers.

4.2.1. Public sector shortages and gap-filling

In the public sector, front-line staff managed procurement in contexts of high uncertainty. Clinical interviewees stated that public wholesalers' medicines were generally of good quality, but expressed a number of complaints about the quality of equipment and supplies such as gloves. Facility staff lacked influence over the public wholesalers' response to orders, and experience of recurrent stock outs and delayed deliveries was almost universal. The following quotations are representative:

> There was no medicine at this centre the whole of January. (Tanzania, public dispensary)

> At times we can stay for almost even six months without getting these [specified] drugs. (Kenya, public dispensary)

> Sometimes up to 45% of the order is reported missing. (Tanzania, public district hospital)

Frontline procurement routines therefore allocated part of limited staff time to gap-filling, a rational response to patients' needs and supply uncertainty. Gap-filling strategies all involved relationship-building, including working with the district authorities. Some vertical programme supplies were delivered to the District Medical Officer (DMO) in Tanzania, and could be chased through the DMO's office. In some Tanzanian districts, facilities visited had sufficient vertical programme supplies, while in another district HIV tests had been missing for a month. In Kenya, public wholesaler and vertical programme supplies could come to dispensaries through the district hospital. In each case, communication and logistics were complicated, requiring local working relationships.

A widely reported gap-filling strategy in Kenya (but not in Tanzania) was resort to borrowing (included within the public sector category on Table 2). For this, relationships were key:

> We normally share with other facilities. (Kenya, public health centre)

> We are forced to go to the other facilities … begging for drugs. Or we barter, if the other facility requires paracetamol, we may trade paracetamol for gloves or a similar arrangement. (Kenya public health centre)

There was investment in mutual support:

> Interviewer: Do you borrow to return or they give you and maybe next time you replace?

> No, no, when you borrow they just give you. But when you, later on you might have a problem, you will assist them. Just creating a good relationship. So when I have a problem, you'll help me. (Kenya public health centre)

4.2.2. Funding procurement at the front line

Those responsible for front line public procurement constantly chased additional funds, and their skills in accessing and using these funds strongly influenced service quality. In Kenya the Health Sector Services Fund (HSSF), and in Tanzania the donor-financed Basket Fund held at district level, were used by facilities to fill emergency supply gaps. The HSSF disbursed funds directly to health centres and dispensaries (Opwora et al., 2011). Interviewees had used these funds for cleaning items, casual labour for security, essential missing drugs, and transport for urgent referrals among other items. The HSSF allowed facilities to treat patients who were unable to pay for missing items:

> We tell them [patients] to buy [but] some of them cannot afford. That is now where we try to squeeze out the HSSF fund. (Kenya public health centre)

In Tanzania, the basket funds were used to buy essential items from suppliers selected by the district authorities. A laboratory in-charge explained:

> … most laboratory supplies are always out of stock at [the public wholesaler] … the procedure … starts by the laboratory technician preparing a list and taking it to the DMO to sign as well as the District Executive Director…. it is then taken to the supplies office, who get quotations from the vendors, and the one with the cheapest prices … is the one who wins the tender …. There is a risk of getting low quality from the vendors because of the business-oriented, profit-making mentality. (Tanzania, public hospital)

This perception that buying medicines and supplies privately risked lower quality than public supplies, is supported by recent literature reviews (Höllein et al., 2016; Wafula et al., 2017: 61). Private market quality concerns continue despite the regulatory efforts of the Tanzanian Food and Drug Authority and the Kenyan Pharmacy and Poisons Board. Furthermore, some private wholesalers in Kenya were reported to refuse orders from public hospitals, fearing long payment delays. Some public health facilities retained charges at facility level. However many rural health centres and dispensaries in each country were not permitted to do so or did not charge, leaving staff with no petty cash for private purchases or transport; some staff reported using their own money in crises.

4.2.3. Patients buying medicines and supplies

In both countries therefore, public sector patients were frequently sent to private shops:

> For a long time, we didn't have gloves … So we were buying for emergencies. …. Even right now, a woman coming to the maternity to deliver brings her own gloves … the stocks that are delivered [by the public wholesaler] are spared for emergencies or for lab use. (Kenya public health centre)

> When medicines come late to our dispensary … patients go without services …. they are told to go and buy medicines from private shops. They complain about the prices there because most of our customers are poor. (Tanzania public dispensary).

