



# Seizing the Trade 4.0 opportunity

How governments can lead global, digital commerce  
in Industry 4.0

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**T**HE DIGITALIZATION OF commerce in Industry 4.0—the application of advanced digital technologies to production and operations techniques—is revolutionizing how the world **makes, transports, and sells** goods. Enter **Trade 4.0**, which is transforming global trade ecosystems at an unparalleled velocity and creating significant market and economic shifts. All facets of international trade—from processing of goods at ports of entry, to security of supply chains, to formulation of trade agreements—are adapting to this wave of transformation.

To navigate this increasingly complex global trade environment, government agencies and businesses should consider reimagining their roles across the three trade archetypes<sup>1</sup> of **facilitator, enforcer, and negotiator** of Trade 4.0. They should do this even as they contend with global health and socioeconomic problems. Government and industry leaders should also address the challenges arising from global commerce at the intersection of digitalization and globalization. To do this, they

can link Industry 4.0 transformations with Trade 4.0 transformations and vice versa.

## To navigate the global trade environment, government should reimagine its role across the three trade archetypes of facilitator, enforcer, and negotiator of Trade 4.0.

The opportunities offered by Trade 4.0 seem endless. To tap into them while mitigating the risks, government should take steps to increase its prowess in Industry 4.0 technologies, hone its data analytics capabilities, forge public-private-partnerships (PPPs) to protect its citizens and trade partners, and strengthen its human capital. We offer a framework that government can consider as it navigates the intersection of digitalization and globalization in the new world of Trade 4.0.





# Reimagining the cross-border flow of goods

*Picture this:* A fresh-out-of-the-academy customs officer returns from a break to her 3 a.m. shift processing cargo along the US-Mexico border. Having just completed a 2,000-mile nonstop journey, an 18-wheeler approaches the US port in El Paso, laden with a 40-foot container full of goods. As the truck rolls up to the booth, the officer should ask the driver for his identification, what he's carrying, and, perhaps, how he made it from Guatemala City in two days. But she does none of these things—after all, she's 2,000 miles away in Buffalo.

Sitting in her cubicle in Buffalo, the officer examines the X-ray and nonintrusive inspection scans on her screen, taken when the truck was 500 yards from the border. The AI algorithms detected no drugs, weapons, or explosives among the 200 packages from 15 importers packed into the container—which doesn't surprise the officer. She knows the shipper and the importers are all members of a PPP between Guatemala, Mexico, and the United States and they electronically shared detailed information about the goods and the journey with all three countries along the way.

The truck rolls past the officer-less booth without stopping, as there's no driver to process for

immigration and health screening in the autonomous vehicle. The truck was automatically screened as it arrived at the port and our officer has all the information she needs for the truck's customs entry, having received and matched the manifest of its contents the day before. Thanks to a traceable digital thread, she has the required information to process the 200 imports—from their additive manufacture outside Guatemala City, their Internet of Things (IoT)-enabled autonomous transport, their tariff classification recently negotiated in North America for 3D printed goods, to their destinations in the hands of 200 individual consumers, each of whom bought these items four days ago at an online marketplace.

The officer moves on to process the next truck in her queue, this one headed to Blaine, Washington, in record time. Not bad for her first night shift!

The notional example above illustrates the potential of digitalization to transform global trade. However, this transformation would include not just the public sector—as imagined above—but also the production, transportation, and sale of goods around the world.

