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Leveraging data to establish local supply chains

Rethinking value creation to support local content in Saudi Arabia

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Content

Introduction

Businesses and countries have acknowledged the supply chain disruption they have witnessed in the past years and have concluded that they need resilient supply chains to sustain the future. However, building a resilient supply chain for the future requires more than just aligning supply with demand or having a robust supply chain infrastructure, or redrafting policies and regulations around it.

A resilient supply chain of tomorrow will be connected, transparent, and available to decision-makers to respond to the changes in the market faster. Tomorrow's successful organizations will adopt an agile, flexible approach to business transformation. They will focus their budgets on targeted, high-impact, modular strategies: cloud-enabling or outsourcing some parts of their supply chains as a priority; hybridizing some — but not all — supply chain management roles to incorporate greater data science capability; or migrating non-standard manufacturing to micro supply chains while retaining their mature global networks for the manufacturing of standardized products and parts.

At its core, companies need to utilize data to understand supply chain material flows — a critical requirement to move from strategic intent to realizing a sustainable supply chain. Organizations could use this data-backed supply chain in making key business decisions around energy security, GDP contribution from priority sectors, labor market, and export-import of industrial products.

While countries embrace the digital transformation, there is also a need to leverage this transformation to boost local content. Many countries are developing initiatives around integrating supply chains and developing supply chain value maps across supplier tiers to the customer.

Leveraging cross-functional data and exploiting micro supply chains are some of the action points that organizations could undertake to have a future-ready,

resilient supply chain. While embarking on this journey, it is also essential to build management capability and the vision to attain an ethical and sustainable supply chain.

In Saudi Arabia, several entities were established over the last decade to activate new policies and legislation with the aim of accelerating the implementation of local content development in the country and transforming the Kingdom into an industrial powerhouse. There is a lot of focus and rethinking on developing an ethical, data-driven, and sustainable supply chain in the Kingdom and utilizing it to drive localization.

This paper presents our approach to tomorrow's supply chain, and dives into how Saudi Arabia is embracing this digital change and its vision and approach to leveraging data to establish local supply chains.

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Data during disruption

Organizations are faced with an increased level of disruption and global risks exposed within their global, regional and even domestic supply chains. Trade flow interruptions caused by pandemics, natural disasters, geopolitical instability, demand and supply variability, geographic and supplier specific challenges are all different kinds of events impacting global supply chains, resulting in potentially severe consequences for businesses. Organizations have realized the importance of using big data to proactively manage supply chain risks and better prepare their network for external disruptions.

As a consequence of supply chain disruption, each country has now started looking inwards on how to strengthen its local supply chain and embrace the agility of the future. The backbone of a strong supply chain network is a well-integrated, robust database enabling the stakeholders to make key business decisions.

As businesses compete and countries develop initiatives to strengthen their local supply chain, they'll become increasingly reliant on data. Imagine, with a click of a mouse or a swipe of a touchscreen, your customer will set your production line in motion, realigning your supply chain in real time to deliver a personalized, frictionless experience. Imagine drawing on data, from smart devices in the field and third parties, to segment your customers and develop separate micro supply chains to service their needs more effectively. Imagine responding to tariffs and regulatory change by seamlessly moving your entire operations from one geography to another — within weeks.

Tomorrow's successful organizations will utilize digital platforms, cameras and Internet of Things (IoT) sensors to collect, integrate and interpret data from across the enterprise. They'll harness advanced analytics to turn those data points into actionable insights, and leverage cognitive technologies and robotics automatically to execute some actions and support evidence-based human decision-making for others.

Now imagine your country using the digital platform to visualize the local capacity of manufacturers, predict the supply-demand dynamics of industrial products and use this database to promote local industries and products. Countries who are reshaping their supply chain and introducing the digital fabric into the system are expected to sustain the future.
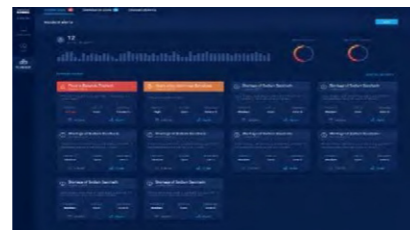
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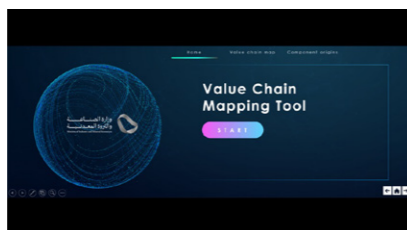
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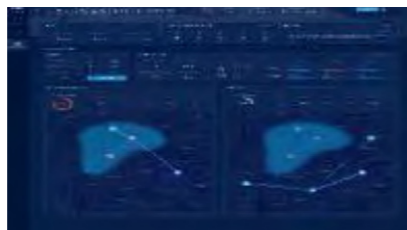
Forecasting events

