



TRANSFORMING
THE SUPPLY CHAIN

Supply Chain Maturity in Frontier Markets

*Using the Frontier Markets Supply Chain Maturity Model to Improve Supply Chain
Performance in Resource-Constrained Environments*

February 2019

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Professional Acknowledgements

from Pamela Steele Associates

At PSA we are humbled to be part of this community and to explore critical topics together. We created this paper upon the foundation of others' hard work. We acknowledge their work and look forward to continuing to partner with them.

Thank you to the Bill & Melinda Gates Foundation for starting the maturity model discussion and continuing to champion it; to the Plaster Group team for essential research and input; to the SOLVE project teams for advocating the use of the maturity model, and guiding supply chain teams in 17 countries; and to the dozens of supply chain teams who trusted the maturity process and shared their results with the world, in order to share challenges and learnings and to be part of the rising tide lifting all boats. It is your work that we continue to expand on and explore.

We are grateful to participate in the process of exploring this public good and excited to add to the knowledge base of the maturity model.

Context and Background

Imagine a supply chain that aims to deliver products to the last mile. The focus is public health, and the products are medicines that are essential for a healthy population. The supply chain is owned and operated by a government, and the staff of the supply chain are public servants. Much of the staff have studied public health or medicine and have been assigned to work in supply chain. External parties donate products, and the expectation is that the government will deliver them to the last mile. Some partners are assigned to improve supply chain performance, but their backgrounds are also often in public health or medicine. Best efforts are made to purchase, store, and deliver these products. However, little is known about how the supply chain performs. Stock levels are often inconsistent. Supply chain costs and funding are unknown. Teams struggle to respond to demand. The supply chain does not perform well, often despite years of teams trying to do better.

For those working in global health and development, commercial supply chains in frontier markets, or supply chains in resource-constrained environments, this supply chain scenario is a reality. This description is representative of most supply chains in these settings.

For supply chains in global health and development, the history of global development plays a part in today's supply chain performance. Development programs were established in the 1960s through loans and grants. Development aid in the mid-1990s focused on commodity procurement and initial investments in supply chains. This assistance led to the creation of central medical stores. Notably, the USAID partnership with John Snow Incorporated (JSI) began technical support in basic supply chain assistance in 1986. This was followed by 30 years of awards from USAID to JSI, including product procurement and technical assistance in some supply chain areas.

Often the focus of these programmes was to get product from the point of manufacturing to the country of destination, working on the assumption that the country's supply chain systems would take over from there. Upon realising that this was not enough, different organisations established development partner owned supply chains alongside government supply chains, to deliver product to the last mile and gather data to return to a funder.

These efforts have saved lives, and product availability has improved. However, the non-governmental organisations that improved availability were not always incentivised to work themselves out of a job. Instead, they became embedded; their presence became necessary for supply chain performance to continue. This put the government in a position of being unable to stand on their own.

Challenges facing supply chains are several, and the development community is complex.

Perhaps a better way of looking at this is not to criticise supply chains with low availability. Perhaps the better model is to applaud those which (despite not having supply chain staff, adequate training, organised partners, clear targets, performance management, supply chain visibility, or budgets) still somehow manage to get some products to the last mile.

The Need for the Model

One of the challenges for supply chains functioning under extreme resource constraints is to find a relevant framework or model which applies realistic expectations for capabilities and performance and provides a

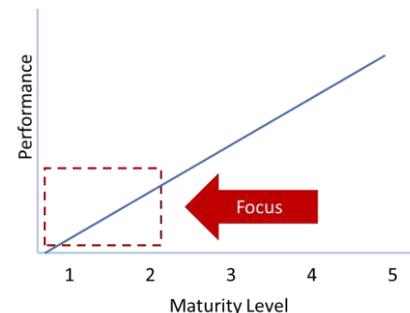
common language for partners and stakeholders. Many frameworks and models for supply chains are available, however, the vast majority are intended for functional, mature supply chains that aim to optimise their current operations. The supply chains in the scope of this work are often not functioning and are often less mature than those supported by the existing models.

Supply chain teams in this context often seek to benchmark or find examples that can apply to them. The challenge in finding applicable examples comes with defining examples of ‘good’ supply chain behaviours. In reality, ‘good’ for one supply chain may be underwhelming for another. Activities and accomplishments in a supply chain are relative. Instead of supply chains being held up to the same standards and expected to have the same practices and to produce the same performance levels, we find that supply chains perform along a continuum. This continuum shows whether some supply chains are more or less mature.

Gaps in Current Models

When this research began in 2015, there were two categories of maturity models: those designed for mature supply chains in mature markets, and those designed as comprehensive assessments for supply chains in resource-constrained environments.

Maturity models typically present supply chain capabilities across five levels of maturity, with a direct relationship between maturity level and supply chain performance. Most of the research and publications in the supply chain field focus on the top-performing, most mature supply chains. However, we focus on improving supply chain performance in the least mature supply chains, and we did not find a maturity model offering enough structure and guidance to be relevant.



Existing assessments for supply chains under resource constraints were useful for their intended purpose, which was, most often, to inform partner performance and future investments. Observations of these tools:

- focused on extensive and comprehensive snapshots, rather than on creating a working model to monitor dynamically shifting constraints;
- were typically completed every year (or less frequently);
- were typically performed in ‘audit’ style by external parties over the course of several days or weeks;
- were often subjectively based on qualitative 1–5 scoring, which is difficult to reproduce with another assessor;
- produced an aggregate score rather than a level based on the Theory of Constraints, which masked constraints and made it difficult to define priority activities;
- produced outputs that did not present tangible activities that were prioritised to maximise impact; and
- were internally focused, without considering market constraints or other external forces.

Defining a New Model

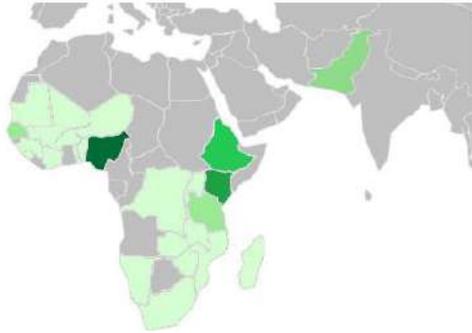
Based on these observations, teams developed a maturity model based on the Theory of Constraints, relevant for supply chains in resource-constrained environments. The first version was based on discussions with 20 supply chain teams in frontier markets. The focus of discussions was on how their supply chains work, how they support their staff, how they manage their funds, and how they continuously improve.

30
Countries Evaluated

140
Maturity Models Collected

8
Product Groups Represented

206
Product Supply Chains Covered



The result was several emerging patterns and behaviours that consistently led to higher supply chain performance. These components were recorded and tested continuously with supply chain teams. Eventually, teams in 30 countries used the model and provided their thoughts and experiences on it.

This new framework was designed to be a self-assessment or completed with light facilitation. It can be completed in half a day and is intended to be completed quarterly, to capture shifts in constraints and progress across component areas.

The model must take into account the following two points.

- Supply chains under resource constraints are fickle. The bottlenecks constraining progress change and shift, and they change more often than current assessments could track. A model was needed to identify these dynamically shifting constraints.
- If supply chains only focus on output measures, like product availability, they may miss the in-process measures that tell the story about what is possible. Therefore, guidance on in-process maturity and measures is needed.

Understanding the Model

While the previous section focused on the reasoning for creating a model, this section focuses on the model itself.

The model assumes a relationship between supply chain maturity and supply chain performance, and that the definition of ‘good’ performance changes as a supply chain matures. For very mature supply chains, for example, we can expect that in addition to good availability, they also have low wastage and low cost.

The model is based on the Theory of Constraints, which states that supply chains are themselves a system and that the lowest performing element of a system, pulls down its overall performance.

Theory of Constraints¹

The Big Idea: every part of a supply chain system has a constraint (bottleneck). Investing and focusing improvement efforts on that constraint is the fastest and most effective path to improving supply chain performance. Investing in non-constraints is unlikely to produce improvements.

What is the Theory of Constraints?

The Theory of Constraints is a methodology for identifying the most important limiting factor (i.e. constraint) that stands in the way of achieving a goal, and then systematically improving that constraint until it is no longer the limiting factor. In manufacturing and supply chain, the constraint is often referred to as a bottleneck.

¹ Adapted from Lean Production, for relevance to Public Health: <http://www.leanproduction.com/theory-of-constraints.html>.

The Theory of Constraints takes a scientific approach to improvement. It hypothesises that every complex system, including supply chain processes, consists of multiple linked activities, one of which acts as a constraint upon the entire system (i.e. the constraint activity is the ‘weakest link in the chain’).

Dr Eliyahu Goldratt conceived the Theory of Constraints and introduced it to a wide audience through his bestselling 1984 novel, ‘The Goal.’ Since then, the Theory of Constraints has continued to evolve and develop, and today it is a significant factor within the world of management best practices.