# Industry 4.0: The digital thread transforming global trade

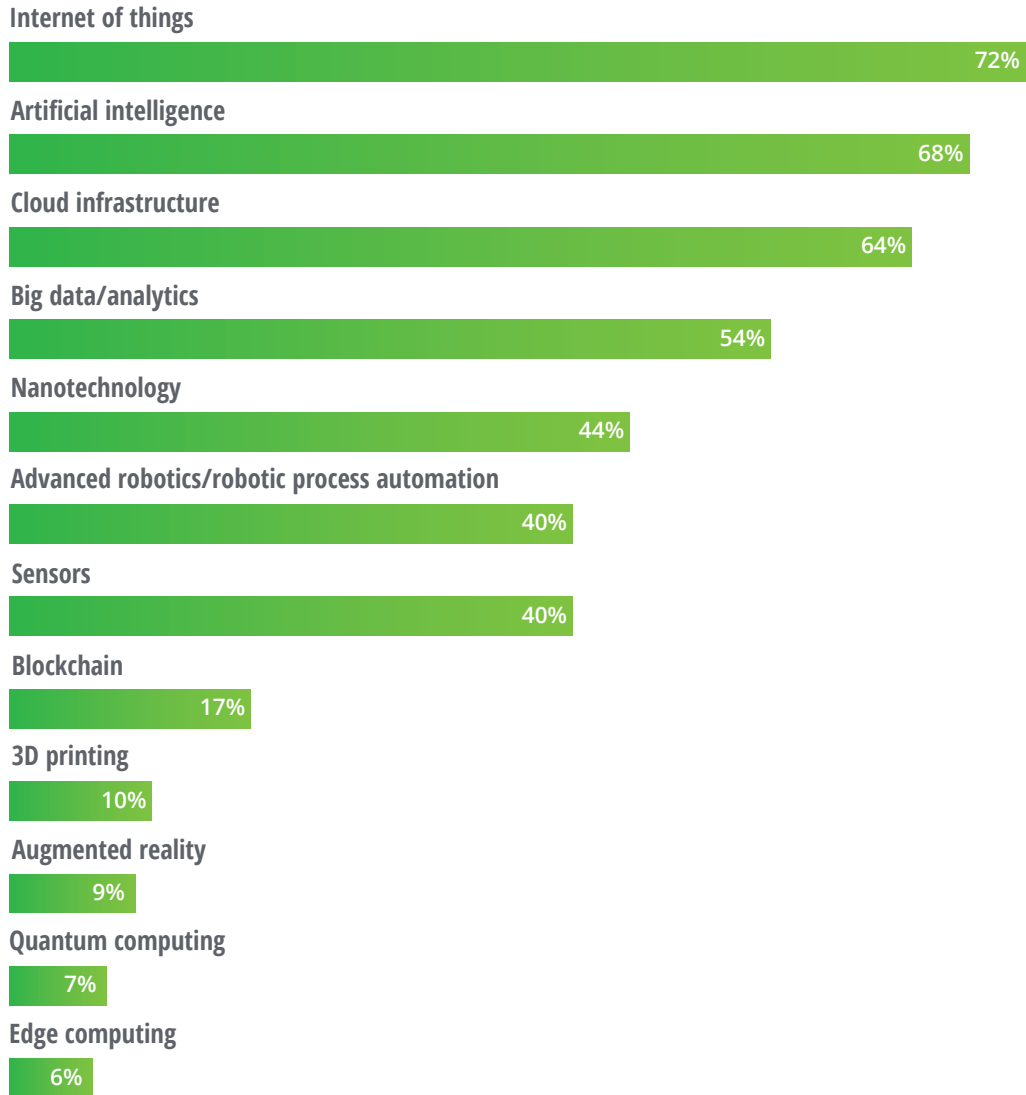
**D**IGITALIZATION IS AT the core of the Fourth Industrial Revolution or Industry 4.0, which is ushering in a digital transformation that's revolutionizing manufacturing and the physical world. Industry 4.0 refers to the marriage of production and operations techniques with advanced digital technologies—IoT, artificial intelligence (AI), robots, drones, autonomous vehicles, 3D printing, cloud computing, nanotechnology, and more. These technologies can communicate, analyze, and act upon information, allowing organizations, consumers, and society to be more flexible and responsive and make more intelligent, data-driven decisions.<sup>2</sup>

Industry 4.0 is far from a futuristic idea—in fact, it is already here and is top of mind for C-suite executives and government agencies responding to the rapid changes resulting from advanced digital technologies. A 2019 Deloitte annual survey<sup>3</sup> of more than 2,000 C-suite executives across 19 countries examined the intersection of readiness and responsibility to see how leaders are balancing this transition to Industry 4.0. The survey results (figure 1) make it clear that these technologies—particularly IoT, AI, and cloud infrastructure—are expected to have a profound impact on how businesses transact and participate in global trade.

**Our survey results show that advanced technologies are expected to have a profound impact on how businesses transact and participate in global trade.**

FIGURE 1

### Which Industry 4.0 technologies are expected to have the most profound impact on your organization?



Note: N=2,029.

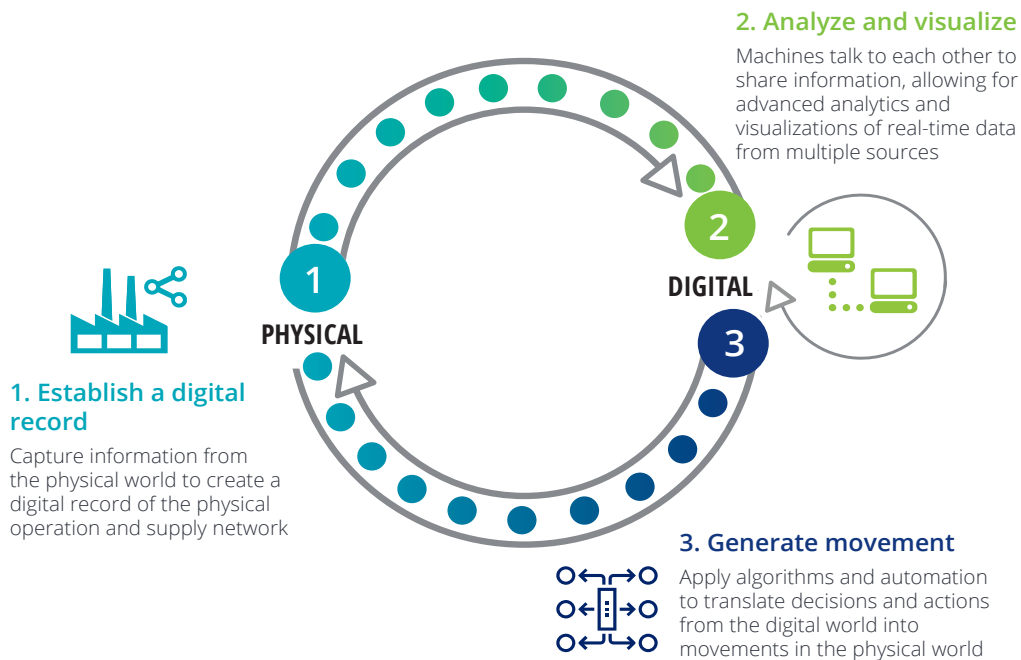
Source: Deloitte Global analysis.

