Multi-Supplier Sourcing Strategies for Global Health Products

Alexander Rothkopf
University of Wuerzburg, Wuerzburg, Germany
alexander.rothkopf@uni-wuerzburg.de

Richard Pibernik
University of Wuerzburg, Wuerzburg, Germany
richard.pibernik@uni-wuerzburg.de

November 2013
1 Motivation & Problem

A number of global health agencies (e.g. UNITAID, the Stop-TB-Partnership, GAVI, or The Global Fund; in the following referred to as "organizations") have significantly improved access to essential medicines and healthcare products/services in developing countries. They have been particularly successful in lowering purchasing prices through volume consolidation and centralization of purchasing activities. UNICEF, for example, has a dedicated organization that provides purchasing of a broad variety of essential healthcare products such as vaccines, malaria medication & insect nets, cold-chain equipment, medical devices, HIV related medicines & diagnostics and more.

Consolidating procurement volumes yields a number of benefits (illustrated on the left hand side of Figure 1): (1) manufacturers can realize economies of scale in production and, thus, offer lower prices. (2) A reduction in demand uncertainty and more stable demand streams further reduce manufacturers’ costs and provide room for lower prices. (3) Volume consolidation can also be a successful intervention to overcome what can be termed the low uptake trap: low and fragmented demand leads to high prices and the high prices prevent demand from increasing. Without a market intervention, consumption of products with significant public health benefits will remain low. (4) Competition (short term): consolidation of purchasing volumes across multiple buyers allows for larger order quantities; these will enhance competition among suppliers/manufacturers and will, thus, lead to lower purchasing prices. (5) Transaction costs: costs for negotiations, administration, accounting, quality control, etc. decrease both on the manufacturer/supplier and the buyer side as the number of suppliers decreases. (6) Economies of information: a professional buyer that consolidates volume can reap economies of information and can leverage better market knowledge. The buyer may, for example, obtain better knowledge of the "true costs" of the manufacturer, upstream API markets, etc.

Despite these obvious benefits, volume consolidation has also created some serious challenges. Global procurement organizations have become very large and influential (sometimes quasi-monopsonistic) players, and their procurement decisions have the potential to substantially impact market structures and dynamics – to the better or the worse. Clearly, many of the aforementioned benefits favor a sole source approach: this will yield highest economies of scale on the manufacturers’ side, highest volume discounts, and lowest administrative and transaction costs. These benefits may, however, come at a high cost in the medium and long term (see the
right hand side in Figure 1): a sole sourcing approach may impair supply market health. Those manufacturers who are not awarded a substantial share of the consolidated volume may choose to divest, give up capacity and knowledge and/or dedicate capacity to other products. Also, they may be disincentivized to make capacity investments in the future. This may result in a quasi supply monopoly with little incentives to innovate (on the process and product level) and, absent competition, higher future product prices and lower overall welfare. In short: immediate volume benefits may be achieved at the cost of lower long term welfare. There are multiple other factors that drive sourcing strategies of donor organizations: limited available capacity of individual suppliers, for example, may force them to allocate the entire purchasing volume to multiple suppliers. Hedging supply risks may be another motive for dual or multiple sourcing presumably, supply chain resilience will increase with the number of suppliers. Multiple sources can, in certain instances, reduce lead times or help achieve other product-related objectives like improving product quality. For the private sector there has been quite some research on when to employ single vs. dual/multiple sourcing. However, this research mainly focuses on risk management aspects and (short term) company earnings. Little is known about whether or not insights from this research also applies to the sourcing strategies of organizations like UNICEF who pursue a different set of objectives and who act on behalf of multiple stakeholders.

![Diagram](image-url)

**Figure 1: Potential drivers of single- and multi-supplier sourcing in a procurement context of global health agencies**
As we will highlight in the following section, different factors are relevant in different sourcing situations and favor different sourcing strategies. In our research we aim to develop a comprehensive framework to determine the best sourcing strategy (i.e. single/multiple sourcing, volume shares) depending on relevant external and internal factors and the specific objectives of developing countries and donor organizations. More specifically, we want to be able to support decision makers in answering the following questions: from a social welfare perspective,

- what is the optimal number of suppliers and what is the optimal volume allocation that balances short and long term objectives of multiple stakeholders (patients, country buyers, donor organizations, procurement agencies, and suppliers) ?
- How do we best set incentives for manufacturers to invest into process and product innovation?
- What are appropriate mechanisms to award contracts and how do they perform under different conditions?
- How should dynamic allocation and reallocation mechanisms be designed in long-term procurement settings?

2 Current Multi-Supplier Strategies

Based on publicly available information we first collate relevant examples of sourcing strategies for different healthcare products of different organizations. These examples foster a better understanding of the framework we illustrated in Figure 1 and help us refine our initial research questions. They will also help us explore, in more detail, which rules and logic drive the current sourcing strategies of the key players in the market.