There are no systematic data in either country on the extent of public sector facilities' reliance on patients' private purchases to deliver current levels of service.

4.2.4. FBO and private sector procurement

The faith-based and private facilities and private shops were a key element of access to treatment. In Kenya, FBO facilities were supplied partly by MEDS and by some vertical programmes via the public sector; they also relied on private wholesalers (Table 2). FBO facility interviewees in Kenya were notably positive about MEDS' responsiveness to their procurement demands, saying that MEDS offered good quality, short delivery times, and were responsive to complaints and to requests for specific items. The availability data from our sample facilities bears this out: among dispensaries and health centres, faith-based facilities generally had higher availability of both medicines and supplies than

the public facilities, and their staff expressed more sense of control.

Private sector interviewees in shops and small facilities felt much less sense of control of quality and price when ordering from wholesalers. Private sector retail and facility buyers were generally very price-focused, and also tied into wholesalers offering credit:

Efficiency of supply, the credit period and also the competitiveness of their prices: these are the three main things. (Kenya, private clinic)

The main reasons why I chose those wholesale pharmacies are the prices of the drugs, quality and the convenience each of them offers. (Tanzania private dispensary).

Yes, there are new suppliers in the market, but the only thing is that you have to belong to a distributor because of the terms they offer to you. (Kenya drug shop)

The phrase 'belonging' to a distributor signals the relative powerlessness of the small retailers, and the difficulty of switching supplier. In each district, private sector interviewees relied on a small number of dominant wholesalers. Supply mistakes, short expiry dates and substitutions were listed as recurrent problems in private sector procurement interviews. Drug shop owners consistently struggled with fluctuating prices, cash flow problems, and an acknowledged lack of control over quality even from established wholesalers.

It is a free market so everyone has the right to set and change the prices … sometimes it forces us to increase the sale price to customers, who in many cases don't have money. … Sometimes I am forced to sell at a loss in order to keep my customers. (Tanzania, ADDO)

The core purchasing constraint for many private sector interviewees was the poverty of their customers, who were constantly seeking the lowest prices, increasing the risk of purchasing substandard medicines.

4.3. Public, non-profit and private wholesaling: market structure and incentives

This lack of frontline power implies that the wholesale level of the value chain exercised substantial leverage in the governance of the system. Wholesaling, encompassing government, donor, faith-based and private commercial bulk purchasing and distribution, powerfully shapes market structure, and therefore retail and health facility-level health care and medicines access. It also transmits incentives that influence manufacturing business behaviour (Chataway et al., 2016; Srinivas, 2012; Pazirandeh and Norrman, 2014).

In Tanzania and Kenya in recent years, wholesalers including large public and non-profit procurement bodies have been one force among others for market liberalisation and globalisation of health sector supplies. In both countries, private wholesaling of medicines creates a large part of the total domestic market, supplying private facilities and retailers and also non-governmental and public facilities (Table 2). Private wholesaler/importers also sell medicines and supplies to public and faith-based wholesalers. In Tanzania, private retail purchase alone was estimated by interviewees to represent around half of the total medicines market (vertical programmes included), while in Kenya one official estimate (MoMS & MPHS, 2010) put the private share of total pharmaceutical expenditure at 80%. In both countries, the local tax-funded share of public medicines expenditure is low: in Tanzania, 63% of the public wholesaler's turnover was represented by vertical programmes in 2011/12, a ratio fluctuating sharply year on year with the size and timing of donor expenditure; part of the Tanzanian Treasury contribution was also donor-funded (MSD, 2013; MoHSW, 2008: 4–5; MSD office records). In Kenya, the bulk of public expenditure on medicines was estimated to be donor-financed (MM&MPHS, 2010).