Supplier, product and raw material

Supply chain data platform

KPMG Spectrum Third Party Intelligence

Figure 1:
Challenges, solutions and action points for supply chain management

Challenges	Solutions and initiatives	Action points
Demand challenges – high variability Supply challenges – domestic and international Logistics and manpower challenges Customer satisfaction challenges	End-to-end supply chain visibility	**Create enhanced real-time visibility from supply to delivery** • Develop supply chain value map across multiple supplier tiers all the way to customers • Build automated supply chain dashboards encapsulating real time information of supply chain status • Gain insight singular and respond faster to risks by leveraging predictive analytics
	Integrated supply chain	**Establish integrated planning to balance demand, resources and supply** • Realign supply chain operating model, integrating the various functions along with the support information systems • Implement integrated supply chain planning processes including demand forecasting, supply planning and delivery planning • Determine optimal inventory levels based on the category risk profile, business risk appetite and target customers service levels
	Process excellence and customer experience	**Re-engineer supply chain processes and customer journeys** • Segment customers based on supply chain criteria • Redefine customer journeys in the new normal • Design customer-centered supply chain processes
	Network re-engineering	**Re-engineer warehouse and logistics networks** • Review the existing distribution network to identify bottlenecks and find alternatives such as hub and spoke models, pooling models etc. • Re-engineer last-mile deliveries, align transportation modes and partner with carriers and distributors partner
	Cost reduction	**Reset cost profile to improve profitability** • Review and analyze overall cost-to-serve to reduce non-value adding activities • Review and reduce direct as well as indirect spend
	Supply chain risk management (SCRM)	**Mitigate diverse risks across the supply chain through multiple interventions:** • Develop a supply chain risk management framework and put in place best-in-class supplier risk management practices • Evaluate near-shore options with a good mix of local suppliers to shorten and de-risk supply chains • Review alternate suppliers following a multi-tier risk assessment of current suppliers based on supply criticality

Figure 1 lists common impending supply chain challenges. Organizations need to develop targeted initiatives and action items to integrate their supply chains, realigning the operating model and business strategies.

Leveraging data to support local content

The Ministry of Industry and Mineral Resources (MIMR) has embarked on a journey to boost the localization efforts in the industrial sector. These efforts are driven by Vision 2030 and the National Industrial Development and Logistics Program (NIDLP), with a primary focus on the energy, mining, industry, and logistics sectors.

Vision 2030 has outlined clear localization objectives and has set the focus on sectors that are identified as most promising. That includes the chemical industry, which has been identified as one of the most promising ones by NIDLP, and where the country aims to localize 70% of the future supply chain of basic and intermediate chemicals across eighteen prioritized specialized chemical groups. Similar aspirations exist for the food processing and military sectors, expected to be localized to 85% and 50% by 2030, respectively.

Currently, manufactured parts in the Kingdom constitute less than 10% of the annual spending on spare parts. Over the next decade, Saudi Arabia plans to spend more than SAR1 trillion in purchasing industrial equipment and spare parts (excluding military). These investments are predominantly set to be spent overseas (75%) with limited value-add to the local economy – this presents an opportunity for a significant localization of the supply chain for industrial products.

To achieve this level of localization and increase Kingdom's agility, the Kingdom is laying foundations of strengthening the local supply chain via digitalization.

The Kingdom's efforts are driven by two key areas of focus: developing local content and implementing concepts of the Industrial Revolution 4.0. The latter is expected to create fundamental shifts in how the global manufacturing industry and its supply network operate, with significant improvements in efficiency, interconnectivity, automation, and velocity. As global supply chains become more complex, and continue to be sensitive to disruption, it makes sense to call for national agendas and development of local content. Transparency across supply chains is a critical factor to make informed decisions on local content development. The ministry recognizes that the sector's growth agenda require product information to be collated, organized, and made available to all stakeholders.

The institutional focus revolves around establishing the Local Supply Chain Development Initiative (LSCDI) – to align with NIDLP's theme of local content, the National Industrial Strategy (NIS) and the Local Content & Government Procurement Authority (LCGPA), to ensure a reliable, relevant, and robust database of value chain use cases is available. Such database of the supply chains then becomes a key enabler of the industrial ecosystem, offering a clear pathway towards achieving localization and economic prosperity.

The availability of accurate data and the implementation of a sustainable data strategy will be key to support policymakers and investors in their industrial and supply chain related decisions. Such data is critical for the government to develop a well-designed ecosystem with a supporting regulatory framework, while it will enable investors to assess their potential portfolio and identify and manage risks.

Collating data, maintaining and sharing the database among various stakeholders is an ongoing initiative by MIMR. It requires seamless coordination between the key entities involved in Saudi Arabia's localization program, including the Ministry of Finance (MoF), Ministry of Investment, Saudi Industrial Development Fund (SIDF), General Authority for Military Industries (GAMI), and General Authority of SMEs (Monsha'at), in addition to the aforementioned LCGPA. Some of these entities must also work closely with the Saudi Customs to ensure all the industrial products are classified and coded with international standards to track their production, export, and import.