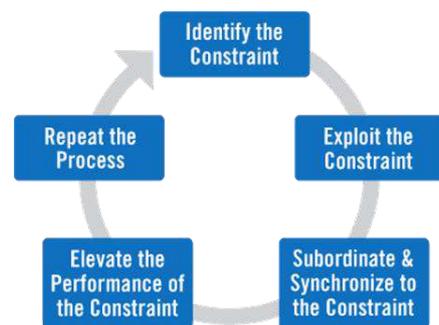
One of the appealing characteristics of the Theory of Constraints is that it inherently prioritises improvement activities. The top priority is always the current constraint. In environments where there is an urgent need to improve, the Theory of Constraints offers a highly focused methodology for creating rapid improvement.

Basics of Theory of Constraints

Core Concept

The core concept of the Theory of Constraints is that every process has a single constraint and that total process throughput can only be improved when the constraint is improved. An important corollary to this is that spending time optimising non-constraints will not provide significant benefits; only improvements to the constraint will further the goal (commodities on the shelf).

Thus, the Theory of Constraints seeks to provide a precise and sustained focus on improving the current constraint until it no longer limits throughput, at which point the focus moves onto the next constraint. The underlying power of the Theory of Constraints flows from its ability to generate a tremendously strong focus towards a single goal (profit) and on removing the principal impediment (the constraint) to achieving more of that goal. In fact, Goldratt considers focus to be the essence of the Theory of Constraints.



The Five Focusing Steps

The Theory of Constraints provides a specific methodology for identifying and eliminating constraints, referred to as the Five Focusing Steps. As shown in the following diagram, it is a cyclical process.

Step	Objective
Identify	Identify the current constraint (the single part of the process that limits the rate at which the goal is achieved).
Exploit	Make quick improvements to the throughput of the constraint using existing resources (i.e. make the most of what you have).
Subordinate	Review all other activities in the process to ensure they are aligned with and truly support the needs of the constraint.
Elevate	If the constraint still exists (i.e. it has not moved), consider what further actions can be taken to eliminate it. Normally, actions are continued at this step until the constraint has been “broken” (until another area has become the constraint). In some cases, capital investment may be required.
Repeat	The Five Focusing Steps are a continuous improvement cycle. Therefore, once a constraint is resolved, the next constraint should immediately be addressed. This step is a reminder never to become complacent: aggressively improve the current constraint... and then immediately move on to the next constraint.

The Nature of Constraints

What are Constraints?

Constraints are anything that prevents the supply chain from making progress towards its goal. In manufacturing and supply chain processes, constraints are often referred to as bottlenecks. Opinions differ on how to best categorise constraints; a common approach is shown in the following table.

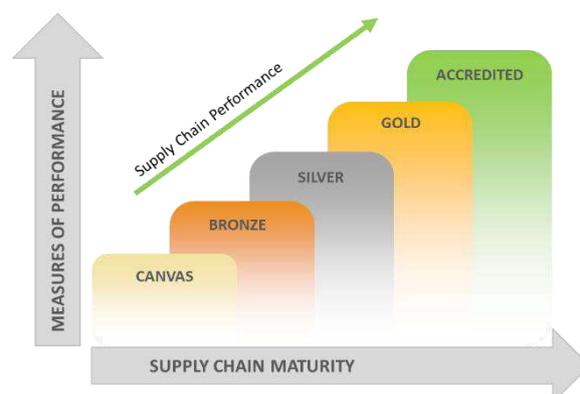
Constraint	Description
Physical	Can be equipment, but can also be other tangible items, such as material shortages, lack of people, or lack of space. <i>In public health, this is a clear area of investment, as assets and supplemental secondments are a heavy focus of investments.</i>
Policy	Required or recommended ways of working. May be informal (e.g. described to new employees as “how things are done here”). Examples include company procedures (e.g. how lot sizes are calculated; bonus plans; overtime policy), union contracts (e.g. a contract that prohibits cross-training), or government regulations (e.g. mandated breaks). <i>In public health, there are often conflicting policies and laws. Policies can be shifted once their impact is understood.</i>
Paradigm	Deeply ingrained beliefs or habits. For example, the belief that “we must always keep our equipment running to lower the manufacturing cost per piece.” A close relative of the policy constraint. <i>In public health, this is “the government must operate the public health supply chain”, or “pharmacists must dispense at every level of the supply chain.”</i>
Market	Occurs when production capacity exceeds sales (the external marketplace is constraining throughput). If there is an effective ongoing application of the Theory of Constraints, eventually the constraint is likely to move to the marketplace. <i>In public health, the impacts are under-developed supply chain markets that prevent supply chains from leveraging the market, such as access to forex, outsourcing, and talent.</i>

Theory of Constraints and the Maturity Model

The maturity model helps supply chains to quickly identify the main constraints or bottlenecks that pull down the performance of the supply chain. If we focus our efforts on these areas, then the performance of the supply chain will improve, and the next constraint will emerge. This continuous cycle of identifying and addressing dynamically shifting constraints will allow supply chains to quickly identify and address the most critical focus areas of the supply chain.

Consistent with the Theory of Constraints, a supply chain system should be rated based upon its lowest-performing capability. For example, a supply chain could have a new warehouse and logistics management information system (LMIS), but if it lacks a process for inventory management or financial management, it should then be scored by maturity level for inventory management and financial management. Until these capabilities improve, the system’s performance will not improve.

The maturity levels in the model are named after medals, like the ones in the Olympics. The idea is that maturity levels are earned, and supply chain teams should be proud of each level they achieve.



The lowest maturity level is called ‘canvas,’ with its connotations of ‘a blank canvas’ that is full of potential.

Comparing Maturity Levels

This section focuses on the general descriptions of the behaviour and characteristics of each maturity level.

Along the top of the table below the are the medal levels: bronze, silver, and gold. Along the left are characteristic categories. The purpose of this table is to describe, in practical terms, supply chains at each maturity level. For example, it is only at the silver level that we see a consistently functioning supply chain.

	Canvas	Bronze	Silver	Gold	Graduated
Features/Looks like...	<ul style="list-style-type: none"> • Very basic • Basics need to be stronger 	<ul style="list-style-type: none"> • Basic processes working • Manual and people-dependent • No process “controls” 	<ul style="list-style-type: none"> • Functioning supply chain • Visibility available 	<ul style="list-style-type: none"> • Consistently performing supply chain • Accountability structures 	<ul style="list-style-type: none"> • Accredited • Capabilities are consistently displayed • Independent from technical and financial assistance from external donors
Performance Indicators	<ul style="list-style-type: none"> • Focus on product availability at service delivery points • < 60% product availability • Limited visibility 	<ul style="list-style-type: none"> • 60-85% product availability • Basic visibility 	<ul style="list-style-type: none"> • 85-95% product availability • Full visibility • Some efficiency – e.g., less inventory needed 	<ul style="list-style-type: none"> • >95% availability • Efficiency – e.g., fewer touches, higher turns 	<ul style="list-style-type: none"> • Very lean; low process variability
Key Priorities	<ul style="list-style-type: none"> • Absolute basic capabilities 	<ul style="list-style-type: none"> • Access to cash • Basic visibility • Execute functions more regularly 	<ul style="list-style-type: none"> • Intentional process design • Product delivery to last mile vs. collection systems • Visibility to product, information, financials 	<ul style="list-style-type: none"> • Efficiency • Reducing waste in product, time, and money 	<ul style="list-style-type: none"> • Continuous improvement
Investor Implications	<ul style="list-style-type: none"> • Difficult to measure • Focus on progress towards capabilities 	<ul style="list-style-type: none"> • Limited data • “Soft skills” and performance management likely a focus 	<ul style="list-style-type: none"> • Data is available; sharing based on data use agreements 	<ul style="list-style-type: none"> • Governance, accountability, ownership, and leadership given data 	<ul style="list-style-type: none"> • Graduation

Performance indicators show what it is fair to expect a supply chain at each level to output. We find that bronze supply chains, for example, have 60–85% product availability. Product availability is always expressed as a last-mile indicator. This is important guidance for internal and external stakeholders so that performance expectations are consistent. Importantly, this can also be used as a proxy measure. If a supply chain does not have the ability to produce data or certain measurements, for example, the maturity level can approximate performance for stakeholders of the supply chain as a ‘good enough’ measurement.

Key priorities should steer the supply chain focus, donor focus, and partner focus. A supply chain at a gold level, for example, will focus on becoming very efficient. This helps to keep the various stakeholders focused so that the supply chain can make quicker and lasting progress.

Investor implications enable those domestic and international funders to have realistic expectations that are aligned with the capabilities of the team managing the supply chain. Taking data as an example:

- at a canvas level, there is no digital data, so we should stop asking for this and instead help the supply chain mature;
- at a bronze level, some data is starting to be available; and
- at a silver level, there is consistent data, but it is important to keep in mind that just because there is data, that does not mean it is all public.