## THE CORE OF INDUSTRY 4.0: THE PDP LOOP

Industry 4.0 technologies enable a continuous and cyclical flow of information and actions between the physical and digital worlds, a cycle known as the physical-to-digital-to-physical (PDP) loop (figure 2). Data is collected from many different physical and digital sources and locations; this data is then analyzed to inform and execute action in the physical world. It is this leap from digital back to physical that is the essence of Industry 4.0.

FIGURE 2

### The Industry 4.0 physical-digital-physical loop



Source: The Deloitte Center for Integrated Research.

For further information, see [Forces of change: Industry 4.0](#) and [Industry 4.0 and manufacturing ecosystems: Exploring the world of connected enterprises](#).



Since Trade 4.0 is already here and picking up speed, it's important to deepen our understanding of the impact of Industry 4.0 on each of the areas critical for trade—**make, transport, and sell**—and, subsequently, the government's role in these areas.

## Make: Industry 4.0 is revolutionizing the way goods are manufactured

The automation and digitalization of supply chains, along with robotic automation and augmentation, have brought about major changes in how goods are produced. From factory to consumer, goods are being tested, processed, and inspected at a rapid pace and new ecosystems are being created, bringing both advantages and risks.<sup>4</sup> Just as the Second Industrial Revolution heralded assembly lines, the Fourth Industrial Revolution has given us a physical-digital-physical loop we can't ignore (see sidebar, "The core of Industry 4.0: The PDP loop").<sup>5</sup> According to Industry 4.0 specialists, "This connection between digital and physical—from digital technologies to the creation of a physical object, and from physical objects to automatic digitalized processes—constitutes the essence of the Industry 4.0 concept for how goods are made."<sup>6</sup>

## Just as the Second Industrial Revolution heralded assembly lines, the Fourth Industrial Revolution has given us a physical-digital-physical loop we can't ignore.

The physical-digital-physical loop refers to the creation, communication, and action loop within the manufacturing of a single good.<sup>7</sup> In Industry 4.0, each of these sub-processes—information

creation, communication, and action—contribute to the transformation of manufacturing. Manufacturing processes can now leverage information creation to personalize goods and provide better experiences to consumers, implement instantaneous global communication to adapt manufacturing approaches, and take action to develop safer, better goods. Processes such as these are fundamental to the transformation of manufacturing in Industry 4.0.

## Transport: Industry 4.0 is transforming the way goods get from point A to point B

Industry 4.0 extends far beyond the walls of the factory—its digital thread is connecting every node of a global supply chain with the ability to track, trace, and deliver goods through IoT, blockchain, drones, wearable technology, and more. Goods can now travel from point A to point B faster than ever and, in the case of digital goods, potentially instantaneously. Not only are consumer products moving faster, they also have the potential to travel with a cleaner carbon footprint, to be anticipated by ports of entry, and to begin their journey even before a customer places an order, thanks to the use of predictive customer and inventory analytics.

Industry 4.0 is bringing about an ecosystem that reimagines the ways in which goods move and contribute to greater efficiencies for society at large.<sup>8</sup>

## Sell: Industry 4.0 is changing the marketplace for buyers and sellers

The benefit of Industry 4.0 for consumers is most visible in the personalized customer experience afforded by AI, smart technologies, and bots. These technologies can elevate the customer experience by using data to predict customer needs and preferences. For example, many customers

these days use recurring, automated reminders to make repeat purchases of everyday products such as paper towels, coffee, contact lenses, or flower deliveries. Seemingly simple, these reminders are in fact the result of a digitalized supply chain and create a more seamless, customer-centric experience. Companies are also leveraging order-to-cash (OTC) capabilities—or the ability to digitally track an order from receipt through payment to enable a more seamless ordering process—to enhance customer experience and satisfaction.

Each of these innovations, in turn, can have real implications for every player in the trade ecosystem—from the customer, to businesses, to the government.