To present our vision on implementing a local supply chain program and having a resilient supply chain, three key questions need to be considered:

1) What are the learnings that Saudi Arabia can obtain from the local content programs/policies developed by other countries?

2) How can Saudi Arabia leapfrog other countries by rethinking their local supply chain development to help the industrial sector grow?

3) How could the different government entities involved in local content development coordinate their efforts to establish a country-wide cross-sector supply chain data system?

Learning from others

What are the learnings that Saudi Arabia can obtain from the local content programs and policies developed by other countries?

There is no single template to implement a local content program. Each country has a unique mix of natural resources, and local capabilities, and should therefore aim to define its own strategy and set of policies and tools to promote local content. The exemplary local content policies produced more cautionary tales than cases of success.

Both the success stories and the failed attempts present learnings for Saudi Arabia and aid to evaluate how to best adapt those learnings to its unique reality. Local content covers a wide range of topics and approaches, ranging from mandated targets for the procurement of local goods and services to the review of contracts, development of manpower and training. This section discusses strategies and policies aimed at the development and enablement of value chains.

Local content in the oil and gas industry

Local content policies are commonly used in resource-rich countries with varied goals and degrees of success. In oil- and gas-rich countries like Norway and Brazil, there was an aim of strengthening their national supply chains creating a network of local suppliers by giving purchase preference to local products and services. In both cases investors reacted quickly, increasing the proportion of local content very rapidly.

In Norway, this index grew from 28% in the early 1970s to 62% by the end of the decade. Government efforts also targeted the integration of the naval and construction industry, allowing the local production of platforms.

How did Morocco become a new hub of the automobile industry?

Over the last decade, Morocco's automobile industry exhibited the fastest growth rate amongst the top 30 car-producing countries in the world, growing at an astonishing average annual growth rate of 28% between 2010 and 2019. Despite having a small internal market, Morocco produced over 400,000 vehicles in 2019. How did a lower-middle-income country accomplish this feat?

Morocco's automobile industry story represents a successful government intervention. In 2009 the country launched the National Pact for Industry Emergence, defining the automobile industry as one of the prioritized sectors. A key element that supported the endeavor was the investments made in logistics infrastructure, with a dedicated railway line to get the vehicles to the Tangier-Med port, and excellent roads.

To support the incoming industries, Morocco offered training to qualify the cluster's recruited staff at the Moroccan technical institutes. The cost of labor has also been an attraction point, but so was a stable political environment and consistency of policy. Besides providing land, power supply, and tax incentives, the government also went out of its way to cut red tape and facilitate operations for companies operating in the cluster. King Mohammed VI,

who championed the strategy of rapid industrialization of Morocco, also supported the initiative by courting his Gulf peers and traveling to sub-Saharan Africa to develop markets and obtain financing.

An orientation to foreign markets, where shortcomings in efficiency and quality are ruthlessly exposed, was also key to develop a competitive industry. Today more than 80% of the production is destined to exports, making cars the number one export product of Morocco. This has been partly supported by various free trade agreements the country signed with Europe, Turkey, and UAE, among others.

The results for the country include export revenues of over US$10 billion a year and the creation of 220,000 direct jobs. Most of those are related to the roughly 250 suppliers that were established in the country over the last decade, showing that the country had some success in creating backward integration in the industry by stipulating the use of local suppliers. Renault became the anchor company of the cluster, with 10% of the cars it produces globally now coming out of the Tangier and Casablanca assembly plants, which account 60% of its final product as local content.

Local content policies are commonly used in resource-rich countries with varied goals and degrees of success. In Norway and Brazil, two countries rich in oil and gas, there was an aim of strengthening national supply chains, creating a network of local suppliers by giving purchase preference to local products and services. In both cases, investors reacted quickly, increasing very rapidly the proportion of local content. In Norway, this index grew from 28% in the early 1970s to 62% by the end of the decade. Government efforts also targeted the integration of the naval and construction industry, allowing the local production of platforms.

Whereas Brazil had uneven results in promoting the national industry using local content policies, the case of Norway is considered a resounding success. Part of that result might be due to its early mover advantage. Other factors that contributed to its success can however serve as a learning for other countries aiming to develop their local suppliers.

The first important distinction between both countries' interventions was Norway's focus on innovation and technical qualification of the local suppliers, which allowed them to become internationally competitive and draw over time most of their revenues from outside the Norwegian market.

To achieve that goal, the government required operators to develop projects to advance local suppliers' competencies, and most of the R&D activities had to be performed in Norwegian entities. In 1979, Norway introduced the so-called Goodwill Agreements with the international operators, through which those received points when contracting R&D in Norwegian institutes. Those points served as a bonus when they were bidding for concessions, and the transfer of technology was more highly valued than financial contributions.