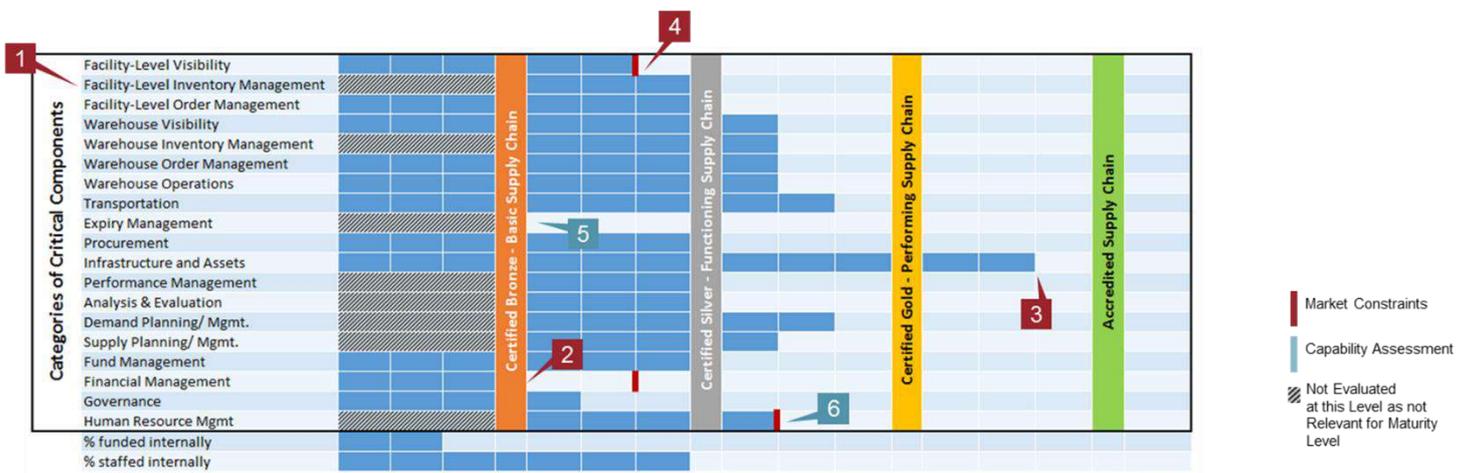
This simple comparison chart can be a powerful tool for supply chains and their stakeholders. A later section describes cases of maturity model usage in more detail. Alignment of realistic expectations is key, so supply chains are not asked or expected to complete activities that are appropriate to a much greater level of maturity than their supply chain has reached. In these cases, the result will be that the team is distracted by the need to fulfil a funder’s request, from strengthening the core supply chain processes and removing the dynamically shifting constraints.

Maturity Model Design

Taking the Theory of Constraints into consideration, this section explores and outlines the areas of the model. An example of the model output is below for illustration purposes.

Categories of critical components: critical components make up the heart of the model. These are the absolute minimum critical process and capability maturity elements that determine constraints and bottlenecks on the supply chain. These are not exhaustive descriptive statements; the model may, therefore, seem very light at first encounter.

These critical components are yes/no indicators that a supply chain team uses for self-assessment. An example is ‘the supply chain has the ability to know when a health facility needs more inventory.’ These critical components are grouped into categories, and by progress in maturity. They can be seen along the left of the output example below. Some categories are greyed out at lower maturity levels: there are no critical components in these areas.



1. Each category is **evaluated for process maturity**, based on specific yes/no criteria.
2. The **least mature areas** determine overall maturity level and resulting performance. In this case, bronze/ “very basic.”
3. Investing where a component is already strong is **unlikely to result in better performance**.
4. The **supply chain market maturity** impacts the capability, and therefore performance, potential of the supply chains functioning within it.
5. Increasing performance can be done through **investing in the weakest areas of a individual supply chains**.
6. Where **market constraints** exist, investing in removing those constraints may move the entire market forward

Identifying Supply Chain Maturity Level

Reading the model output provides several pieces of information. Refer to the above graphic (points 1-4).

1. **Categories of critical components** are listed along the left of the figure above. As mentioned, these include the yes/no indicators to determine maturity levels.
2. **Process maturity:** based on the Theory of Constraints, there are four categories of critical components between bronze and silver: Facility-Level Visibility, Expiry Management, Financial Management, and Governance. This means that until the components in these four categories have graduated to a silver level, the output performance of the supply chain will remain at the bronze level. The summary table in the previous section can be referenced for more information on what this means for the supply chain and stakeholders.
3. **Higher performing areas** can be easily identified in this maturity summary. In this case, Infrastructure and Assets is the highest performing area. It is important to note that additional investments of time, talent, or funding in this area are extremely unlikely to yield better supply chain performance. At times, supply chain improvement projects target areas that are already doing well,

with the idea that further focus will produce further performance improvements. If these decisions are being made, it is important that the investment should focus on the bottleneck and constraining areas, rather than on the areas already performing at a higher level of maturity.

4. **Market constraints** can be seen by the red vertical lines. These express the instances where a supply chain is unable to make changes to a constraint internally. For example, in Facility-Level Visibility, this supply chain is experiencing an external constraint which is stopping further progress. Perhaps they have implemented low-tech solutions across their supply chain but cannot achieve greater process maturity without widely available internet access.

Activity and Focus Guidance

Two types of focus and investments can be made for supply chains. These may be investments in internal supply chain talent and project time, or they may be external investments from donors. Refer to the above graphic (points 5-6).

5. **Increase performance of individual supply chain**, removing constraints on that supply chain and allowing a path to better performance.
6. **Increase the performance of a market**, removing constraints on all supply chains within that market.

Practically speaking, it is critical that funders and investors spend the short time of the assessment (less than one day) on understanding the current constraints and maturity level. This is to ensure a lasting impact for their investment. If an investor, for example, selects an investment area which is already a high performing area of the supply chain, their investment is unlikely to have an impact on performance or ongoing focus. Similarly, for internal supply chain investments (investments of staff time, for example), staff motivation will often be higher when impact related to their activity can be seen.

When investing in market changes, it is recommended that the maturity results for many types of supply chain in a market be considered. While there are advanced market analytics tools available, complementing those with the maturity model will ensure alignment with what these supply chains truly need to improve performance.

Sustainability Considerations

Below the model summary are two additional lines, indicating the percentage of activities which are funded and staffed internally. These are the two most important factors in determining whether a supply chain is ready to be self-sustainable and stand alone.

Funding augmentation: for supply chains functioning under resource constraints, it is not surprising that external funding sources will exist. It is extremely helpful to quantify exactly how much funding comes from internal and external sources, as the supply chain completes a costing baseline or ongoing cost management. This informs the supply chain to allow for data-driven conversations about financial sustainability.

Staff augmentation: supply chain talent is often difficult to find in frontier markets, and even more difficult in the public sector. It is not surprising, then, that external donors often augment staff by funding new positions. This is more concerning than funding augmentation, however. This externally-funded staff is often only in temporary positions; when they leave, they take with them their knowledge of their role. It is recommended that investment is made in internal staff development rather than in externally-funded staff. While internal staff turnover is also often high, investing in the development of internal staff is much more likely to lead to long-term organisational development, which is often greatly needed.

Key Points About the Model

These points are helpful to keep in mind while interacting with the model and reviewing the examples in this paper. These points apply specifically to global public health.

Some donors and partners tend to **focus on the lower maturity range of supply chains**. For example, supply chains functioning at a gold or accredited level are often either self-reliant or very clear about their needs from funders. Therefore, observations and available examples are more heavily clustered around the lower maturity levels.

Given ongoing resource constraints, it is also expected that these supply chains will progress to gold or accredited level and that this level of performance will be **sufficient to support the public health system**. This is an important point, as the scale of maturity described early in this paper focuses on the lowest levels of maturity when compared to a global, cross-industry scale. When discussing this model outside the global public health community, it may become apparent that the scales of maturity under discussion are different. This is to be expected.

Vertical supply chain systems which focus on a single area (HIV, Family Planning, MNCH, Routine Immunisation) are very often **externally funded and have more resources** than the supply chains which are internally funded by governments in frontier markets and resource-constrained environments. This means that these externally-funded, vertical supply chains often perform better than internally funded supply chains. This also means that “integration” efforts to combine processes from more than one supply chain will most likely take on the maturity level of the lower performing supply chain, based on the Theory of Constraints. It is recommended therefore that maturity levels of both supply chains be considered. Ideally, the aim should be to integrate those which already operate at a similar maturity level. This will reduce performance changes during and after integration.

There are **many supply chains functioning** within each country’s public health system, so it is critical to be clear on sub-national and sub-health-system maturity levels. For example, vaccine supply chain performance in one station or region will likely have a different maturity level in comparison with another state’s essential medicines supply chain. Avoid broad statements such as “Country X is a bronze.”

The **model can help support decisions** on issues such as outsourcing transportation. Certain capabilities are required for successful outsourcing, such as performance management. It is important to consider the maturity of these required capabilities. For example, if a supply chain has a canvas or bronze level of performance management maturity, it seems unlikely that an outsourcing program will work, even if the cost-benefit analysis shows significant cost savings. It is recommended that the maturity of these required capabilities be considered in these types of decisions.