## **The benefit of Industry 4.0 for consumers is most visible in the personalized customer experience afforded by AI, smart technologies, and bots.**



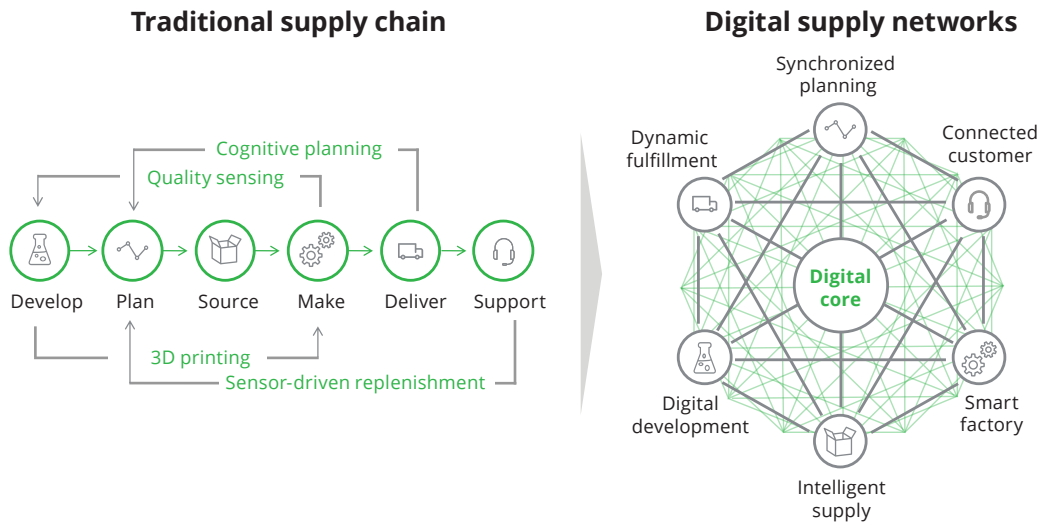
# Crossing borders: When Industry 4.0 becomes Trade 4.0

WHEN THE DIGITALIZATION of how we make, transport, or sell is applied to goods crossing international borders, Industry 4.0 becomes Trade 4.0. Under Trade 4.0, supply chains have fundamentally shifted from traditional, linear ones to integrated, digital supply

networks characterized by multidirectional, always-on communication between the nodes of the network (figure 3).<sup>9</sup> These changes are causing the emergence of an ever-complicated trade ecosystem which comes with a slew of new trade-related challenges.

FIGURE 3

## Traditional supply chains are morphing into complicated digital supply networks



Source: Deloitte analysis.

# A framework for navigating Trade 4.0

WITH THE TRADE ecosystem becoming increasingly digitalized, government agencies should adapt their roles across the three archetypes of **facilitators**, **enforcers**, and **negotiators** of Trade 4.0. This can help them keep pace with the evolving international trade milieu and make the most of the opportunities while minimizing risks to their profits and populations.

Below, we explore specific examples of the roles government can play and examine how Trade 4.0 could impact its missions and processes. Further, we map archetype-specific challenges (figure 4) that government leaders can consider as they think about how to adapt to the rise of Trade 4.0.

## Government as a facilitator

As a facilitator of international trade, government facilitates interaction between the private and commercial sectors for the import and export of products at ports of entry; it also promotes the interests of domestic companies abroad. Over the past several decades, overall global trade has grown steadily at an average annual rate of 4%,<sup>10</sup> with the value of all trade reaching US\$20 trillion in 2018.<sup>11</sup> In the United States, this translated into 81,438 trucks and rail and sea containers bringing in nearly US\$7.7 billion worth of goods into the country each day, all of which required checking and processing at the ports of entry.<sup>12</sup>

In its role as a facilitator, government evaluates, assigns, and collects trade tariffs and duties. In

2018, globally applied tariffs stood at an average of 9%,<sup>13</sup> while the United States had a trade-weighted average import tariff of 2% on industrial goods (nonagricultural goods such as machinery, automobiles, textiles and clothing, consumer goods, etc.).<sup>14</sup> With cross-border trade growing manifold in complexity and volume, there will continue to be room for government agencies to grow their role in this area, accurately collect duties, and optimize trade facilitation.

## Government as enforcer

With a view to uphold laws and protect national and economic security, government works to ensure that global supply chains are safe, secure, legitimate, and fair. Trade enforcement is an interagency effort. For instance, many US government agencies work together to enforce US trade laws, identifying high-risk activity, deterring noncompliance, and disrupting fraudulent behaviors.<sup>15</sup>

Enforcement takes on many forms, including combating dumping or commodity subsidization that could damage US industries; upholding safety standards for goods such as personal protective equipment or children's toys; and seeking criminal penalties in matters such as customs fraud or intellectual property violations. At a high level, the tools of trade enforcement include financial instruments such as penalties for dumping or countervailing duties, law enforcement actions, or remediation (through formal dispute processes detailed in multi- and bilateral trade agreements).<sup>16</sup>

Historically, government trade agencies had to maintain a delicate balance between trade facilitation and enforcement responsibilities—for example, physically opening cargo containers to check for security threats is counterproductive to the goal of speeding cargo through borders without delays. Now, thanks to the digital way of making, transporting, and selling goods, along with data providing real-time visibility into these processes, government agencies can pursue and improve trade facilitation *and* trade enforcement goals simultaneously.