It follows that donors' procurement practices, and private wholesaling market structure and behaviour, between them dominated domestic market-shaping in essential medicines and supplies. Public wholesalers used large international tenders to procure medicines and supplies. Large donors generally undertook international tendering directly, reducing the public wholesalers to logistics suppliers. This approach gave donors control of quality and payment, reducing their organisational risk, but also undermined domestic industrial linkages.

Data in Table 4, combined with the interviews, confirm that donors' procurement practices have shifted the balance of sourcing of medicines from local producers towards overseas (particularly Indian) suppliers of essential medicines. In Kenya, reliance on Indian imports for the chronic disease and other essential tracer medicines was low relative to local suppliers, and in Tanzania 37% of other essential items were regionally sourced (Table 4). However local manufacturers' shares of the tracer medicines for HIV/AIDS (ARTs) and of the new first-line anti-malarial treatments (ACTs) were very low, as vertical programme funders imported from India and high income country (HIC) manufacturers (Table 4). While local firms had supplied the bulk of the previous first line anti-malarial treatment (Sulfadoxine and Pyrimethamine, SP) (Mujinja et al., 2014), the switch to the new more expensive ACTs as first line treatment had raised barriers to market entry by local firms. Subsequent to this data collection, the sole Tanzanian supplier of anti-retrovirals was closed.

In Kenya over half of publicly-sourced tracer medicines had been bought locally, and in Tanzania over 20%, despite these constraints and despite the use of international tendering as the public wholesalers' main procurement method (Table 5). Private wholesalers had bought proportionately less locally in each country. In Kenya, private wholesale buying from HICs (Table 5) reflected the market leverage of the higher income segment of Kenya's private sector. Strikingly, faith-based wholesalers interviewed, including MEDS in Kenya (Table 5) and Action Medeor in Tanzania, were making major efforts to purchase locally, as was PEPFAR in Tanzania when sourcing medicines for opportunistic infections. These organisations were actively adapting their

Table 4
Country of origin of all essential tracer medicines, by category of medicine and country of use (percentages by medicine category) 2012.

Country of use	Tanzania				Kenya			
Country of origin	ACTs	ARTs	Chronic disease	Other	ACTs	ARTs	Chronic disease	Other
Tanzania		10		19				
Kenya			12	18	1	2	59	44
India	37	90	41	46	44	90	12	27
China	8			8	4		2	6
HICs	55		47	7	51	5	20	17
Other				2		2	7	6
Total	100	100	100	100	100	100	100	100

Note: ACT: artemisinin combination therapy; ART: antiretroviral therapy.

Table 5
Tanzania and Kenya: Country of origin of tracer medicines, by wholesale sector (% by sector).

Country of origin	Tanzania			Kenya			
	Wholesale source sector			Wholesale source sector			
	Public	Donation	Private	Public	FBO/NGO	Donation	Private
Tanzania	22		11				
Kenya	10	25	20	54	76	50	32
India	49	25	47	30	8	40	31
China	6		6	8	1		4
HICs	12	50	12	8	10	10	25
Other			4		5		8

procurement processes to working with local suppliers. Interviewees attributed MEDS′ relatively high reliance on local procurement (at 75%, see Table 5 Col. 5) to its mix of local tenders of accessible size and active working relations with local manufacturers.

In both countries, interviewees including regulatory officials, public and NGO wholesalers and clinicians, identified particular local manufacturers as producing reliable quality medicines, and also reported problems, investigations and complaints about particular firms or products. Facility level and other interviewees argued that more local public procurement could improve flexibility and quality of local supplies, by allowing enhanced regulatory oversight:

> … the health system will be in a position to monitor right from the primary stage of production, and quality of drugs would be assured right at the factory level. (Tanzania, public health centre)

In both countries, the business model of private wholesaling and distribution was strongly influenced by profits from importing. Private wholesaling was dominated by wholesalers/importers acting as representatives of Indian and multinational (MNC) exporters to East Africa. In Kenya, some distributors acted mainly as marketing and distribution agents for branded imports from MNCs such as Novartis, Sanofi and Astra Zeneca. Others had built up businesses as distribution agents both for local manufacturers and for large Indian exporters such as Cipla and Aurobindo (see also WHO, 2011). One distributor interviewed represented two local manufacturers in tendering to KEMSA, and this formed a substantial element of his local purchases; otherwise he stated that he preferred importing, since imports were lower priced, by implication allowing higher resale margins.

