

Evaluating Constraints and Prospects in Public Health Supply Chain: The Case of the Ethiopian Pharmaceutical Supply Agency (EPSA)

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Introduction

It is widely recognised that a well-functioning and efficient supply chain is critical for the provision of public health services and to guarantee the consistent availability of high-quality health products at all key delivery points. Identifying and eliminating constraints that hinder supply chain operations is considered one of the key steps towards reform in the provision of medicine and other health products. Over the past decade, many public health organisations and humanitarian aid agencies have developed programmes and projects to critically assess their operations and improve a range of aspects that affect the performance of their supply chains.

The Ethiopian Pharmaceuticals Supply Agency (EPSA) was established as a semi-autonomous public institution in 2007 to supply quality-assured and affordable pharmaceuticals to all public health facilities in Ethiopia. EPSA has contributed to the achievements that have been made in the health sector regarding the reduction of morbidity and mortality associated with both communicable and non-communicable diseases. Since its establishment EPSA has sought to build its capacity in terms of human resource and supply chain systems at all levels. As a result, EPSA's capacity in procuring, storing and distributing pharmaceuticals through the Revolving Drug Fund (RDF) and other programmes has noticeably increased.

In 2015, EPSA developed and commenced implementing a five-year Pharmaceutical Sector Transformation Plan, covering all aspects of the end-to-end supply chain. The plan was revised in 2018

and by the end of 2019 EPSA had achieved many of its strategic objectives and made significant progress.

This paper presents the findings on supply chain constraints (or bottlenecks) identified by EPSA's Admas Programme, which was launched by Pamela Steele Associates and its consortium partners in late 2018, with support from the Bill and Melinda Gates Foundation. The programme aims to further improve EPSA's supply chain operations by building the technical capacity and the behavioural capabilities of its workforce. It is underpinned by the development of national health policies and emphasises a government-led and government-owned supply chain reform. The programme's ultimate goal is to make a sustainable and effective contribution to improving health and wellbeing for the citizens of Ethiopia.

Methodology

The approach adopted by the Admas Programme is anchored in a Theory of Constraints bottleneck analysis, and in the Gates Foundation's Supply Chain Maturity Model. A Theory of Constraints analysis aims to identify the essential limiting factor that hinders the achievement of a supply chain goal, and seeks to guide systematic corrective action to address the constraint until it ceases to be a limiting factor. Bottlenecks are generally interpreted as process activities that hinder organisational performance and bottleneck analysis seeks to locate those activities and determine the cause of the problem. The Gates Foundation's Supply Chain Maturity Model takes the analysis a step further and helps supply chains to improve their operations through a continuous cycle of identifying and addressing dynamically shifting bottlenecks. The maturity levels in the model, which range from 'canvas' to 'accredited', highlight

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the weakest link in the supply chain and rate it according to the lowest-performing capability that impacts the overall system performance.

Between April and May 2019, as part of the Admas Programme, PSA put together a team of international subject matter experts, who identified a set of supply chain bottlenecks at EPSA. The team conducted an extensive literature review of the key strategic and operational documents and evaluation reports, and discussed them at a consultative workshop. The experts' findings were then reviewed during a validation workshop, held in Addis Ababa in June 2019, with EPSA's 19 top management officials.

The validation workshop approached the analysis and discussion of the supply chain constraints using the Lean Six Sigma DMA-IC (Define, Measure, Analysis, Improve, Control) method, which aims to provide organisations with a roadmap for identifying end-to-end solutions. The five improvement steps of this approach include listening to customers' voices, identifying supply chain challenges, and conducting an inquiry into the current status of supply chain performance, using the Supply Chain Maturity Model.