## Government as negotiator

Governments formulate trade agreements, resolve trade-related disputes, and represent their economies' best interests in front of global trade forums. Such agreements are typically incredibly complex and sophisticated, taking considerable time to complete. For the United States, the average time to negotiate a bilateral free trade agreement is 18 months, then another three-and-a-half years for ratification and implementation.<sup>17</sup> As seen with Brexit<sup>18</sup> and the Trans-Pacific Partnership,<sup>19</sup> moving from negotiation to implementation can be often deeply politicized and subject to domestic concerns as well. The process is even more daunting when it involves multilateral negotiations under the aegis of the World Trade Organization (WTO) and its more than 150 members.

Today, many are questioning the ability of government to keep pace with Trade 4.0,

specifically in matters of trade negotiation and implementation.<sup>20</sup> Historically, the global community has put off the establishment of international norms and agreements related to digitalization of trade. Since 1998, the WTO has held a moratorium on placing tariffs on digital trade such as the sale of e-books or software across borders. Notwithstanding the merits of such tariffs, this may be interpreted as a result of a collective “we’re not ready to come to consensus yet.” Nevertheless, despite Trade 4.0 not being addressed globally, the United States-Mexico-Canada Agreement (USMCA), fully ratified by all three countries in 2020, is the first major international trade agreement with a comprehensive chapter on digital trade.<sup>21</sup>

This landmark accomplishment could lay the groundwork for other bi- and multilateral trade agreements to address the promise and perils inherent in Trade 4.0.

The extended timelines and complexities of negotiating and implementing agreements may prove to be a headwind to adapting to novel challenges such as export controls and intellectual property rights (IPR), especially in the age of on-demand additive manufacturing.

But what happens when Trade 4.0 refuses to wait at the door? As governments scramble to come to terms with the new reality, the same evolving trade ecosystem that presents opportunities can also bring many challenges. Introspection on some key aspects (figure 5) could help them be prepared for these challenges.



FIGURE 4

## Key questions governments must answer to excel in Trade 4.0

Trade 4.0 transformation	Facilitator	Enforcer	Negotiator
<b>Make</b>	How can government encourage and incentivize innovative production methods that reduce consumer costs, increase consumer safety, and promote domestic economic interests?	How will it ensure that goods and services are classified accurately for due processing and that IP rights are protected as goods become inherently more software and digital oriented?	How will government prioritize the industries and sectors in which it wants a comparative advantage by negotiating rules of origin in new trade agreements?
<b>Transport</b>	How can government anticipate changes in product composition and adapt harmonized tariff rules and duties in a manner that's easy for industry to understand and encourages use of new digital methods to track and share data across the supply chain?	How will it establish trusted trader and risk-based policies to encourage industry to share their supply chain data to anticipate and eliminate national security threats?	How can it embrace the potential of free trade zones in trade negotiations to promote the advantages of domestic warehousing, manufacturing, and distribution, given the availability of more modularized chains and autonomous and fast movement of goods across large areas?
<b>Sell</b>	How will government create policies to level the playing field for large and small e-commerce providers in a manner that drives domestic profits and drives down the cost of consumer goods and services?	How can it ensure the integrity, authenticity, and safety of international consumer imports amid the rise of global e-commerce platforms with rapid air transit times and numerous supply chain nodes?	What legal provisions must it put in place around storage of valuable client data in the country in which it is ultimately used to personalize online marketplace sales and other data-driven decisions?

Source: Deloitte analysis.

Figure 4 brings to the fore the challenges and corresponding opportunities of Trade 4.0 by matrixing the three main trade processes (make, transport, and sell) with three of government's core trade functions (facilitate, enforce, and negotiate). As evident from the matrix, government agencies are likely to face some challenges in these areas with naturally overlapping actors, resources, and equities. Addressing the challenges will likely require distinct investments. However, within

Trade 4.0, trade agreements, customs structures, etc., are largely currently too passive to spark the kind of systemic change that may mobilize trade innovation. It appears, therefore, that it is the responsibility of government to harness bold approaches to address these challenges and explore the full potential of Trade 4.0. Further, it is the responsibility of trade beneficiaries to continue thinking and learning about these forthcoming realities.