Distributors in Tanzania also acted as intermediaries between local manufacturers and the public wholesaler. Tanzanian wholesaler/importers bundled local and imported items to supply MSD tenders, and one manufacturer of other health sector supplies was considering moving into this business. There were a number of reasons why manufacturers in Tanzania preferred indirect supply to the public sector. Public tenders carried considerable risk: smaller manufacturers in particular reported increasing delays in payment after delivery and changes to contracted volumes during production. There was therefore an incentive to shift this risk to an intermediary, despite reduced margins. From the public wholesaler side, the attraction of bundling by wholesalers included fewer contracted suppliers to deal with. Given the wholesaling structure, this "bundling" would tend to incentivise a shift over time to increasing reliance on imports.

4.4. Procurement patterns and local manufacturers' market access

These trends at wholesale level had had the effect of weakening domestic linkages between health sector procurement and local industry. Tanzania and Kenya each have active domestic pharmaceutical and health supplies industries, largely owned by East African capital (Banda et al., 2016; UNIDO, 2010). Kenya, with around 40 pharmaceutical firms and substantial upstream suppliers, is the regional hub. Tanzania's smaller industry supplies mainly its domestic market. Both countries' pharmaceutical sectors operated in a liberalised and globalised market environment, with zero regional import duties on finished pharmaceutical imports, and almost complete reliance on imports of active pharmaceutical ingredients, excipients and machinery.

In 2009, these pharmaceutical industries were producing around a third of domestic medicines' consumption (Table 6). However in Tanzania, local producers' market share of an expanding market had since dropped sharply, to 15%, while exports had largely collapsed; meanwhile Kenyan producers had sustained their market share of a more slowly growing market. Both countries had received rising volumes of donor-funded medicines, particularly Tanzania. Data are unreliable (UNIDO, 2010) but domestic market size, measured in Table 6 as local production plus net imports, includes donor-funded medicines to the extent that they were included in countries' import data.

Table 6

Kenya and Tanzania: pharmaceutical markets 2009 and 2013 (millions of current US dollars) and market share of local manufacturers (%).

Country and year	(1) Imports (USD m)	(2) Exports (USD m)	(3) Local production (USD m)	Local market share (%)[a]
Kenya				
2009	298.6	67.3	99.9	30
2013	466.4	82.1	193.1	33
Tanzania				
2009	99.4	7.9	49.2	35
2013	286.1	1.7	48.7	15

Sources: Kenya: Imports, exports and local production: KNBS (2014, 2015). Mid-year exchange rates from Central Bank of Kenya https://www.centralbank.go.ke/ consulted 17.2.16

Sources: Tanzania: Imports and exports: Comtrade data base http://comtrade.un.org/data/ downloaded 5.8.14; local production URT (2012, 2013). Mid-year exchange rates from Bank of Tanzania https://www.bot-tz.org/ consulted 12.2.16.

[a] Share calculated as (3)/((1) + (3)–(2)).

Manufacturers interviewed stated that WHO pre-qualification, required to tender for donor-funded contracts, was expensive in relation to firms' revenues, and unlikely to generate business because of difficulties in meeting the required scale and Asian manufacturers' tender prices. The impact on market access was identifiable in both countries, despite Kenya's stronger local industry (Table 4). In Tanzania, manufacturers stated that the shift to ACTs as first-line anti-malarial medication, without access to donor-subsidised tenders, had reduced their cash flow, with one manufacturer reporting a loss of one third of turnover from the switch. Loss of local suppliers potentially reduces access by disadvantaged populations, since local producers in Tanzania have been shown to distribute more effectively than importers in rural areas (Mujinja et al., 2014).

