Accidental agitators

Digital Reinvention in transportation

IBM Institute for Business Value

Executive Report

Digital Strategy

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Reimagining the enterprise

With its high capital costs, entrenched regulation and powerful stakeholder interests, the transportation sector is an unlikely source of global innovation. However, over recent years, it has become a digital innovation epicenter. Startups such as Uber and Lyft in the US, Didi in China, Ola in India and BlaBlaCar in Europe have redefined personal transportation. And companies such as Convoy, Transfix, Truckloads and Kontainers are similarly disrupting long-haul freight and logistics. Beyond road transportation, the Internet of Things (IoT) and GPS technologies are permeating even more deeply. Promoting accelerated digitization and formation of sophisticated transportation ecosystems, digital technologies are impacting the transportation sector like never before. We call this process Digital Reinvention.™

Opportunities

Digitization has redefined the global transportation sector like few others. In what was until recently one of the last bastions of analog processes and entrenched inefficiency, transportation across road, rail, sea and air is experiencing profound redefinition and invention. In personal transportation in particular, prominent startups have shattered traditional industry value chains by introducing new digital platforms that simultaneously break down entry barriers and redefine how markets operate.[1]

These successes are motivating innovation elsewhere. In service areas as disparate as sea, rail and air, business leaders are recognizing how susceptible traditional business models are to external disruption, and many are choosing to become disruptors themselves. For example, Memphis-based global logistics giant FedEx is using intelligent robots as mailroom attendants and mechanical assistants in its repair facilities.[2] France's national railway business SNCF has employed Internet of Things (IoT)-enabled devices to more accurately predict when repairs are required to trains and equipment, increasing not only efficiency, but system reliability and train safety.[3] And Atlanta-based global delivery company UPS has launched an artificial intelligence (AI)-based chatbot that mimics human conversation to help users more conveniently find UPS locations, get shipping rates and track packages.[4]

A majority of transportation industry leaders recognize the forces impacting their sector and the imminent challenges ahead. Fifty-one percent of global transportation executives responding to a recent survey on changing industry dynamics told us that the traditional value chains in their industry are being replaced with new value models. Forty-nine percent said that the boundaries between transportation and other industries are blurring. And fifty-five percent said competition from new and unexpected sources is impacting their traditional businesses.[5]

51%
of surveyed transportation executives say traditional value chains are being replaced with new value models

49%
of surveyed transportation executives report that boundaries between their industry and others are blurring

55%
of surveyed transportation executives say competition from new and unexpected sources is impacting their businesses

Digitization has been fundamental to this change. IoT devices, for example, are flooding transportation enterprises globally. Enabled by what is rapidly becoming ubiquitous cloud-based connectivity, IoT is rapidly yielding what was, until only recently, inconceivable levels of integration, coordination and alignment. Open, data-rich business environments are supporting not only new operating and organizational environments, but fundamentally different new business models.

For example, China-based delivery business SF Express is integrating internal and external data to gain business insights that incorporate consumer behavior, local business environments and supply chain patterns to increase both service quality and operating efficiency.[6] Phoenix-based automotive manufacturer Local Motors has developed a 3D printed, AI-enabled, self-driving shared shuttle vehicle called Olli.[7] San Francisco-based Zipline is deploying all-weather drones to deliver urgently required medical supplies to remote areas of Africa and elsewhere.[8] And California-based Skuchain is applying the cryptographic technology blockchain to traditional logistics operations to improve transparency and security.[9]

At the same time, other macroeconomic forces are buffeting traditional transportation businesses. In many areas, including shipping, unconstrained capacity growth has depressed freight rates, placing intense pressure on margins. Recent reports suggest that as many as 9 percent of ships around the world are sitting idle because of a combination of oversupply and insufficient demand, despite the fact that much of the older merchant fleet has already been scrapped.[10] With demand expected to stay flat in the foreseeable future, economies that are reliant on global shipping activity, such as Singapore's, are coming under increasing pressure.[11]