To support this strategy, the Norwegian government invested heavily to create new research and training institutions, which were integrated with all supply chain links: operators, equipment suppliers and engineering services firms. This approach enabled strong bonds to develop between universities and local suppliers.

Finally, the state also supported the creation of integrated service companies, also known as EPCs (engineering, procurement and construction). In a segment dominated by large American companies, Norway was able to foster smaller and more specialized companies such as Aker-Kvaerner and

Vetco Aibel, which became global players. Over time, as local players became stronger and more competitive, and partly moved by the EU's requirements in the late 90's, the Norwegian government was able to open up the market and phase out incentives.

Meanwhile, in Brazil, local content is measured by expenditure. Focus is placed primarily on the participation of domestic partners within the oil and gas value chain, as the procurement of goods and services from those partners. However, despite high levels of local content in both goods and services in Brazil, higher costs and delays in delivery stymied local companies from achieving its production and financial targets due to these challenges. Companies, including the state-owned Petrobras, have paid fines for failing to meet local-content requirements. The balancing of stakeholder interests in the implementation of the local-content policy has caused the interpretation of the policy by authorities and certification agencies to change frequently since it was drafted in 2004. As a result, suppliers spend considerable time and money planning and ensuring compliance, and this has led to voices to make the regulations even more flexible and consistent to ensure the sustainable development and growth of the overall petroleum industry. Local content in Brazil is relatively high due to decades of nationalistic oil policies and protectionism. Tough local content requirements have stifled oil firms' investment interest in Brazil. They have raised that complying to the rules made oil development in open blocks unprofitable. Brazil is looking to cut local content requirements for future oil contracts in a bid to satisfy the demands of local suppliers and allow new customs breaks for oil majors active in the South American country.

Key takeaway

Investments in supply chain infrastructure, strong local value chain, and an integrated industrial ecosystem allow policymakers to have a holistic understanding of the parts that need to be put together to develop a successful program instead of focusing on incentivizing single products and services.

Rethinking local supply chain development

How can Saudi Arabia leapfrog other countries by rethinking their local supply chain development to help the industrial sector grow?

The strategic directions to boost promising sectors in Saudi Arabia have been set out by NIDLP. In its assessment, NIDLP identified 15+ sectors in the Kingdom that would need screening to define priorities and ensure maximum value generation via localization.

Prioritizing sectors would require an initial assessment of their maturity within the Kingdom and region, using a set of selected (but non-exhaustive) assessment parameters such as share of GDP contribution,

demand (local, regional, global), capacity to attract foreign direct investment, barriers to entry, capacity to generate employment, sales, and exports.

The sectors in focus should also be aligned with the objectives of Vision 2030, which defines mining and energy sectors among its top priority sectors. As a next step, all the products of these promising sectors need to be assessed and prioritized to explore their localization potential.

Figure 2:
Factors to assess sector maturity

Percentage of GDP
Export growth
Demand
FDI attractiveness
Barriers to entry
Employment
Sales