In Tanzania, the decline in market share was thus partly generated by the terms of donor-funded procurement. A further blow was the loss of industrial protection when import tariffs on medicines were removed across the East African Community in 2009, increasing price competition from Asian exporters who may benefit from domestic export support. The WHO, alongside large donors and NGOs, has argued for zero import protection on medicines, characterising tariffs as a tax on illness (Olcay and Laing 2008). Tanzanian interviewees confirmed that this view influenced trade policy. In both countries, manufacturers stated that they now faced taxes or duties on some imported inputs, while competing with duty-free imported formulations. While the public wholesalers continue to provide up to 15% price premia for tenders from local manufacturers, the cumulative impact of the changes has been to increase barriers to market entry for local producers, with particularly negative effects in the less robust Tanzanian industrial structure.

Kenyan manufacturers' market share may have been in part sustained by the country's lower reliance on donor medicines funding, alongside greater industrial capabilities of local firms. Kenyan manufacturers were supplying a broader range of essential medicines, including those for chronic disease (diabetes, hypertension and mental illness), and more technologically demanding items such as injectables and IV fluids. Tanzanian firms' range was narrower, mainly tablets, capsules and some syrups – and was narrowing further.

Both countries also displayed high reliance on imports of medical equipment and laboratory supplies (Table 7). China was emerging as a supplier of medical equipment and supplies such as microscope slides and glucometer strips, and Korea (among HICs) of diagnostics. Tanzania and Kenya were supplying domestically a majority of basics such as brooms, bedsheets, disinfectant, bed nets and alcohol/spirit for wound cleaning (Table 7). Kenyan manufacturers also produced bandages, syringes and needles and some types of gloves, and exported some of these items to Tanzania (Table 7).

Table 7
Country of origin of tracer medical equipment and health sector supplies, by type of item and country of use (percentages by type of item) 2012.

Source country	Tanzania				Kenya			
	Medical equipment	Supplies			Medical equipment	Supplies		
		Medical	Lab	Other		Medical	Lab	Other
Tanzania		31	3	63				
Kenya		5	4	13	7	38	16	73
India	7	2	4	17	3	2	1	
China	15	20	3	3	17	30	4	
HICs	75	41	85	3	67	23	74	11
Other	3	1		1	6	8	4	16
Total	100	100	100	100	100	100	100	100

Equipment and supplies are diverse, and relied on erratic and cash-constrained locally-funded procurement. Private pharmaceutical wholesalers dealt in medical supplies such as clinical gloves and laboratory items, and there were some specialist equipment wholesalers. Medical supplies, like medicines, were imported tariff-free, while producers of e.g. hospital furniture complained of tariffs and taxes on their imported inputs. Local producers of medical and laboratory supplies and equipment thus faced similar competitive disadvantages to pharmaceuticals suppliers. Overall, local manufacturers of medicines and supplies for the health sector had lost out in access to rapidly expanding market demand segments, notably donor-funded medicines, while facing increasingly risky and uneven public procurement patterns alongside sharpening import competition in core domestic markets.

5. Discussion: a developmental perspective on procurement

Procurement processes, we have shown, act as a governance structure at multiple levels across the health sector, and connect need to industrial development. Routines and constraints in front line procurement processes embedded the workforce in 'horizontal' working relationships that sought to improve access to treatment. In the public sector, how staff stitched together stock control, ordering, chasing the public wholesaler and district authorities, borrowing, and purchasing using a variety of funding sources, influenced treatment access. While the strengths of public and donor procurement, according to facility interviewees, were low prices and quality assurance, weaknesses were not all attributable to local ordering and stock management failures. Other causes identified included top-down working relationships generating relative powerlessness of frontline staff, erratic and uneven financing, logistical problems, long geographical supply chains, and inflexible tendering systems.

In the faith-based sector, facility staff undertaking procurement worked with faith-based wholesalers where available, and relied, like larger private sector facilities, on working relationships with private wholesalers they judged reputable through experience, but over whose quality they lacked control. Patients in small private dispensaries and drug shops, generally seeking the cheapest medicines, were the most vulnerable to wholesale suppliers of medicines of doubtful quality.

Given the continuing persistence of access gaps and low incomes, a broader perspective on procurement policy can embed it more securely in health system strengthening, complementing a focus on strengthening top-down logistics. This shift in perspective should combine recognition of the strengths within persistently uncertain funding contexts of multi-level governance of procurement rooted in effective relational working with an appreciation of the broader developmental opportunities, as well as the problems, generated by power relations within value chains.