Examples of the Maturity Model

There are many ways this model can be used. This section outlines some of those examples and offers descriptive case studies about supply chains at each level of maturity.

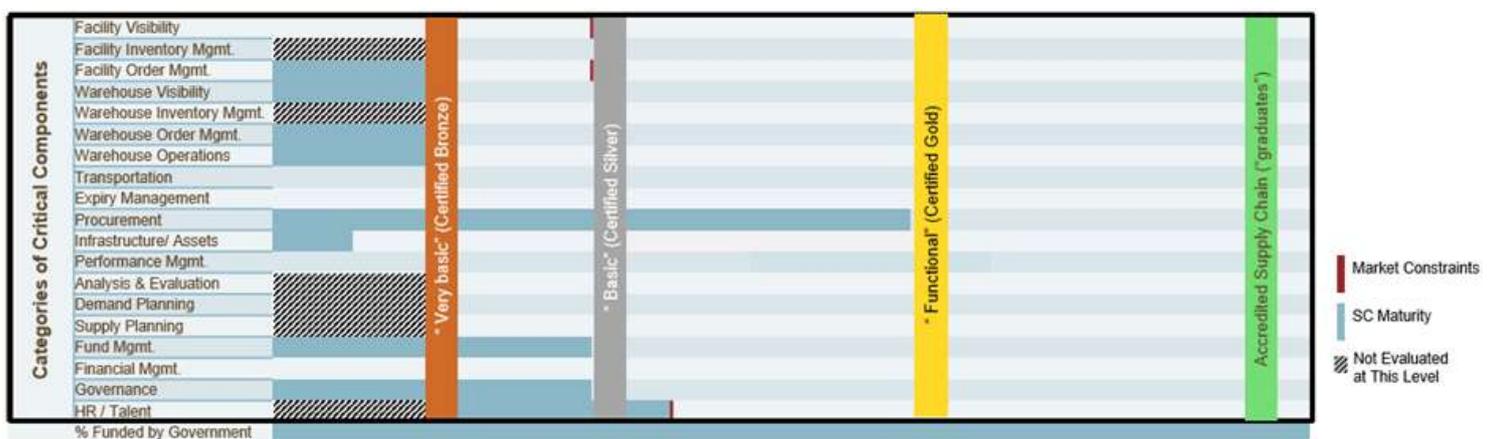
Canvas Maturity

The least mature level is called ‘canvas’ (as in ‘a blank canvas’) and exhibits much potential. Many areas of these supply chains are non-functional: for example, warehouses contain expired medicines; there is no proper way to locate inventory; facilities struggle to execute the recommended process; and so on. It can be overwhelming for teams to understand where to start.

Supply Chain A is a public health supply chain and relies on a defunct revolving drug fund (RDF) for facilities to order and collect their product. As shown in the visual below, there is no transportation/delivery capability in this supply chain. Vertical program commodities piggyback on RDF collection. However, this collection rarely happens; it can take more than three months for facilities to receive products. Instead, they turn to local markets for essential medicine, where same-day delivery is usual. In many cases, this is allowed under policy.

The result is that the supply chain procurement process, while functional and fairly nimble, has no purchasing power as facilities rarely buy through the state. The result is a supply chain with 40% availability of essential drug commodities at last mile. Supply Chain A is focused on defining a basic, functioning supply chain to serve the health facilities.

Supply Chain A: 40% Availability



Implications for accountability to donors: progress is difficult to measure at this canvas level, as little to no output data exists. Instead, process improvements (e.g. building roles and accountability structure, creating order management system, etc.) must be measured, and perhaps infrequent audits. Patience is required. It is recommended that the maturity level be used as a proxy measurement. Investments for a supply chain yielding less than 60% availability are unlikely to vary wildly, so this type of proxy should be sufficient for guiding investment decisions.

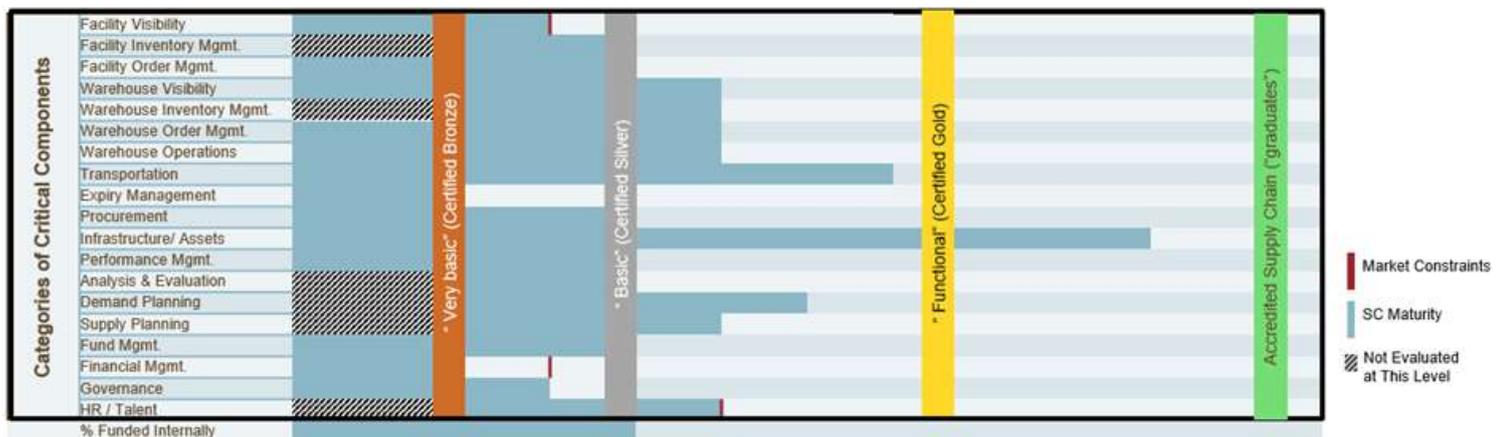
Bronze Maturity

Bronze supply chains are starting to become functional and are still fragile systems. The focus is on being able to more regularly execute basic supply chain fundamentals (e.g. order product, find inventory) rather than on optimising the process, whether executed in-house or outsourced to a private/parastatal organisation. Bronze supply chain systems often focus on functional and manual processes (such as orders submitted on hand-written notes) and are not yet demonstrating electronic/automated systems or developing warehouse processes that do not rely on people’s memories.

Bronze supply chains are very dependent upon the quality and commitment of their staff and on access to cash (internal or external). These supply chains may also face market constraints (e.g., they must train in-house staff as they are not able to hire from an externally developed talent pool).

Supply Chain B sits near the top of the bronze band, as reflected in their capabilities and in their performance. Past investments in this supply chain were in assets such as new warehouse buildings and vehicles, which drove its high capability in the infrastructure/asset category. Supply Chain B reports strong availability metrics, but there is a constraint on financial management, as there is no visibility into systems

costs. The observation is that this is an expensive, inefficient, and therefore unsustainable system. Access to data will be difficult unless it is made an explicit part of the granting process. Other areas that the supply chain needs to focus on are facility visibility, expiry management, and governance.



Supply Chain B: 80% Availability

Implications for accountability to donors: ideally, donors can hold countries accountable for performance in executing processes and basic performance data. However, data is often just beginning to become available in this bronze band and is often manual and time-delayed and not useful. Thus, many donors rely on data gathered through site collections and assessments to retrospectively identify issues and guide future investments; these are often expensive and time-delayed, not coordinated among donors, and the data is not useful for supply chain management. This is where a simple maturity model questionnaire and ability to rapidly confirm process execution may be particularly useful. It is again recommended that the maturity level be accepted as a proxy for more advanced numbers-based performance results.