The gamut of industrial products manufactured under each industrial segment needs to be assessed with respect to a prioritization framework that will aid in developing a clear roadmap to unlock their true localization potential, illustrated in Figure 3 (non-
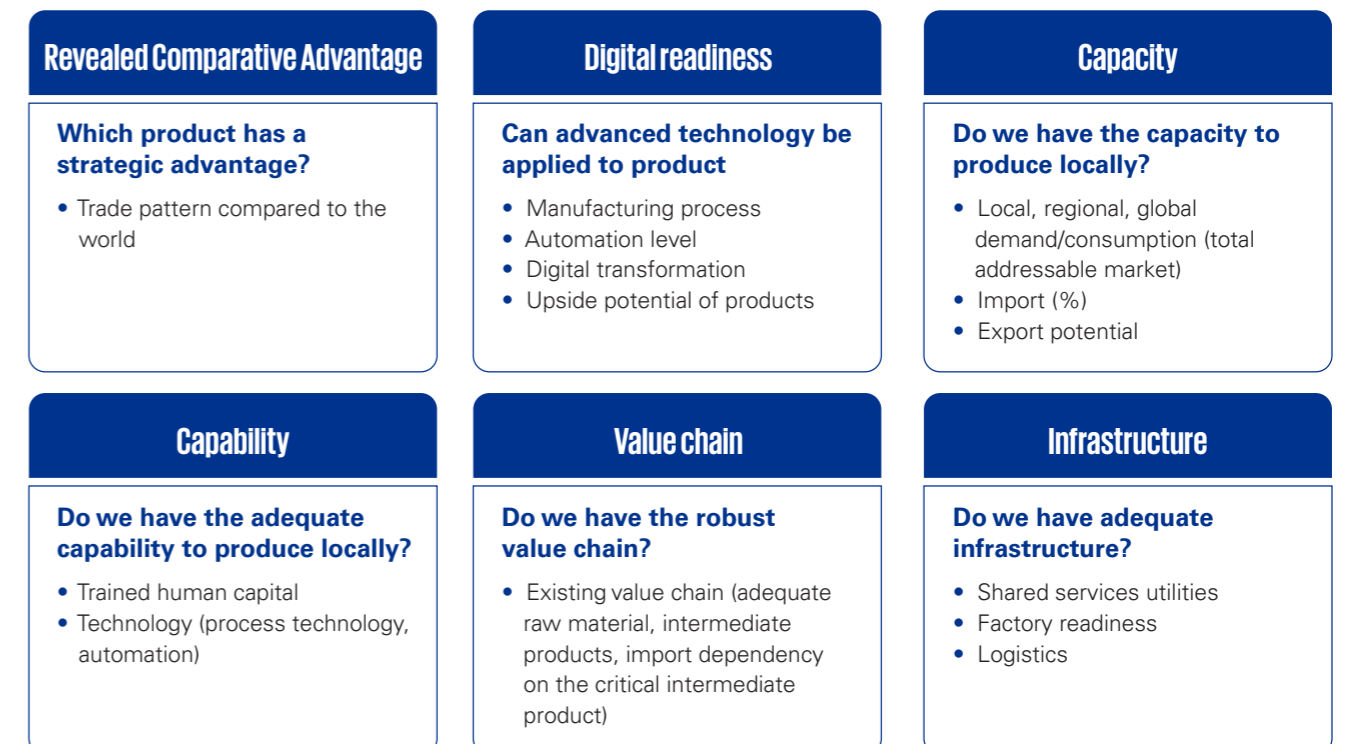
exhaustive). Broadly the framework can be divided into six dimensions: Revealed Comparative Advantage (RCA index), Digital readiness, Capacity, Capability, Value chain, and Infrastructure.

LSCDI has been established with the purpose of providing an information platform and tools that lead to the establishment of local supply chains that are integrated, sustainable, and which are expected to facilitate the development of locally integrated industries.

Once implemented and operational, the LSCDI will help in raising awareness of local supply chains –the structure, the gaps, database, supporting industrial network, and increasing visibility of SMEs. It will also provide manufacturers the access to large orders from state-owned enterprises, government procurement, and enhance regional awareness and access. Open government best practices, such as that of the US Office of Management and Budget, are leveraged by Saudi Arabia to help enhance transparency and competitiveness on government procurement.

The first phase of the LSCDI, which was recently concluded, focused on describing the local value chains, identifying gaps, and identification of use cases. It will be followed by the identification of import

Figure 3:
Prioritization framework

Revealed Comparative Advantage	Digital readiness	Capacity
Which product has a strategic advantage? • Trade pattern compared to the world	**Can advanced technology be applied to product** • Manufacturing process • Automation level • Digital transformation • Upside potential of products	**Do we have the capacity to produce locally?** • Local, regional, global demand/consumption (total addressable market) • Import (%) • Export potential
Capability	**Value chain**	**Infrastructure**
Do we have the adequate capability to produce locally? • Trained human capital • Technology (process technology, automation)	**Do we have the robust value chain?** • Existing value chain (adequate raw material, intermediate products, import dependency on the critical intermediate product)	**Do we have adequate infrastructure?** • Shared services utilities • Factory readiness • Logistics

gaps, supply chain data collection, and the development of taxonomies and business cases. To help enable the identified opportunities, the LSCDI aims to also develop a value chain database with product and services codification system, set up a business intelligence platform and dashboard, and define supply chain business linkages.

Each industrial product will contain information of its unique code, using more than 110 data parameters such as value chain components, manufacturing process, local production, import, export, and industrial complexity index among others.

This comprehensive dashboard will have unique features that will help policymakers and investors visualize the status of the products, which sectors to prioritize, maturity of local content, training requirements, and investment outreach plan. Supply chain data from both public and private sector will be utilized to feed a variety of use cases, as indicated in Figure 4.

This initiative covers 15+ sectors (e.g., chemicals, heavy equipment, pharmaceuticals, building materials, textile) including more than 10,000 products at an HS12 level.* LSCDI will capture the full details for these sectors and products, including local content

information, to allow more transparency of their value chains to the stakeholders.

This will also allow the supply chain maps of these products to be analyzed and enable the identification and measurement of added value to the product. LSCDI also aims to develop the value chain for industrial products in alignment with Saudi Arabia's industrial strategy. An example of the break-down of a value chain can be seen on Figure 4 below.

The acceleration of the Fourth Industrial Revolution in Saudi Arabia is also an essential part of the NIDLP plan in supporting the efforts to promote localization of industrial products. It also stresses on the importance of the localization of technologies that reduce dependence on labor and external companies in a wide range of activities, thereby helping to ensure business continuity in all circumstances.