Other analytical tools employed during the workshop to identify the root causes of bottlenecks and offer potential solutions included the 'Five Whys' approach, and cause-and-effect analysis, using the fishbone diagram. A group activity organised in the format of the World Café method was also conducted to validate the list of bottlenecks identified by the subject matter experts. In the same group activity, a supply chain self-assessment was carried out, using the Supply Chain Maturity Model to refer to the overall maturity level of EPSA's supply chain. At the end of the workshop the participants submitted a list of identified bottlenecks to EPSA for validation using three parameters: 'resolved', 'pending' and 'ongoing'. The expert panel suggested several ways to achieve improvement: for example, by adopting the agile-based methodology; using a change commitment curve, process maps, and scores cards; and applying and Plan-Do-Act-Check (PDCA) for each bottleneck.

Logos: PSA and Admas Programme

Findings and discussion

In total, 104 bottlenecks were identified through the bottleneck analysis. Most of them can be categorised into three major areas: quantification and market-shaping, procurement and contract management, and warehousing and distribution.

The validation exercise for *quantification and market shaping* pointed to key challenges, such as forecasting, product identification, inadequate recording and reporting of quantification activities, and a lack of reconciliation between the supply plan, the health facilities' budget and the actual delivery. Market shaping in general suffers from the lack of market surveillance tools and activities, even though EPSA has developed a market-shaping framework.

In the area of *procurement and contract management*, the persisting issues are the general lack of automation of procurement activities, the lack of foreign currency for international procurement, and prolonged delays in releasing funding, which may stretch to up to five months. A shortage of staff remains a pressing issue and the performance of employees is inhibited by a range of skills gaps at various levels of professional activity.

EPSA has been able to set in motion business process reengineering in order to improve procurement procedures and explore alternative procurement methods.

In regard to the practicalities of contract administration, there are a wide range of bottlenecks, and only a few of them have been adequately resolved. A recurring issue is delay in site preparation, and backlogs in installation and commissioning, normally at health facilities. There has been a partial improvement in lead times for medicine and equipment at the facilities and the hub. The port clearance delays have also been decreased, and fewer reports of product damage have been submitted, reducing the high demurrage costs incurred in the past. However, there has been little improvement in adherence to delivery schedules, which are frequently disrupted by inadequate contract management, which lacks proper monitoring and evaluation.

Warehousing bottlenecks were identified in material handling equipment, warehouse operations, warehousing space and physical infrastructure, product loss, and general inventory management. Delayed product deliveries and the lack of prior information on the incoming pipeline are among the persisting issues across all supply chain functions, despite the utilisation of a GPS tracking system and the involvement of the working group for incoming shipment. It has been acknowledged that the warehouse operations demand greater planning for inter-hub transfer and the optimisa-

tion of storage hubs, which requires reviewing all the warehouse activities and mapping them according to the standard operating procedures (SOPs) and policies.

In the area of *distribution*, some progress has been made in overcoming delays in loading and off-loading containerised shipments, and minimising incomplete deliveries. However, overall, the issue of late deliveries and partial shipments still exists. Considerable progress has been made in resolving several bottlenecks pertaining to the product handling by the drivers, who have now received adequate training. The fleet has been upgraded, a maintenance service strategy has been introduced, and related SOPs now offer much-needed support to fleet management.

Conclusions

The bottleneck analysis helped to determine the range of constraints that continue to hinder EPSA's supply chain performance. The validation exercise with the agency's key officials enabled them to classify the bottlenecks as 'resolved', 'pending' and 'ongoing', and to expound the root causes of, and possible solutions to, the constraints. The process also highlighted persistent bottlenecks that are not specific to EPSA but are common to public health supply chains in low- and middle-income countries.

The fact that some African countries that face similar problems in their health supply chains to those experienced by Ethiopia are now dealing with them is promising, and the Admas Programme makes a strong case for elaborating solutions to supply chain constraints in EPSA. It is anticipated that, with improved policies and SOPs, a better workforce, greater stakeholder collaboration and a more autonomous EPSA, most of these bottlenecks will gradually disappear. EPSA intends to conduct similar assessments quarterly to measure the improvement of its supply chain performance, and the agency's technical team will continue to monitor and evaluate the tasks and actions deployed to resolve the ongoing bottlenecks.

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