## EXAMPLES OF TRADE 4.0 IN PRACTICE

While governments across the world are still figuring out their roles as facilitators, enforcers, and negotiators of international trade, there are examples of Trade 4.0 already at play. They are visible in the use of additive manufacturing, autonomous vehicles, and e-commerce in the making, transportation, and selling of goods respectively. In the sections below, we seek to better understand the capabilities of digitalization across a good's life cycle to allow for a deeper visualization of Trade 4.0 and government's many trade enablement roles.

### *Make: Additive manufacturing*

Additive manufacturing, or more colloquially 3D printing, is changing global supply chains by reducing the capital required to achieve economies of scale. It offers greater flexibility for on-time, on-demand, and smaller-scale manufacturing. Additive manufacturing has gone from being a prototyping tool to a catalyst for greater quality assurance and interoperability in an ever-changing world. It has seen early adoption in the creation of goods across industries such as aerospace and defense, health care, and telecommunications, all of which have strong roots in the global supply chain. With implications for the types of goods and materials that cross borders, additive manufacturing can impact each of government's roles in Trade 4.0:

- **Trade facilitation:** Trade leaders should determine how to handle the cross-border flow of intellectual property (3D models), which, in some cases, is replacing the flow of goods. Logistically, technology-related goods may also be increasingly difficult to classify for customs purposes due to their complex origins.
- **Trade enforcement:** Leaders should determine how to verify the authenticity of goods produced using additive manufacturing to protect IPR.
- **Trade negotiation:** Trade policy leaders should renegotiate the rules of international trade forged in bi- and multilateral trade agreements and in international organizations to adapt tariff rates and trade preferences to reflect increasingly localized modes of production. From a customs duty perspective, the types of goods being transported internationally are likely to change as a result of the use of smart technologies.<sup>22</sup> As the flow of technological products increases, trade organizations such as the WTO may face challenges in classifying goods for duty purposes. This, in theory, could lead to more frequent reviews of goods by both trade organizations and tariff reviewers.

### *Transport: Autonomous vehicles*

Autonomous vehicles may revolutionize not only passenger transit but also the flow of cargo as we know it. In the near term, AI may power autonomous trucks across borders, carrying goods at a lower cost without drivers. Naturally, these humanless processes mean government should prepare for vast, and unprecedented, shifts in trade processes as follows:

- **Trade facilitation:** Trade leaders should find ways to deal with more predictable, automated supply chains and to verify goods on board driverless trucks that show up at border crossings.
- **Trade enforcement:** Leaders should consider how government and industry can collaborate to enable innovation at the border and ensure supply chain security to drive optimal efficiency, even as such partnerships get underway.

- **Trade negotiation:** If there are fewer physical goods crossing borders and a rising number of digital entities, trade leaders should get in front of negotiation challenges related to customs controls and tax revenues.

***Sell: E-commerce***

E-commerce is revolutionizing supply chains and service delivery. Because e-commerce goods are typically shipped directly to consumers, goods are increasingly being shipped around the world in smaller parcels that are subject to less regulation. As e-commerce shifts consumer behavior, government agencies should address the following aspects of selling to help ensure safe and efficient economic growth.

- **Trade facilitation:** As global de-minimis values (the total shipment value below which few or no taxes are charged on shipments) trend higher, allowing for easier shipping of low-value goods, trade leaders can facilitate the efficient flow of hundreds of millions of small parcels that are replacing traditional cargo previously transported in bulk across borders via container.
- **Trade enforcement:** Trade leaders should effectively detect threats in small parcel supply chains, which make it harder to identify opioids and other narcotics, weapons, counterfeit products, and consumer safety threats shipped in small quantities directly to individual consumers.
- **Trade negotiation:** Trade policy revolves around the tariff and duty rates applied to goods in bulk, and leaders should determine how to apply trade policy to goods that are increasingly shipped in small packages and quantities, duty-free.

# Realizing Trade 4.0: Reap the benefits, mitigate the risks

**W**HAT SHOULD GOVERNMENT do to optimize the potential and overcome the challenges of Trade 4.0? It should enable its agencies to better use data, increase its expertise in modern technologies, and create meaningful partnerships to protect its citizens and trade partners.