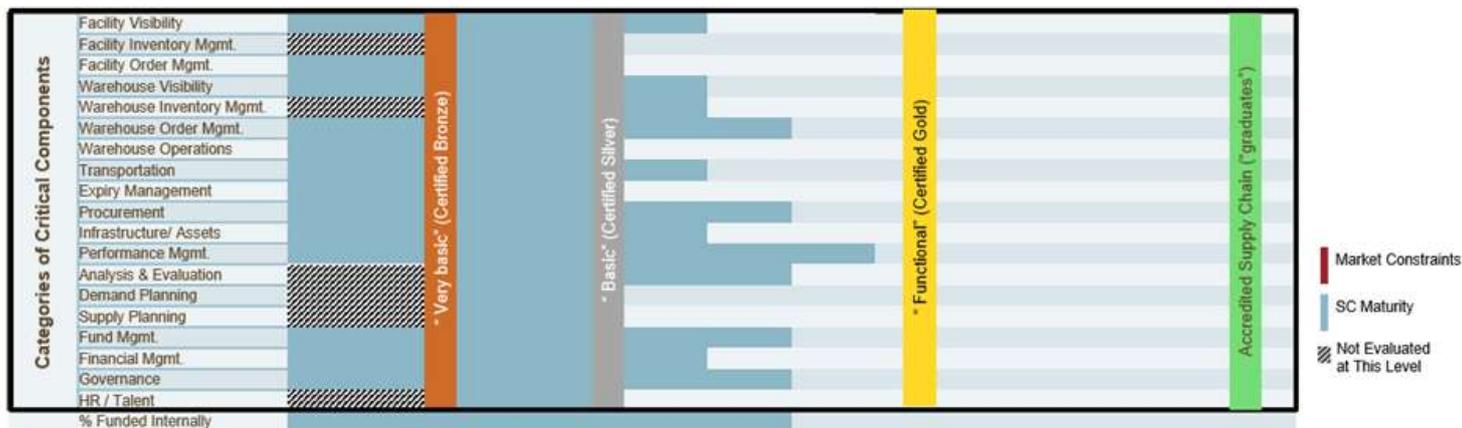
Silver Maturity

Moving from bronze to silver is about (1) moving from a focus on executing process effectively (achieving high availability) to reducing variability and costs in the process (improving consistency and efficiency), and (2) designing solutions that reach the point of care rather than requiring staff to collect from intermediary levels (district warehouses) – although this may result in variability across contexts. This level requires obtaining and using data on product inventory visibility, information/orders, and financials moving throughout the supply chain. The system may still rely on a mixture of *ad hoc* and standard processes, but the focus is on making the process “lean” – e.g. on removing variation in process execution, and on removing ‘buffer’ inventory that is put in place to mitigate against issues. At this level of maturity, there may be a lack of standards/benchmarks for governance. Systems may be in-house or outsourced.

Supply Chain C is a good example of a basic/silver supply chain system that has been successful in most states/regions in implementing health supply chain reform policy, though challenges still exist with state-level buy-in. The supply chain has basic components completed and has moved its focus towards establishing a country-wide control tower to increase visibility into all elements of the supply chain.

This supply chain functions within a mature market with access to quality private contractors from whom they can demand visibility, and a talent pool from which to hire government staff who are capable of managing the contracts. Governance and strong leadership have been a driving element.

Supply Chain C: 90% Availability



Supply Chain D is an example worth describing. It is at silver maturity level and is fully donor-supported. There is 100% external funding and several staff augmentations. This type of system, while functioning at a high level of performance, is unlikely to be sustainable because it is highly externally supported. The performance of the vertical supply chain system (95%) is better than that for other essential medicines (85%) within the same health system. Both supply chains use the same warehouse management system and electronic LMIS and have quarterly delivery cycles to health facilities. The vertical system performance goals, however, relate to efficiency, which results in performance improvement investments (process and KPI management), process documentation, and variation reduction. This efficiency approach is missing for essential medicines. The lowest scoring components for both systems are fund management and financial management.

Implications for accountability to donors: visibility is possible at this level of maturity, and the government probably has the data needed to measure or hold teams or outsourced agencies accountable. However, the donor’s ability to use this data depends on the government’s willingness to share it; implementing partners are often required to sign data-use agreements, which limit their ability to share data.

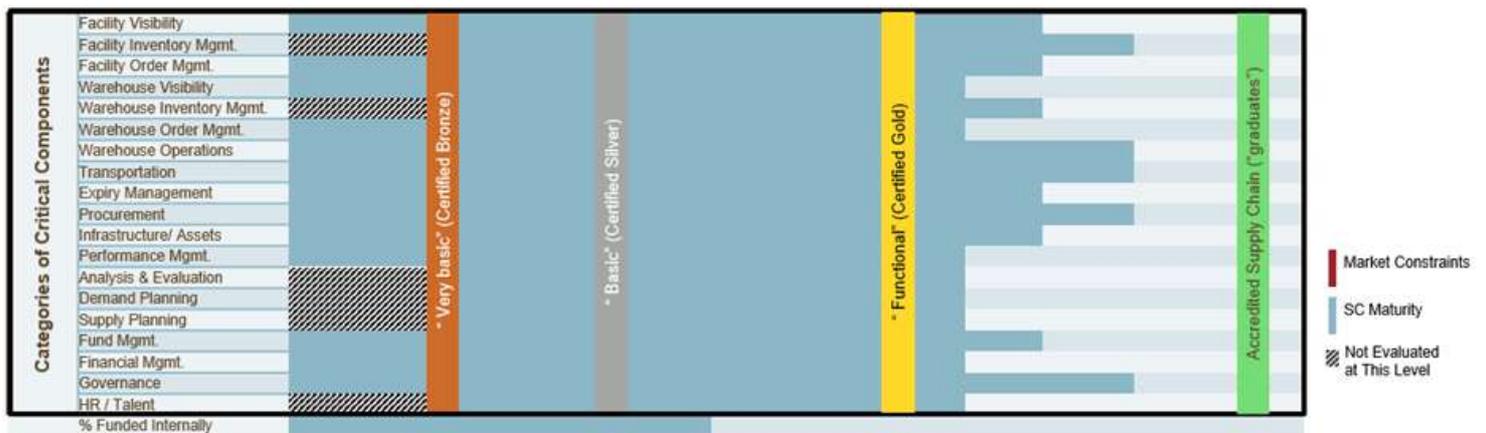
Gold Maturity

Gold systems use standard approaches, measure how each process contributes to the overall supply chain goal, and generally focus on performance and financial management. Governance, accountability, and ownership (all requiring country government leadership) become the cornerstone of this level of maturity.

Supply Chain E introduced a demand-driven approach to determining inventory levels for last mile locations. It adopted principles used in commercial distribution to deliver products to the last mile, rather than relying on staff from last-mile locations to pick up product from the warehouse.

The model involves contracted, dedicated private ‘third party’ logistics professionals (3PL) delivering contraceptives from the regional level directly to service delivery points (SDPs) every month. Inventory data is electronically collected during the delivery service.

Supply Chain E: 98% Availability



Implications for accountability to donors: given visibility into financials, inventory, and information/orders, it is more straightforward to hold these systems accountable regarding availability, visibility, and efficiency.

Accredited Maturity

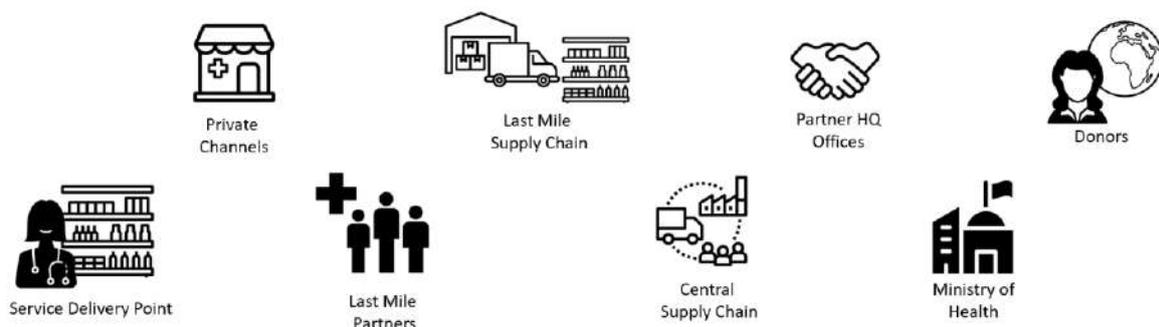
This band refers to countries that have graduated from donor support and are accredited as mature supply chains. These supply chains focus on elements such as the definition of success; analytics; demand and supply planning and tracking; clear governance; and financial management. They have strong operating and accountability structures to ensure standards are upheld. Supply chains often outsource essential functions to the private sector rather than build them and replace these contractors if/when they underperform.

Use Cases for the Model

The maturity model has many practical uses. This section outlines two categories: first, an exploration of model applicability to stakeholders at different maturity levels; and second, its various potential uses are explored.