In this framework, procurement emerges as an important arena for both health and industrial policy. The GVC framework emphasises the role of lead buyers in value chain governance, and historical research identifies how health care demand patterns structure supply industries (Srinivas, 2012; Chataway et al., 2016). Health sector procurement practices constitute "implicit" industrial policy, shaping pharmaceutical and vaccine manufacturing in high- and middle-income countries (Srinivas, 2012; Massard da Fonseca, 2017; Shadlen and Massard da Fonseca, 2013; Pazirandeh and Norrman, 2014). Pharmaceutical manufacturers have historically relied on domestic markets for their early development, and the Africa-based pharmaceutical industry is no exception (Banda et al., 2016).

Procurement in East Africa thus opens up developmental opportunities, as Wang'Ombe and Mwabu (1987) noted two decades ago. Building more effective multi-level governance can strengthen links between serving population health needs and supporting local industrial development. The challenge for public, NGO and donor procurement is to sustain quality control while greatly increasing responsiveness to frontline requirements.

Strikingly, the non-commercial wholesaler in this study with the best such responsiveness, MEDS, was also the wholesaler with the strongest local purchasing, with resultant industrial and employment benefits. MEDS' working practices were strongly relational, both up- and down-stream, involving accreditation of local firms, regular consultation with local manufacturers, in-house quality control, and rapid response to facility requests and complaints. MEDS' relative success in associating local procurement, quality assurance and downstream responsiveness shows that relational working processes can build mutual understanding as a basis for effective negotiation and market development.

Public and non-profit wholesalers can thus shorten supply chains while encouraging domestic market competition through relational working with local suppliers. This shift implies substantial working practice changes within public and donor procurement. Because of the central importance of quality, procurement for health care cannot be arms-length. It requires inspection, quality assurance and control, alongside knowledge sharing and a level of trust. These in turn require better communications between procurement bodies and local firms, and between procurement bodies and frontline staff. Other supportive policy changes, such as modest levels of tariff protection to support emerging industrial strengths, also require improved relational working between health and industrial policy makers to identify scope for mutual benefit. Potential gains include industrial and employment growth, and a reduction of a reliance on low-priced Indian imports that is widely feared to be unsustainable as reputable Indian exporters move to higher margin opportunities (Chaudhuri et al., 2010).

6. Conclusion

Access to essential medicines and supplies in the public sector health facilities on which the bulk of Tanzanian and Kenyan low income populations rely remains problematic and erratic. Local procurement staff were disempowered, and local industrial suppliers had been weakened or constrained within a globalising market context. Responsiveness to needs remained poor, and reliance on private

medicines purchases high.

The cultural and institutional changes required to shift to a more domestically oriented, needs-led procurement mix can be built on the strengths of current multi-level governance of procurement, alongside effective use of the market-shaping power of wholesale procurement. Procurement can be made to function more effectively as an active policy field for: assessing and transmitting need; sustaining access in low income contexts with high uncertainty; generating greater responsiveness to population needs; and strengthening competent local industrial suppliers; thus shifting more of the benefits of health-related industrial value chains towards the domestic economy. Better local procurement by public and non-profit wholesalers can generate wider access to treatment, can support investment by competent, regulated local manufacturers, and improve local distribution.

Increasingly these challenges are being addressed in East Africa. In Tanzania the Second Five Year Development Plan (United Republic of Tanzania (URT), 2016) identified pharmaceuticals as a priority industrial sector, encouraging public procurement to link actively with local manufacturers. Generating effective two-way relational working between front-line procurement staff, wholesalers and industrialists can close the policy circle, extracting benefits for both health care and industrial development.

Acknowledgements

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2018.01.008

References

Abimola, S., Negin, J., Jan, S., Matniuk, A., 2014. Towards people-centred health systems: a multi-level framework for analysing primary health care governance in low- and middle-income countries. Health Pol. Plann. 29, ii29–ii39.