NIDLP also works to support the innovation of advanced technologies and ensure that all its focus sectors benefit from artificial intelligence (AI) such as seaports, factories, mines, and smart electricity grids, to support improving operations and analytical capabilities across all the sectors to ensure that they can take proactive actions towards future crises.

With an aim to transform Saudi Arabia into a leading industrial powerhouse and international logistics hub, the latest venture came from the NEOM project, with the announcement of Oxagon, set to become a leading modern manufacturing and industrial R&D facility. Oxagon is also positioned to be one of the world's most technologically sophisticated logistics centers, with state-of-the-art integrated port and airport connections. Its ambition to balance

technology, economy, and environment within a well-functioning city aims to attract, retain, and promote innovators from all around the world. At Oxagon, factories will be built across seven priority manufacturing sectors: renewable energy, autonomous and sustainable mobility, modern construction, water innovation, sustainable food production, health and wellbeing, and technology and digital.

Figure 4:
LSCDI value chain data strategy and example of use cases
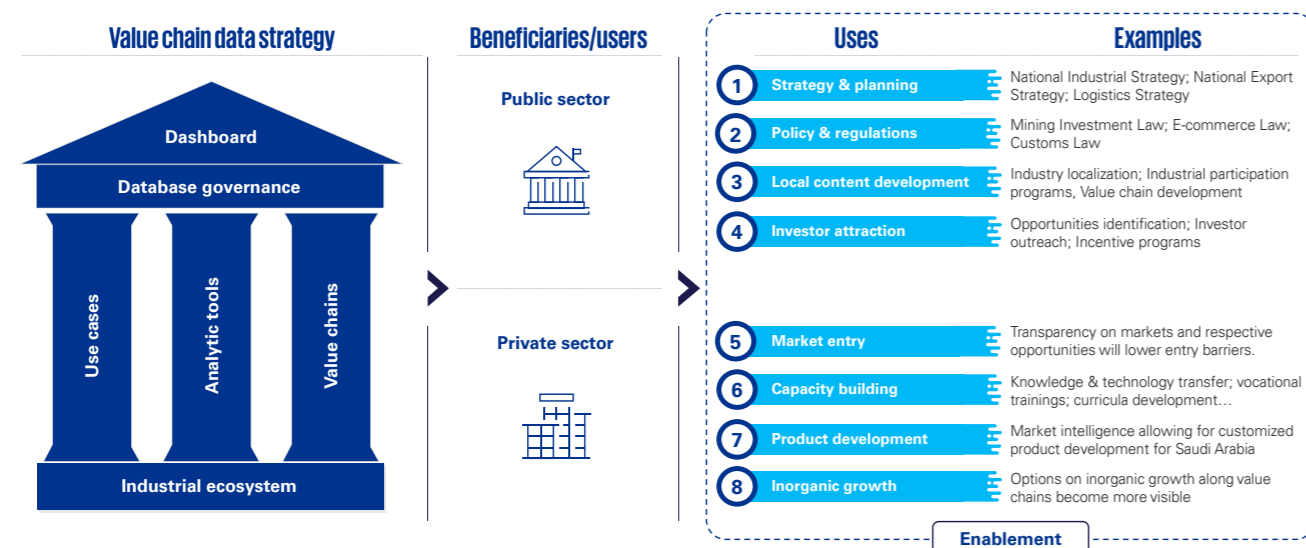
* HS code is short for Harmonized Commodity Description and Coding System, a list of numbers used by customs to classify a product.