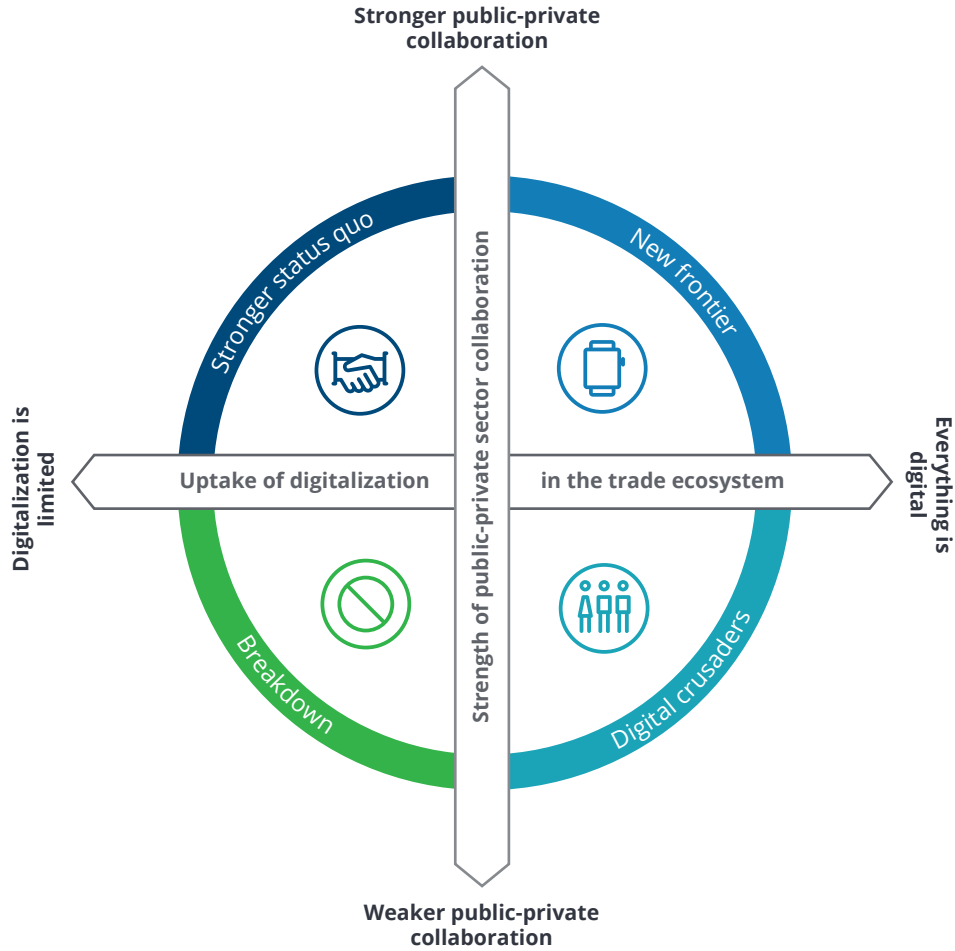
**Government should better use data, increase its expertise in modern technologies, and create meaningful partnerships to protect its citizens and trade partners.**

To better understand the solution environment of Trade 4.0, it is helpful to plot on a graph where government agencies fall on the uptake of digitalization in trade and the rise of PPPs as seen in Figure 5. Digitalization, on the x-axis, is inevitable and signifies industry’s undeniable shift toward Trade 4.0. PPPs, on the y-axis, are a purposeful investment crucial to any Trade 4.0 solution and help government meet private companies where they stand in technological advancements, helping both parties prepare for unprecedented changes in real time. Depending on which quadrant they fall into, we can categorize government agencies into four scenarios based on their approach to Trade 4.0 partnerships—new frontier, stronger status quo, digital crusader, and breakdown.



FIGURE 5

**Trade 4.0 solution environment: Four scenarios for government agencies based on their approach to partnerships**



Source: Deloitte analysis.

The most promising potential of Trade 4.0 lies in the **new frontier**, where maximum digitalization meets efficient partnerships. Only in the new frontier is digitalization met with the proper resources to generate solutions and act on them. In this scenario, government has secure, strategic partnerships with the private sector and can

leverage its capabilities and competencies to face some of the nation’s most challenging Trade 4.0 issues. These partnerships, which are constantly growing, can enable private sector growth while also providing the government with the skills, digitalization, and reach to adapt and respond to emergencies and resulting challenges.

## The most promising potential of Trade 4.0 lies in the new frontier, where maximum digitalization meets efficient partnerships.

What happens when government fails to digitalize but works together with commercial entities using new partnerships to attempt to improve trade processes? A **stronger status quo** can emerge and government and industry, while able to communicate, anticipate, and respond to changes efficiently, can reach a ceiling in their relationship as companies continue to digitalize and government settles into its present capacity.

On the other hand, if government continues to digitalize but doesn't forge relationships with industry partners, it can become a **digital crusader**. Often government agencies make the same mistakes that companies made years earlier,<sup>23</sup> causing unfortunate and tumultuous downstream effects for consumers and industries. Agencies should build their automated practices and digital scope around the infrastructure of the private sector, since the industry has already begun digitalizing at a rapid rate. However, a digital crusader government refuses to get left behind but is soon faced with the reality that it can't move ahead without any industry partnerships.

In the most undesirable scenario, government agencies can land in the **breakdown** scenario, where neither digitalization nor partnerships are pursued, and government is ill-equipped to manage Trade 4.0. In this scenario, government failures could lead to increased IPR challenges, delays in shipping and transport, chaos in global trade governance, and eventually overall instability.