Banda, G., Wangwe, S., Mackintosh, M., 2016. Making Medicines in Africa: an Historical Political Economy Overview. In Mackintosh, M., Banda, G., Tibandebage, P., Wamae, W. (Eds.), 2016. Making Medicines in Africa: The Political Economy of Industrializing for Local Health. Palgrave Macmillan. Chapter pages 7–24.

Bigdeli, M., Peters, D.H., Wagner, A.K., 2014. Medicines in Health Systems: Advancing Access, Affordability and Appropriate Use. Alliance for Health Policy and Systems Research, WHO, Geneva.

Chataway, J., Banda, G., Cochrane, G., Manville, C., 2016. Innovative Procurement for Health and Industrial Development. pp. 243–260 In Mackintosh, M., Banda, G., Tibandebage, P., Wamae, W. (Eds.), 2016. Making Medicines in Africa: The Political Economy of Industrializing for Local Health. Palgrave Macmillan. Chapter pages 7–24.

Chaudhuri, S., Mackintosh, M., Mujinja, P.G.M., 2010. Indian generics producers, access to essential medicines and local production in Africa: an argument with reference to Tanzania. Eur. J. Dev. Res. 22 (4), 451–468.

Ewen, M., Kaplan, W., Gedif, T., Justin-Temu, M., Vialle-Valentin, C., Mirza, Z., Regeer, B., Zweekhorst, M., Laing, R., 2017. Prices and availability of locally produced and imported medicines in Ethiopia and Tanzania. Journal of Pharmaceutical Policy and Practice 10, 7.

Flecker, J., Haidinger, B., Schönauer, A., 2013. Divide and serve: the labour process in

service value chains and networks. Compet. Change 17/1, 6–23.

Gereffi, G., Humphrey, J., Sturgeon, T., 2005. The governance of global value chains. Rev. Int. Polit. Econ. 12/1, 78–104.

Global Fund, 2012. Guide to Global Fund Policies on Procurement and Supply Management of Health Products. The Global Fund, Geneva (June).

Höllein, l., Kaale, E., Mwalwisia, Y.H., Schulze, M.H., Holzgrab, U., 2016. Routine quality control of medicines in developing countries: analytical challenges, regulatory infrastructures and the prevalence of counterfeit medicines in Tanzania. Trends Anal. Chem. 76, 60–70.

Huff-Rousselle, M., 2012. The logical underpinnings and benefits of pooled pharmaceutical procurement: a pragmatic role for our public institutions? Soc. Sci. Med. 75, 1572–1580.

KEMSA (nd) New Business Model http://www.kemsa.co.ke 26/5/2016.

KEMSA Task Force, 2008. KEMSA Task Force Report. KEMSA, Nairobi. http://pdf.usaid.gov/pdf_docs/Pnadn474.pdf.

Kaplinsky, R., Morris, M., 2001. A Handbook for Value Chain Research. https://www.ids.ac.uk/ids/global/pdfs/VchNov01.pdf, Accessed date: 5 March 2015.

Kenya National Bureau of Statistics (KNBS), 2014. Economic Survey 2014. Nairobi, Kenya.

Kenya National Bureau of Statistics (KNBS), 2015. Economic Survey 2015. Nairobi, Kenya.

Massard da Fonseca, E., 2017. How can a policy foster local pharmaceutical production and still protect public health? Lessons from the health–industry complex in Brazil. Global Publ. Health. http://dx.doi.org/10.1080/17441692.2017.1396354.

Medical Stores Department (MSD), 2013. Medium Term Strategic Plan II: 2014 – 2020. United Republic of Tanzania, Dar es Salaam Available from: http://msd.or.tz/index.php/medium-term-strategic-plan-2014-2020/category/6-medium-term-strategic-plan, Accessed date: 30 April 2015.

Mujinja, P.G.M., Mackintosh, M., Justin-Temu, M., Wuyts, M., 2014. Local production of pharmaceuticals in Africa and access to essential medicines: 'urban bias' in access to imported medicines in Tanzania and its policy implications. Glob. Health 10 (12), 1–12.