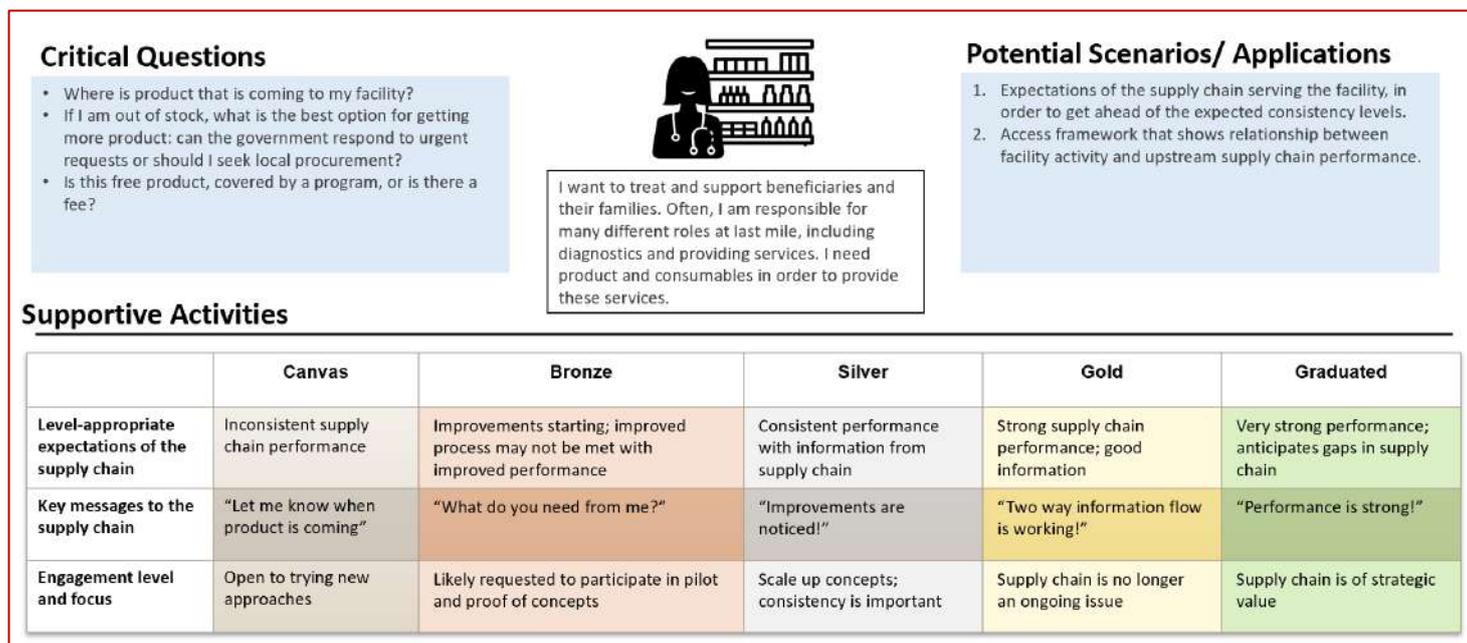
Model Applicability to Stakeholders

There are many stakeholders in a supply chain. Here, an example is given using common stakeholders in a public health supply chain:



Maturity Model Applicability at Last Mile Service Delivery Point

The level of maturity of the supply chain that supports individual service delivery points can set expectations of last mile staff and potential beneficiaries, as well as create a connection between last-mile action and supply chain performance.



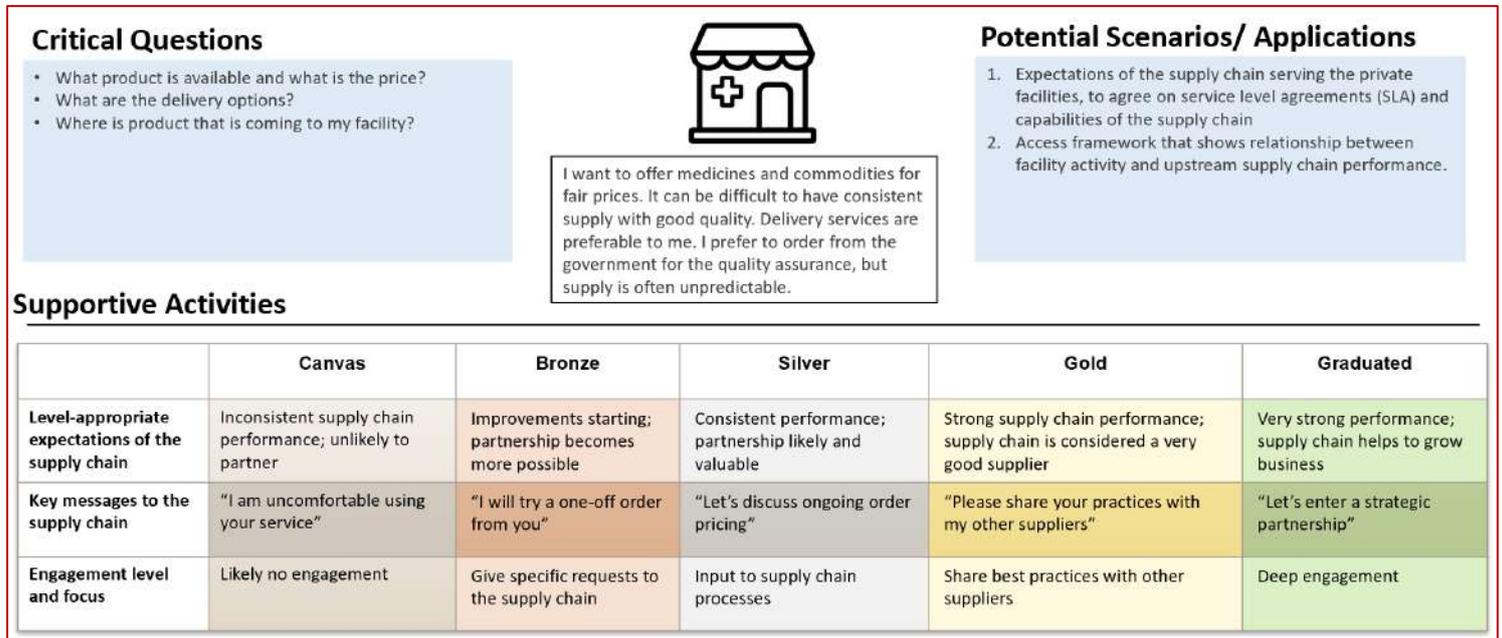
In this graphic, we see the health worker or doctor in the centre. It is very likely that she has many activities in her scope and is very busy. Her focus is to improve the health of the families in her community.

- On the left, there are critical questions that she asks as part of her job, such as seeking status of incoming products.
- On the right, there are potential scenarios or applications of the maturity model. For example, in expectation setting.
- Along the bottom are supportive activities this health worker can perform expectations she can have; key messages she can send; and the recommended level of engagement with the supply chain.

At the bronze level of maturity, there are some activities she can perform which will increase supply chain performance. From here, the supply chain needs openness to trying new approaches. It is likely she will have to endure pilots and proof of concepts, as the teams that support her try to find better approaches. Looking ahead to gold, however, supply chain will no longer be an issue for her, and she will have the product and supplies she needs to improve the health of her community.

Maturity Model Applicability for Private Channels

The level of maturity of the supply chain that supports private channels can set expectations of channel customers and drive sales. For the governments which allow supply chain sales to private channels, this can be a welcome source of revenue.



In this graphic, we focus on a private-channel shop or pharmacy. They are selling many items and are often challenged to find a consistent supply of quality product.

Taking the bronze level of maturity as an example, if a pharmacy knows that the supplying supply chain is a bronze, they will likely send a one-off order rather than enter into an ongoing pricing relationship. The pharmacy manager's ideal input would be to be very specific in what she needs from the supply chain. If the supply chain is silver, however, they may use something similar to a framework contract, and the shop or pharmacy may want to input into supply chain process changes.

Maturity Model Applicability for Last Mile Partners

The level of maturity of the supply chain supported by last mile partners can indicate the type of technical support, assistance, and focus that is most needed from a last-mile partner to improve supply chain performance.

Critical Questions

- What are the constraints and bottlenecks in this supply chain?
- What are the areas that require the most technical assistance? Am I able to offer that support?
- How do I best balance my budget with the needs of the supply chain?



We support the last mile supply chain with technical assistance and sometimes with product. We want to see commodities and necessary supplies in stock so that health outcomes improve. Often, I am responsible for many areas including supply chain.

Potential Scenarios/ Applications

1. Focus on constraint areas to inform workplans and areas of technical assistance
2. Ensure staff is trained in relevant areas of supply chain focus; ideally technical support staff should be trained 1-2 maturity levels above the supply chain staff

Supportive Activities

	Canvas	Bronze	Silver	Gold	Graduated
Level-appropriate expectations of the supply chain	Roles & responsibilities likely undefined	Early wins; starts and stops	Credibility is improving; consistent performance	Supply chain team is driving work; partners offer requested TA	Supply chain team setting best practices
Key messages to the supply chain	"Start small and break problems down"	"Promote your accomplishments and build momentum"	"Amazing work! Switch "muscles" to get to Gold"	"Tell us where you want to focus next"	"Share your learnings with others!"
Engagement level and focus	Many areas of opportunities; important to focus	Create momentum and use change management	Offer TA through deep expertise in key constraint areas	Performance is high; offer TA in self-sustaining and strategy	Document best practices to share across community

Fortunately, there are many partners at the last mile, offering technical assistance and other types of support. The maturity model can help inform work plans and focus areas. It can also guide hiring decisions for the last mile partner, as they can observe gap areas in the supply chain’s capabilities and hire to complement and develop those.

Maturity Model Applicability to Last Mile Supply Chain

The role of the last-mile supply chain agency is vital. Identifying and improving the level of maturity of the supply chain that supports the last mile can prioritise the team’s time and focus external offers of support. This team may be at a state, region, or district level.

Critical Questions

- Which facilities need what type of inventory?
- How can we improve consistency of product availability?
- How can we make the best use of offers of support from the MOH and partners?
- What are the areas we should be focusing on and including in workplans?



My role is to make sure product is on the shelf at last mile. Sometimes I am constrained by the upstream supply chain or lack of resources. Often, I am asked what type of support I need the most.