Figure 5:
Example LSCDI value chain data
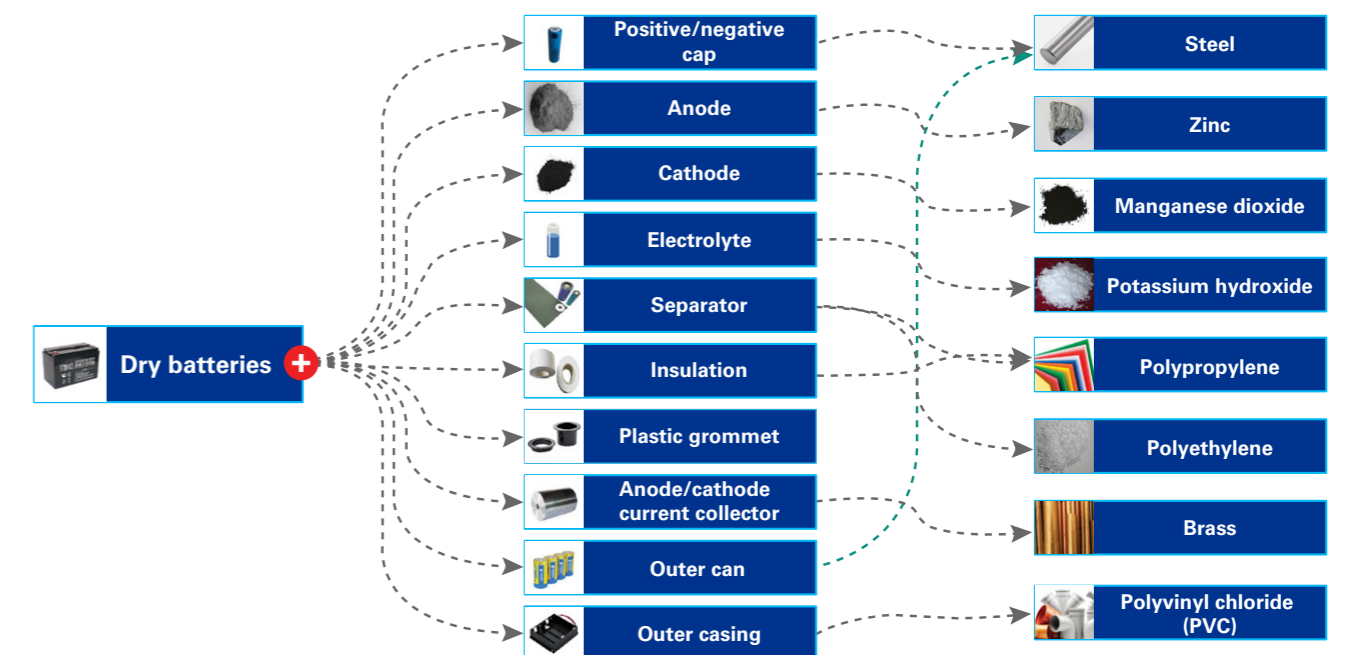
Working as an orchestra

How should the different government entities involved in local content development coordinate their efforts to establish a country-wide cross-sector value chain data system?

As the responsibilities of governments become increasingly complex and more entities with clear mandates are established, the critical challenge is to ensure alignment between these enabling organizations. Close coordination among entities with regard to policies and actions will allow LSCDI achieve its commitment in supporting local supply chains in Saudi Arabia.

To tap into localization opportunities, the industrial ecosystem must first gather the status of these products in the Kingdom, considering their demand, supply, technology and capital requirements. Gathering status of 10,000+ products will require strict data governance and data integrity protocols. NIDLP has set clear plans to gather and manage data related to industrial supply chains.

With MIMR spearheading the initiative, the National Industrial Information Center's (NIIC), role to lead and orchestrate the coordination of data and information among all the entities to promote localization.

As use cases are rolled out, participating stakeholders are expected to step up in different roles:

- **Entities involved in use cases**
  Use cases of the involved entities are the starting point of the overall initiative. Those entities should ensure efficient and sensible use of data, as well as provide direction on the activities to be performed.
- **Entities in advisory role**
  Some entities that are part of the larger industrial landscape are expected to provide direction to the initiative.

- **Entities directly involved in project delivery and quality control**
  The key stakeholders which are expected to be more closely engaged with the initiative and leading the quality control process.

To ensure a smooth implementation of the use cases and coordination among the key entities involved, a governance structure with well-defined authority and accountability has been defined. It includes a steering committee, as well as a technical committee. The former will provide strategic direction for project activities and oversight of key project outcomes. The latter will provide ongoing monitoring of project tasks and inputs to guide engagement activities. With these steps, Saudi Arabia has the potential to pave its path to becoming a global powerhouse of the manufacturing sector and support the Kingdom's goal of building a resilient future.

The road ahead

A strong supply chain network is a key enabler for a country's resilience and ability to provide for their local needs while playing a major role in the global supply chain linkages. The disruption of the global supply chain witnessed after 2019, has challenged this resilience from multiple fronts.

Managing business continuity during disruptive times became a primary concern. This can be achieved by developing greater resilience through the build-up of a world-class digitally enabled supply chain. Here, a multi-modal network integrates all manufacturers, factory owners, investors, government entities and promotes collaboration with suppliers, enhancing operational performance and reinforcing sustainable ways to cater to Saudi Arabia.

Addressing challenges in global supply chain disruptions would mean that organizations would have to re-invent their processes, business continuity approach, adapt digitalization solutions, and break away from business-as-usual mindset. Resistance to this shift can be expected due to the quantum of investment and efforts that would be required. However, the government should prioritize responsive operations and supply chains as these would lead to an impactful digital transformation and provide a reliable data repository that can be shared with the investors for potential investment opportunities.