The GAVI Alliance – Advance Market Commitment for Pneumococcal Vaccines

The GAVI Alliance (GAVI) established an Advance Market Commitment worth $1.5 billion for Pneumococcal Vaccines and expected to contract multiple sources "...to accelerate the development of new [Pneumococcal] vaccines, to contribute to the creation of a healthy market with multiple suppliers, and to enhance the possibility to access lower tail prices through future offers..." (GAVI Alliance Secretariat, 2013, p. 32). To achieve this GAVI has (at the moment) contracted two suppliers – GlaxoSmithKline and Pfizer – to supply vaccines until 2024. The chosen volume split is even, i.e. each supplier committed to deliver 48 Mil. doses annually from 2014 on. As part of their strategy GAVI has not allocated the entire future demand to these two suppliers: the Strategic Demand Forecast (SDF v5.0) indicates a demand of more than 200
million doses per year from 2014 on while the current long term agreements with the two suppliers cover less than 50 percent (GAVI Alliance Secretariat, 2013). The remaining volume is not yet allocated to ensure a healthy supplier market that induces innovation, i.e. GAVI wants to motivate other pharmaceutical companies (as well as the current suppliers) to develop new and improved Pneumococcal vaccines, and long term low prices, i.e. the current suppliers shall be motivated to improve processes and lower cost in order to secure additional shares in the future. Also, new suppliers are supposed to offer new vaccines at lower prices.

**UNICEF – Ready-to-use therapeutic food**

Another example for splitting procurement volumes is ready-to-use therapeutic food (RUTF). In the past, a shift from single sourcing to multiple sourcing emerged for RUTF purchases of UNICEF. Originally, Nutriset (located in France) was the only manufacturer of RUTF and, thus, the sole supplier to UNICEF. Recently, however, UNICEF’s supply division renewed contracts with fourteen suppliers, awarded the biggest share of the total volume to Nutriset, and the remaining volume to thirteen suppliers from Africa, Asia, Europe, and America. Notably, more than half of this remaining RUTF volume is procured from suppliers that are (at least partly) owned by Nutriset (Komraska, 2012, p. 9). The decision to diversify the supply base and to split the volume across fourteen suppliers is grounded in UNICEF Supply Division’s strategy for RUTF that is targeted at: (1) a diverse supplier base with sufficient capacity to respond to surges in demand, including emergency response; (2) competition in the market in order to obtain best value for money; (3) assurance of quality in line with set international standards; and (4) supporting local economies by establishing contractual agreements for affordable products of assured quality that meet program needs (Komraska, 2012). According to UNICEF, the multi-supplier strategy has led to reduced prices and lower lead times (Komraska, 2012, p. 11).

**UNICEF/The Global Fund – Bed Nets (LLINs)**

UNICEF procures bed nets for countries where malaria infection rates are high. The organization consolidates demand of almost 40 countries and provides a substantial share of the 150 million nets per year that WHO intends to distribute in sub-saharan Africa (WHO, 2012, p. 23). According to UNICEF, consolidation of demand for bed nets increased global production capacity and scale economies on the suppliers’ side. Also, competition among suppliers became more intense. As a consequence, prices dropped significantly. From 2010 to 2012, for example,
the average price for bed nets procured by UNICEF fell from $5 to approx. $3.7 (UNICEF, 2013, p. 2).

Demand for bed nets is cyclical. It spikes every three years when campaign distribution for bed nets enters a new replenishment cycle (because of a an anticipated shelf life of three years) (see for example (UNICEF, 2013, p. 2)). This fluctuation in demand induces challenges for the suppliers of bed nets. First, cyclical fluctuations hamper capacity utilization and prevent suppliers from reaping economies of scale. Second, there is uncertainty with regard to the peaks and the overall demand within a cycle. Both the cyclical fluctuations and uncertainty increase the suppliers’ costs and risks and will, eventually, lead to higher procurement costs. Just recently, The Global Fund has reacted to these challenges with an effort to further consolidate demand. This includes collaboration with other agencies (including UNICEF) to increase the consolidated purchasing volume and new contracts with seven suppliers. This initiative is expected to save up to $140 million (The Global Fund, 2013).

Global Drug Facility – Stop-TB-Partnership

The "Stop-TB-Partnership" founded the Global Drug Facility (GDF) to improve the availability of drugs and diagnostic equipment to fight tuberculosis worldwide. The GDF realized that the main "barriers [for less drug shortages] were caused primarily by financial constraints, inefficient procurement systems and poor management" (GDF, 2011, p. 2). To help remedy these problems GDF implemented a procurement process in which suppliers’ shares of the total procurement volume for one product are contingent upon a competitive bidding process conducted by an agent of GDF. GDF states that they contract up to four suppliers, i.e. they pursue multi-supplier sourcing, in a long term agreement to reach affordable prices, quality, and security of supply (GDF, 2013b).