Potential Scenarios/ Applications

1. The team is already very busy and finding time to dedicate to process improvement is a challenge. The maturity model framework can be used to prioritize improvement projects.
2. There are many partners helping the team and sometimes working on uncoordinated projects. The maturity model can be used to focus and coordinate partners and workplans.

Supportive Activities

	Canvas	Bronze	Silver	Gold	Graduated
Level-appropriate expectations of the supply chain	Try new approaches to remove constraints and bottlenecks	Develop proof of concepts/ test cases that increase maturity levels	Scale ideas that work across more facilities	Remain consistent in continuously improving maturity	Be open to questions and suggestions when sharing with other supply chains
Key messages to the supply chain	"Willing to try new approaches that are connected to removing constraints"	"Constant feedback helps to know which approaches are working"	"Showcases what's working"	"Focus on efficiency"	"Let's share our knowledge with others in the community"
Engagement level and focus	Laying the foundation of basics	Basic visibility structures in place	Visibility to product, information and financials at last mile	Continuous improvement culture	Teaching back best practices

This team has a tough job of keeping a product in stock. The maturity model can help identify areas for improvement and communicate expectations to stakeholders. For example, time is scarce for process improvement projects; using the maturity model to identify bottlenecks will focus improvement efforts to where they will be most impactful.

Maturity Model Applicability to Central Supply Chain

The responsibility of the central supply chain team is vast. They must ensure that operations and management across the entire country are working well. Understanding underlying maturity levels will focus their support and align expectations.

Critical Questions

- Which regions need what type of inventory in the coming weeks/ months?
- What are the areas we should be focusing on and including in workplans?
- Where should I invest money or resources that will have the greatest impact?
- How do I show that we are improving?
- What is the current barrier to improvement?



Potential Scenarios/ Applications

1. Our budget is very constrained this year. The model can help prioritise supply chain activities in workplans.
2. The staff is looking for a process improvement project. We use the maturity model to understand capability gap themes across the supply chains in the country.
3. I need to be able to explain product availability across the country; I use the maturity model results to give indications of performance and set expectations.

My role is to make sure the entire supply chain is running well. Resource constraints are common, and I must prioritise regional orders and communicate expectations and performance results to national government.

Supportive Activities

	Canvas	Bronze	Silver	Gold	Graduated
Level-appropriate expectations of the supply chain	Communication is inconsistent and manual	Data is starting to become available, but only in pilot-sized sets	Data is just available; be positive with observation and feedback	Trust forecasts and order requests for accuracy	The benchmark; sponsor teaching trips to share approaches
Key messages to the supply chain	"Tell us how we can help you remove bottlenecks"	"Keep focusing on removing the next bottleneck!"	"Showcase what's working and teach it to others"	"Focus on efficiency"	"Let's share our knowledge with others in the community"
Engagement level and focus	Process improvement efforts focus here; assign staff with strong change mgmt. skills	Process improvement efforts focus here; assign staff with deep functional skills	Visibility may show mixed results; aim for a strong relationship not criticism	Continuous improvement culture	Teaching back best practices

The team at the central supply chain can use maturity to understand the variable performance and needs across the country. This can help segment facilities into meaningful groups and identify the type of support that they need. Budgets are often very constrained, and the maturity model can help the team identify themes of constraints across the country so they can focus their attention on those capabilities.

Maturity Model Applicability to International Donors

Critical Questions

- Where should I invest money or resources so they will have the greatest impact?
- What supply chain improvement activities should be in our annual workplan?
- How do I show that an investment made a measurable impact?
- How can I help align the community on priorities?
- How do we support government ownership?



I want to help. I want to see results and progress. Often, I need to show that my investment is helping to achieve a specific outcome. I need visibility to investment impact.

Potential Scenarios/ Applications

1. I want to invest in supply chain but don't know where I should invest first. The model can help determine where the investment will have the greatest impact.
2. A group asked for funding in an area that I don't think is a current priority. The maturity model can help facilitate conversations to agree on priorities and workplans.
3. I need to understand the impact of my work. The model can show where the supply chain has matured.

Supportive Activities

	Canvas	Bronze	Silver	Gold	Graduated
Level-appropriate expectations of the supply chain	Showcase examples from other places Advocate on their behalf	Processes are cumbersome and require human intervention	Visibility to product, information and financials are available	Strong performance and accountability structures are in place	Technical assistance and financial assistance are no longer needed
Key messages to the supply chain	"Failure is normal in process improvements"	"How can we help improve visibility?"	"Let's share information throughout the supply chain"	"How can we hold each other accountable for our commitments?"	"Let's showcase the supply chain to help others learn from your success!"
Engagement level and focus	We are here to support you!	Help pilot supply chain improvements	Scale up concepts and improvement projects	Key metrics drive conversations	Determine and execute roadmap for government ownership

Donors can use the maturity model to align with the government on strategy for continuous improvement and to incentivise partners to focus on inputs, rather than on doing the output work for visible results.

Donors want to help; often their focus and scope are so large that it is difficult to know what type of technical assistance or support is needed where. Using the maturity model to express constraints and roadmaps can help to align expectations among donors, governments, supply chains, and partners. For example, moving past endless pilots occurs when the supply chain gets to a silver level. Therefore, one approach to breaking the pilot cycle is to understand the constraints of the bronze supply chain and work together to remove them.

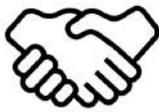
Similarly, the maturity results from many supply chains can be compared to observe if there are areas where most supply chains experience a constraint. One example may be financial management. If this is observed, a donor may want to heavily invest in improving the community's overall understanding of financial management, create public goods that can be used to support financial management, and fund technical assistance partners who understand financial management for supply chains in this context.

Maturity Model Applicability to Partners at HQ Offices

Visibility into the field can be a challenge for partners at HQ Offices. Teams use the maturity model to align with the community on a strategy for continuous improvement and to incentivise field partners to focus on sustainable technical assistance.

Critical Questions

- What are potential areas for future technical assistance?
- What supply chain improvement activities should be in our annual workplan?
- How do I show that an investment made a measurable impact?
- How can I work better across the community?
- How do we support government ownership?



Potential Scenarios/ Applications

1. I need to understand the impact of my work. The model can show where the supply chain has matured.
2. I need to offer support for in-field teams. The model helps me understand the skill sets I should hire.
3. I apply for grants and need an evidence base to draw from to indicate the type and location of need for technical assistance.

My role is to support in-field teams and liaise with donors, partners, and government. I need to show that my investment is helping to achieve a specific outcome. I need visibility to investment impact.

Supportive Activities

	Canvas	Bronze	Silver	Gold	Graduated
Level-appropriate expectations of the supply chain	Showcase examples from other places. Advocate on their behalf.	Processes are cumbersome and require human intervention	Visibility to product, information and financials are available	Strong performance and accountability structures are in place	Technical assistance and financial assistance are no longer needed
Key messages to the supply chain	"Failure is normal in process improvements"	"How can we help improve visibility?"	"Let's share information throughout the supply chain"	"How can we hold each other accountable for our commitments?"	"Let's showcase the supply chain to help others learn from your success!"
Engagement level and focus	We are here to support you!	Help pilot supply chain improvements	Scale up concepts and improvement projects	Key metrics drive conversations	Determine and execute roadmap for government ownership

Partners at HQ offices need to understand areas for assistance as well as the impact of the work. Both support the alignment to their organisation's mission and provide input for further grant applications to keep work going. For supply chains at bronze levels, they should understand how to help improve visibility in supply chains. They can use the maturity model to work with other partners to accelerate progress and amplify each other's work.

Ways to Use the Model

The model is in use in over 20 countries today. It is primarily used to guide supply chain team focus on removing constraints. There are many more potential uses for the model.

The model can be used:

- as a **fit-for-purpose current-state assessment** that is 'light' enough to be completed in a few hours and repeated at least quarterly. Many supply chains requiring external funding support are functioning at a canvas or bronze level. These supply chains do not always need a comprehensive, in-depth assessment of current-state capabilities and performance;
- as a **proxy measure** to showcase supply chain performance in the case that data is unavailable or unable to be shared. This is a powerful mechanism to use to build trust among partners, reduce the burden on supply chain and partner staff (who often are required to do multiple surveys to capture current state), and celebrate capability improvements;
- as an **expectation setter**, as discussed in the previous section;
- as a **guide for activity prioritisation**, where teams focus their funding and efforts on areas which are constrained. In the case that many supply chains are under consideration, priority can be set based on patterns and trends in the areas where many supply chains are constrained;

- **as short-term-plan** generators, where teams can select one or two critical components which are currently constraints. They can create short-term plans (three to six months) to address these constraints and make progress in eradicating them;
- **for mid-range planning**, where teams can observe the overall trends of constraints and create the right plans to address them. For example, if several constraints emerge which relate to financial management and performance management, mid-range plans (six to 18 months) can be created and executed, focusing on building staff skill-sets and capabilities to address these constraints;
- as input into a **long-term strategy**, where teams identify their next major maturity level and create the mechanisms to achieve it. For example, if visibility categories have been the biggest constraining areas, the team can develop a visibility strategy and execute it in the months ahead;
- as a model for developing a **self-sustaining supply chain**. For many years, the development community has focused on ‘sustainability’ across many areas of public health. We find that ‘sustainability’ can have several definitions and meanings for different stakeholders, which makes it a challenge to have a clear conversation with the government; or
- **to bring together different industries**, such as commercial and development, which enable staff from commercial organisations to donate their time to supply chain teams functioning under resource constraints. The maturity model provides a common language to identify and solve problems together.