Ministry of Health and Social Welfare (MoHSW), 2008. Mapping of the Medicines Procurement and Supply Management System in Tanzania. Dar es Salaam. http://www.who.int/medicines/areas/coordination/tanzania_mapping_supply.pdf, Accessed date: 4 May 2015.

Ministry of Medical Services and Ministry of Public Health and Sanitation (MoMS & MPHS), 2010. Sessional Paper on National Pharmaceutical Policy. Nairobi. http://apps.who.int/medicinedocs/en/d/Js18697en/, Accessed date: 4 May 2015.

Olcay, M., Laing, R., 2005. Pharmaceutical Tariffs: what is their effect on prices, protection of local industry and revenue generation? http://www.who.int/intellectualproperty/studies/TariffsOnEssentialMedicines.pdf, Accessed date: 17 August 2015.

Opwora, A., Toda, M., Waweru, E., Edwards, T., Fegan, G., Noor, A., Molyneux, S., Goodman, C., 2011. Health Service Delivery, Governance and Supportive Supervision under the Health Sector Services Fund: National Baseline Survey, vol. 1 KEMRI Wellcome Trust, Nairobi.

Ozawa, S., Pongpirul, K., 2013. 10 best resources on …mixed methods in health systems. Health Pol. Plann. 29 (3), 323–327.

Pazirandeh, A., Norrman, A., 2014. An interrelation model of power and purchasing strategies: a study of vaccine purchase for developing countries. J. Purch. Supply Manag. 20, 41–53.

Shadlen, K., Massard da Fonseca, E., 2013. Health policy as industrial policy: Brazil in comparative perspective. Polit. Soc. 41/4, 561–587.

Sidibé, M., Yong, L., Chan, M., 2014. Commodities for better health in Africa: time to invest locally. Bull. World Health Organ. 92 (d).

Srinivas, S., 2012. Market Menagerie. Health and Development in Late Industrial States. Stanford University Press, California.

UNIDO, 2010. Pharmaceutical Sector Profile. Kenya UNIDO, Vienna.

United Republic of Tanzania (URT), 2016. National Five Year Development Plan, 2016/2017-2020/2021. Ministry of Finance and Planning, Dar es Salaam.

United Republic of Tanzania (URT), 2012. Annual Survey of Industrial Production 2009: Statistical Report. Ministry of Trade and Industry, Dar es Salaam, Tanzania.

United Republic of Tanzania (URT), 2013. Census of Industrial Production 2013. Tanzania Mainland. National Bureau of Statistics, Dar es Salaam, Tanzania.

Waako, P.J., Odoi-adome, R., Obua, C., Owino, E., Tumwikirize, W., Ogwal-okeng, J., Anokbonggo, W.W., Matowe, L., Aupont, O., 2009. Existing capacity to manage pharmaceuticals and related commodities in East Africa. Hum. Resour. Health 7, 21.

Wafula, F., Dolinger, A., Daniels, B., Mwaura, N., Bedoya, G., Rogo, K., Goicoechea, A., Das, J., Olayo, B., 2017. Examining the quality of medicines at Kenyan healthcare facilities. Drugs - Real World Outcomes 4 (1), 53–63.

Wang'Ombe, J.K., Mwabu, G.M., 1987. The economics of essential drug schemes: the perspectives of developing countries. Soc. Sci. Med. 26 (6), 625–630.

Wiedenmayer, K.A., Kapologwe, N., Charles, J., Chilunda, F., Mapunjo, S., 2015. The reality of task shifting in medicines management – a case study from Tanzania. Journal of Pharmaceutical Policy and Practice 8, 13.

WHO, 2011. The World Medicines Situation Report. WHO, Geneva. http://www.who.int/medicines/areas/policy/world_medicines_situation/en/, Accessed date: 18 August 2015.

Yadav, P., Stapleton, O., Van Wassenhove, L.N., 2011. Always Cola, Rarely Essential Medicines. http://ssrn.com/abstract=1656386, Accessed date: 1 August 2016.

Yadav, P., 2015. Health product supply chains in developing countries: diagnosis of the root causes of underperformance and an agenda for reform. Health Syst. Rev. 1 (2), 142–154.