GDF splits volumes according to a predetermined schedule. In their recent tender for second and third line anti-TB medicines they announce different splits for different multi-supplier sourcing scenarios (two suppliers: 65/35, three suppliers: 60/25/15, four suppliers: 55/20/15/10) and then request price quotations from the pre-screened suppliers (GDF, 2013a, p. 10). It must be considered, however, that the flexibility to choose between these schedules depends on the availability of a sufficient number of suppliers, which may be limited for individual product lines.
In a joint effort the Bill & Melinda Gates Foundation, the Clinton Health Access Initiative (CHAI), the Governments of Norway, the United Kingdom, the United States, Sweden, the Children’s Investment Fund Foundation (CIFF), and the United Nations Population Fund (UNFPA) reduced the price of Bayer AG’s contraceptive implant Jadelle from $18 to $8.5 per unit for eligible countries (Gates Foundation, 2013). This price reduction is based on a volume guarantee and a timely and reliable forecast from eligible countries that allows the manufacturer to install appropriate capacity (Velleuer, 2013).

3 Related Research Questions and Future Research Directions

What is the optimal number of suppliers and the optimal volume allocation?

The examples in the previous section demonstrate that "the right number of suppliers" and the "the right allocation of volume" are relevant across key donor organizations and different medicines and healthcare products. We can also observe that varying emphasis is put on interrelated factors such as price, competition, resilience, etc. Determining the right number of suppliers and the right allocation is challenging because they are context-dependent and also driven by the specific objectives of the purchasing organization.

For example, GAVI's AMC is a pull mechanism to incentivize the development and supply of Pneumococcal vaccines. At the same time it also targets volume consolidation and economies of scale, and the development of a healthy supplier market with long term competition, innovation, and market entry of new suppliers. These objective may be conflicting. How many suppliers should an agency contract upfront to maintain incentives for innovation and market entry, but not hamper economies of scale and capacity utilization? How should they split the overall volume among the initial suppliers and how much of the future volume should be left as incentive to continue to invest into innovation? The case of UNICEF’s RUTF shows other drivers that can be relevant. In that particular example there is a dominant player with its subsidiaries competing with other suppliers. How many suppliers are efficient if economies of scale, lead time, and quality are relevant to the decision?

The development of a framework for determining the right number of suppliers and the right volume allocation in different contexts of the global health initiatives will be a major contribution of our research.
How do we best set incentives for manufacturers to invest into process and product innovation, capacity, etc.?

Our examples show that the purchasing organizations are interested in creating incentives for suppliers to contribute to long term market health. One important measure of procurement agencies is to commit to a (large, consolidated) purchasing volume as, for example, discussed in the context of Jadelle. However, this also entails disadvantages because the buyer is locked-in with certain suppliers during a longer time period, and other suppliers may be discouraged to maintain capacity and to invest into process and product innovation. A volume commitment may even create disincentives for the contracted supplier: why should he invest into product innovation and why should he let the purchasing agency participate in the benefits of process innovations if a long term contract prevents competition and renegotiations?

An important question arises: How can incentives be incorporated in procurement contracts to make it attractive for selected suppliers to make an effort to innovate, and how can procurement schemes be designed to make it attractive for other suppliers to maintain expertise, resources, and capacity?

We are interested in better understanding how to set the right incentivizes and in developing a toolkit that helps practitioners evaluate the trade-offs involved in different procurement mechanisms.

What are appropriate mechanisms to award contracts and how do they perform under different conditions?

The examples also highlight that different mechanisms are used to award contracts to suppliers. These range from negotiations, via auctions, to complex long-term market creating mechanisms like volume commitments and advance market commitments.

Each mechanism has its unique characteristics. Auctions, for example, are known to perform well to lower procurement prices. However, they demand very strict prerequisites (like a screening process that yields pre-qualified suppliers, an interchangeable good of the same quality from each supplier and so on). Also, different auction settings may induce players to behave strategically, as other research suggests, and may lead to inferior outcomes. It can be shown that bidding for certain volume shares (e.g. for 55/20/15/10 shares in the GDF example) may induce strategic bidding behavior and intractable and inferior results. Therefore, the more general question is: under which conditions should a procurement agency choose which mechanism to
award procurement volumes? How should they configure this mechanism to achieve good results and avoid the negative consequences of strategic behavior on the manufacturer/supplier side?

We want to provide guidance in selecting appropriate procurement mechanisms to award volumes in different purchasing contexts.

How should dynamic allocation and reallocation mechanisms be designed in long-term procurement settings?

From our previous examples it became apparent that timing plays a crucial role in the procurement decisions of global health initiatives. A single sourcing decision today may reduce prices in the short-term but may leave the buyer facing a sole supplier (monopsony) tomorrow. The examples of GAVI with the AMC or UNICEF with RUTF indicate that organizations are aware of the fact that today’s sourcing decisions effect future supply market conditions in terms of price, capacity, and innovation. Therefore, they have diversified the supply base and provided incentives for future market entrance of other suppliers. The timing is also crucial in the case of bed nets; because demand fluctuates significantly from year to year achieving a constant capacity utilization is difficult for the manufacturers. How should procurement agencies structure flexible contracts and procurement mechanisms that can accommodate market changes and allow for re-negotiations in future time periods?

We are interested in better understanding the component of timing to achieve long-term market health and support procurement agencies to choose a mechanism that considers the dynamics of global health markets.
References