Using the Model

This section outlines how to use and facilitate the model and is written for users.

Understanding the Model Sections

The screenshot in the next page is a view of the model, v7.

Supply Chain Maturity Evaluation		Country:		Commodity Type(s)		HIV:		
Version 7.0 (English)		District/State/Province:		Family Planning:		Malaria:		
		Date of Completion:		Reproductive Health:		Tuberculosis:		
		Names of Team Completing Evaluation:		Essential Medicines:		Other:		
		Private/Public/NGO:		Vaccines:				
Maturity Category	Basic ("Bronze" capabilities)	"Bronze" Capabilities (Select Yes, No)	Mkt Constraint	Functioning ("Silver" capabilities)	"Silver" Capabilities (Select Yes, No)	Mkt Constraint	Performing ("Gold" capabilities)	"Gold" Capabilities (Select Yes, No)
B Service Delivery Point (SDP) / Health Facility (HF) Visibility	<ul style="list-style-type: none"> Some visibility to inventory and consumption at some facilities, monthly (at least 20%). 			<ul style="list-style-type: none"> Visibility to inventory and consumption at most facilities, twice per month (greater than 80%). Some information provided to facilities (about warehouse inventory, upcoming shipments, health programs). 			<ul style="list-style-type: none"> Digital (near real time; 1 week or faster) visibility to inventory and consumption at all facilities (100%). Information about upstream supply chain (inventory and shipments) provided to all facilities. Data connected to larger supply chain digital software platform. 	
	Service Delivery Point (SDP) / Health Facility (HF) Inventory Management			<ul style="list-style-type: none"> Policy on how much inventory should be kept in the facility. Inventory policy reviewed on a defined schedule. 	C		<ul style="list-style-type: none"> Inventory segmentation used (reviewed quarterly). Regular (at least quarterly) inventory level audits (cycle counts). 	
Service Delivery Point (SDP) / Health Facility (HF) Order Management	<ul style="list-style-type: none"> Ability to determine that facility needs more inventory. Ability to determine order amount for facility (can be manual). 			<ul style="list-style-type: none"> Order amount is based on inventory policies. 			<ul style="list-style-type: none"> Digital order management process is in place or process to digitize within 1 day. Takes into account orders already placed but not received. Order amount considers health facility budget. 	
Warehouse Visibility	<ul style="list-style-type: none"> Ability to locate specific product within warehouse. 			<ul style="list-style-type: none"> Ability to track inventory levels. Ability to track order status. 			<ul style="list-style-type: none"> Use electronic WMS with batch and bin tracking. Visibility to incoming and outgoing inventory (past and future). WMS connected to supply chain platform. 	
Warehouse Inventory Management				<ul style="list-style-type: none"> Dynamic policy on how much inventory should be kept at the warehouse with defined min / max levels. 			<ul style="list-style-type: none"> Inventory segmentation used (reviewed quarterly). Regular (at least quarterly) inventory level audits (cycle counts). 	

Section A records the characteristics of the supply chain and the date of the assessment.

Section B shows the categories of critical components.

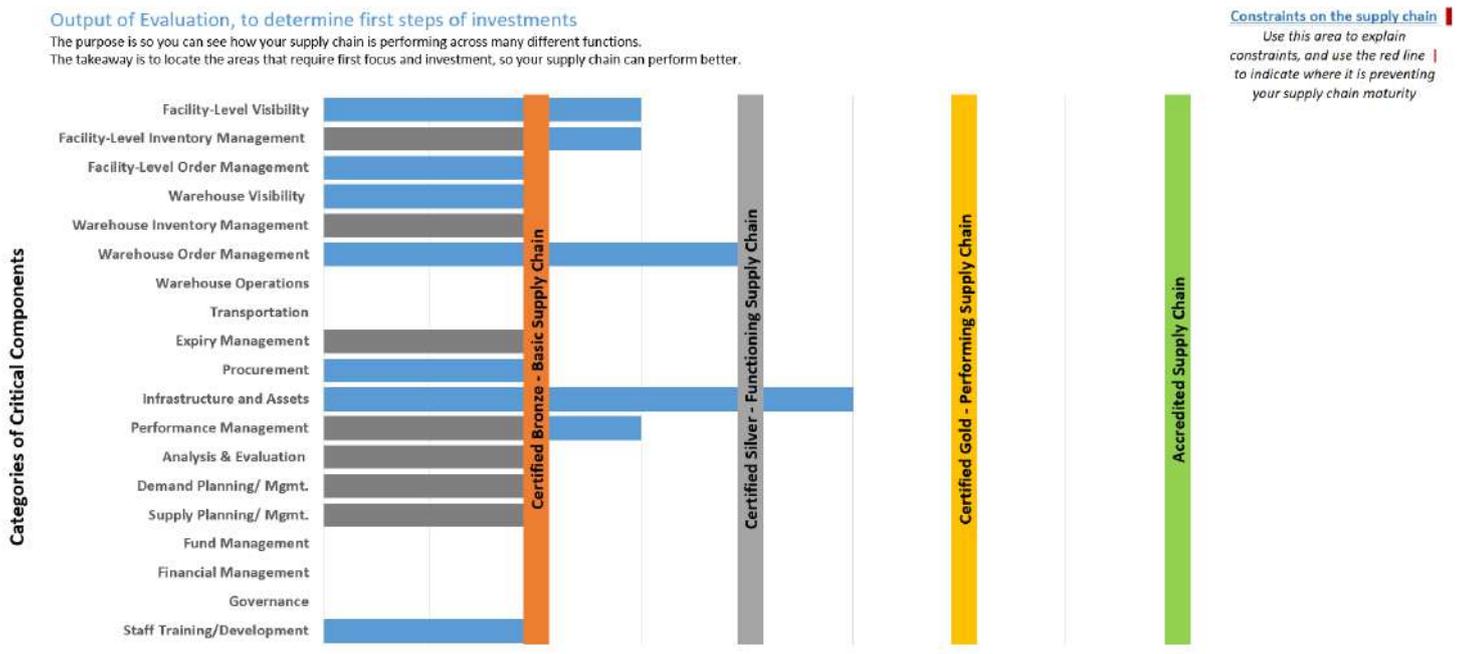
Section C shows the critical components by maturity level.

Users go through these critical components and select ‘yes’ or ‘no’ if the supply chain has the complete capability or not. A ‘no’ is not bad; it is merely a capture of the current state. If the component is close to becoming a capability, the progress can be captured during the next maturity model assessment. If the supply chain is constrained by external factors, mark the component as a ‘market constraint’ and discuss this with your stakeholders.

These assessments can occur at any time. Each time they do, they capture the current state of dynamically shifting bottlenecks and change in capabilities. These serve as vital information and proxy data for supply chain performance.

It is critical to consider the outcome as a statement of fact rather than as ‘good’ or ‘bad’. Remember, supply chains exist along a continuum, and the maturity model was created to capture this.

Once the assessment is complete, see the results on the ‘Output’ tab and refer to the [‘Maturity Model Design’](#) section on guidance on reading the output and identifying current-state maturity level.



Be proud of your model, share it with your stakeholders and community and ask that they join in celebrating progress in maturity and supply chain performance.

Minimum Viable Interview

Ideally, the supply chain team takes two to three hours to complete the self-assessment. However, if time is short and there are many unknowns, an analyst or interviewer can ask the following qualitative questions and glean enough information to populate the model for a directional maturity result.

1. Is there visibility into the consumption and inventory at the facility? If so, what percentage is visible?

2. Is there visibility into the consumption and inventory at the warehouse (warehouse closest to the SDP)? If so, what percentage is visible?
3. How does inventory physically move from a warehouse to the facility? Is there delivery confirmation?
4. What are the market constraints pushing on the supply chain (industry or policy) that prevent strong performance?
5. Does the government pay for a portion of the supply chain? If so, what portion and what functions are affected?
6. Is the government staff augmented by other organisations? If so, what functions are affected?
7. Is the cost of the supply chain (financial flow) tracked and reviewed?
8. What is the availability of commodities at last-mile (or the best guess they have)?
9. What is the formula for measuring availability and cadence for measurement at the last mile/SDP?

Improving the Model

The model was originally created with input from supply chain teams in frontier markets and has used feedback and input from dozens of teams to improve. It will continue to need input from teams like yours and from teams representing supply chains in resource-constrained environments. Join the community and provide your thoughts and feedback, as well as your examples and success stories, to info@pamsteele.co.uk.