So how do organizations initiate the supply chain transformation? Our recent KPMG publication, The future of supply chain: The road to everywhere, presents six recommendations:

Put the customer first

Today's market leaders no longer think of their supply chains as a linear series of inputs and flows. Instead, they are building interconnected, digitally-enabled and predictive networks with the customer at the center. At the heart of these successful business models is a reliance on digital platforms to connect them directly with their customers, boosting engagement and helping them win and retain customer loyalty in an increasingly fickle marketplace. Platform-enabled, customer-centric sales models allow organizations to control the customer experience end-to-end, leveraging a mix of digital technology, personal interactions, and physical experiences to build utility, convenience, and delight into their transactions in a way that creates customer expectation. Leading organizations don't react to changing customer expectations, they determine the level of service that sets the standard for their competitors.

Utilize the platform effectively

It's not only customers enjoying unprecedented levels of choice and convenience as a result of emerging technologies. The rise of digital platforms has opened supply chains up to a world of new possibilities. Using slick digital interfaces, suppliers are now able to do business directly with retailers or customers. Even the elements of the supply chain itself — from planning through manufacturing and inventory to fulfillment — can now be purchased 'as-a-service' from third-party providers and managed through platforms. Finally, platforms enable manufacturers and logistics companies to become 'as-a service' providers themselves, creating new revenue streams by monetizing surplus capacity.

Win the war of talent

Tomorrow's supply chains look to be intelligent, predictive, and self-correcting. They'll collect data from an ever-increasing array of sensors, cameras, and applications, using advanced machine learning algorithms to monitor and adjust automatically detected discrepancies between designed and actual performance. An exponential increase in the volume of available data is already putting pressure on market-leading organizations to recruit specialist analysts capable of turning that data into insights that can cut costs, diversify products and drive sales. And it's not just data scientists; tomorrow's businesses will need specialists in AI, blockchain, robotics, and cyber, too. However successful organizations aren't just trying to snap up hot digital talent and then calling the problem solved. They're developing strategies and programs that continuously enhance their workforces, allowing them to adapt to an ever-changing landscape.

Understand the importance of sustainability

The supply chain brings to life the ethical and sustainable vision of a business. Supply chains and procurement are only as resilient as their weakest link; therefore, business continuity relies on us thinking about their impact on people and the planet. An ethical and connected network means embracing the digital platforms that enable visibility and collaboration, educating and supporting key third parties, and taking bold steps in empowering consumers to make informed buying decisions.
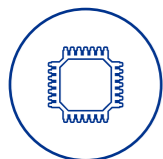
Leverage cross-functional data

Supply chain automation and digitization don't just reduce costs and drive efficiencies; it generates vast and ever-increasing quantities of digital information. Many organizations already use predictive analytics and machine learning tools — overseen by teams of data scientists in so-called 'control towers' — to analyze, integrate and interpret this data in real-time, enabling them to preempt rising costs, and expose process bottle-necks and augment decision-making.
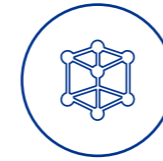
Exploit micro supply

Micro supply chain models represent a far more profitable approach to delivering variety than yesterday's one-size-fits-all operating models because they allow businesses to run multiple standard work processes in parallel, significantly reducing the costs of complexity associated with accommodating multiple variations within a single standard process. But they're not only an effective means of enhancing customer-centricity and reducing complexity costs and cost to serve. Because they're aligned with specific customer segments, micro supply chains enable businesses to react faster to changes in specific corners of the market. Micro supply chains often shift production and distribution from remote global manufacturing hubs to locations that are much closer to the end customer. They combine traditional mass-production methods with small-batch modular techniques, ensuring items remain as generic as possible for as long as possible and exploiting recent advances in 3D printing technology to finish and personalize goods near the point of delivery. It's a model that relies on agile partnering and fluid, 'as-a-service' relationships instead of long-term contracts and capital-intensive fixed assets, and it's highly flexible.

MIMR is well-positioned to remodel and transform the supply chain network by ensuring the one thing that connects the multi-faceted industry – data – which when made available can be used to integrate all the stakeholders and ensure supply chain resilience.

With MIMR and NIDLP sitting at the center of this data enablement and digital transformation, they have a critical role in supporting the ministry in managing the data. The massively increased flows of data would require ongoing data stewardship in the form of a data governance framework. These governance frameworks would include taxonomies, codification, naming conventions, closed-loop data correction paths, and collection protocols. MIMR is already evaluating how to align its internal systems with global best practices on codification systems along with Saudi Customs requirements (Harmonized System Codes and Item Number Codes).

Ministries such as MIMR would have to look further on how to enhance capabilities to embrace this shift and consider system infrastructure, digital skills, and experience needed to manage these independently moving parts efficiently. Effective collaboration is the key to a successful transformation. Saudi Arabia is undergoing a very promising transformation phase. With an objective to increase locally sourced products and services as well as adopt Industrial Revolution 4.0 technologies, it has a clear sector strategy to improve supply chain efficiencies. The optimized use of supply chain data sits at the heart of this objective. Once the data from multiple sources are established, integrated, and made available, each priority sector would witness the key decisions springing from data-driven solutions.

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