To successfully reach the new frontier and avoid a less optimal quadrant, government should consider *what*, *how*, and *who* needs to change in the face of Trade 4.0:

### What should change: Use data differently at every corner

Agencies should invest in AI and machine learning to identify inefficiencies in how goods are made, transported, and sold, so that government can adapt current policy and anticipate crises in the modern trade landscape. In addition, government should use commercial data to enrich and augment its resources for faster and more efficient targeting decisions. Increased access to data and data analytic resources such as these can provide government more opportunities to take a data-centric approach to key trade challenges.

Achieving the new frontier requires government agencies to increase the quantity and quality of data they have access to, while also manipulating, learning from, and acting upon existing data. This is where the true power of Trade 4.0 comes into play.

The increasingly sophisticated applications of trade data in the new frontier mean that government agencies can now use Trade 4.0 insights to conduct increased targeting of shipments with finer-tuned inspections—cargo can thus flow more freely, and injurious or fraudulent shipments are detected more frequently. Advanced analytics can be used to gain deeper insights into risks to set better bonding limits and inquiry into allegations of trade violations can be conducted faster and more thoroughly than before. Fundamentally, the safety and security of the global supply chain can be improved.

Trade 4.0, however, is not a panacea to global trade enforcement. In the absence of a sustained commitment on the part of government agencies to

embrace the benefits of data in Trade 4.0, governments and their citizenry can be at risk. Malicious actors are often early adopters of new technologies and they can potentially apply them to subvert trade laws. In such a case, government passivity can carry a high price.

## Trade 4.0, however, is not a panacea to global trade enforcement.

### How to enable change: Maximize partnerships, don't go it alone

Agencies should establish data-sharing partnerships between government, other governments, and industry to channel the power of the full range of public and private sector trade data.

Trade 4.0 is pushing not just government entities out of their comfort zone—it's doing the same to their commercial counterparts as well. It could be important to expand trusted trader programs, which create intentional government-commercial partnerships, thereby enabling improved identification and facilitation of legitimate trade. Also, engaging with the WTO and key associations can be an important asset in dealing with future trade crises and expansions alike. The ability to quickly create bilateral and multilateral agreements to encourage cross-border data transfers and international cloud services would allow government to reap the competitive advantages of Trade 4.0 and advance society. At the same time, it can help manage the risk of cyber

intrusions, embedded malware, and ensure fair appreciation of tariffs through an easily calculable methodology.

### Who should adapt: Optimizing training toward the new frontier

Government agencies will likely have to be integrated with technologists and futurists trained to prepare and adapt at every turn. In other words, Trade 4.0 should be ingrained in the functionality of agencies from inside out.

Employing trade experts in teams to drive digital transformations, while also hiring more data scientists, can help ensure that agencies can contend not only with technological transformations but also with impending consumer, producer, and market shifts. Trade experts and data scientists can analyze market and economic shifts, applying their expert understanding of supply chain implications and data analytics ramifications. Such expertise and a focus on human capital can be critical to ensure that government is able to view its international trade challenges through an intentional, data-driven lens.

And, for existing talent in government agencies, training and onboarding programs should be geared toward preparing the workforce for inevitable and lasting change. Data fluency and analytical skills are requirements not only for promising employees but the foundation of a strong and equipped agency. Agencies should also provide employees additional opportunities to learn about digital—as well as physical—threats anytime and anywhere.



## Partnering for success in Trade 4.0

The digitalization of global trade in Industry 4.0 has sparked Trade 4.0 in its wake, creating opportunities to shift and expand government capabilities in ways consumers, businesses, and nations may have never before imagined.

Trade 4.0 will not wait for us and will continue to shift market dynamics and change form as it responds to the nebulous uncertainties of today. And Trade 4.0 has only been exacerbated by the COVID-19 pandemic, pushing suppliers and forcing entities to shift from decades-old production chains to digital, modular supply value chains almost overnight. The result is dramatic shifts for the supply chain and trade environments as a whole. These shifts make it difficult for government agencies to trace points of origin, transshipments, and illicit activities (such as forced labor) along the supply chain and leave loopholes for potential cyber intrusions at every point on a disaggregated supply value chain.

**Trade 4.0 will not wait for us and will continue to shift market dynamics and change form as it responds to the nebulous uncertainties of today.**

Remaining vigilant and aware of Trade 4.0 challenges and the continuous momentum of digital processes is generally the first step for governments and consumers alike. While government agencies should strive to strategically invest, partner, and hire talent, the private sector should employ its capabilities to understand how Trade 4.0 impacts consumer behavior. It will likely take this type of private-public coordination and collaboration to leverage Trade 4.0 for the collective good—a cleaner, safer, equitable modern economy. The risks are endless, but so are the possibilities for a world facing Trade 4.0 head-on and moving toward a more connected, coherent, clean, and capable global trade ecosystem.

## Endnotes

1. These archetypes were developed for the purposes of this article and are not, therefore, comprehensive of all government's roles.
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