Digital destiny

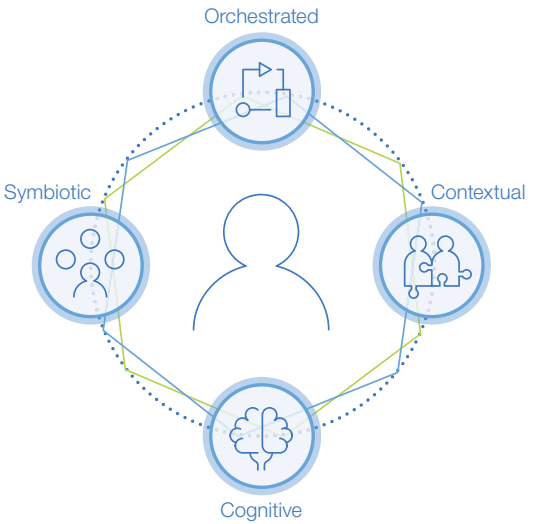
The environment confronting the transportation industry is best understood within what we call the everyone-to-everyone (E2E) economy. The E2E economy has four distinct elements: It is orchestrated, based on business ecosystems that are both collaborative and seamless. It is contextual, in that customer and partner experiences are calibrated and relevant to their specific actions and needs. It is symbiotic, in that everyone and everything, including customers and businesses, are mutually interdependent. And it is cognitive, characterized by data-enabled self-supported learning and predictive capabilities (see Figure 1).

Within this context, Digital Reinvention™ involves multiple digital technologies described earlier — including cloud, AI, cognitive computing, mobile and, of course, IoT. Technologies combine to reconceive customer and partner relationships from the ground up.

Digital Reinvention processes involve creation or orchestration of unique, compelling experiences for customers and other stakeholders enabled by new or emergent business ecosystems. The most successful digitally reinvented businesses establish a platform of engagement for their customers, acting as enabler, conduit and partner. Digital Reinvention is possible — indeed inevitable — within the E2E economy.

Figure 1

The everyone-to-everyone economy consists of four elements



Source: IBM Institute for Business Value analysis.

Digital Reinvention differs in concept from both digitization of individual capabilities or functions, and digital transformation —or the coordinated integration of digitally transformed business processes and activities (see Figure 2).

Figure 2

Digital Reinvention follows a path that starts with digitization and progresses through digital transformation

Source: IBM Institute for Business Value analysis.

To thrive in the face of technology-led disruption, transportation businesses need to pursue strategies that extend beyond traditional digitization and even digital transformation. Digitization in transportation, for example, involves setting up digital systems that support specific processes or functions, such as online consignment booking or individual vehicle or craft GPS tracking. Digital transformation in transportation involves integrating across multiple digital — or digitized — systems and processes. The ability of transportation businesses to offer customized experiences involving a single view of a customer across disparate parts of an organization reflects digital transformation– integrating everything from shipment booking to billing, for example.

Digital Reinvention goes much further. It involves fundamentally reimagining the way transportation businesses operate and engage with their customers, partners and other stakeholders. It entails a wide range of digital applications, including creation of deep, collaborative relationships through fully integrated ecosystems. Digital Reinvention is not fragmented or specific. It requires fundamental rethinking about how transportation businesses operate.

Hungry like the wolf

Digitally conceived entrants into the transportation sector often have an advantage in the Digital Reinvention stakes. Unburdened by legacy organization and infrastructure, digitally-born startups already possess Digital Reinvention attributes. And if their business models are powerful and unique, digital startups can dramatically disrupt the markets in which they gain a foothold, potentially placing significant competitive pressure on established industry leaders.

For example, Antwerp-based T-Mining is employing blockchain technologies to improve logistics efficiency, security and transparency in the shipping transportation industry. Through sophisticated data sharing, secure tracking and title transfer, T-Mining has reduced costs for stakeholders across the logistic chain.[12] The potential savings of applying blockchain technologies across the USD 12 trillion industry are massive, with overall savings estimated to be in the vicinity of USD 38 billion dollars.[13]

In freight transportation, startups around the globe are leveraging digital technologies to dramatically improve efficiency and create superior customer experiences in what has traditionally been a highly manual industry. For example, Jerusalem-based Freightos is enabling importers and exporters to more efficiently browse through freight forwarders online to quickly compare quotes and identify the best available deal.[14] As with shipping, the productivity improvements possible within the USD 15 trillion global logistics industry run into the billions of dollars.[15]

Also in the logistics industry, Yojee, an Australian startup, has created an AI- and blockchain-enabled platform to provide significantly more efficient, seamless on-demand movement of goods and services. Yojee is already helping smaller delivery companies benefit from economies of scale achieved with transactions processing through its platform.[16]

And California-based Matternet is creating a sophisticated drone and landing station-based transportation system. In the Matternet system, GPS-enabled all-weather smart-drones will be available to transport physical goods. But unlike other similar businesses, depending on where pickup and delivery is located, Matternet drones will autonomously dock at automated landing stations to swap batteries in order to fly further or exchange loads. Matternet's docking and swapping innovation is expected to significantly extend distances serviced when employing current drone and battery technology.[17]

End of the beginning

Successful Digital Reinvention requires traditional transportation businesses to rethink industry value chains and business models, but in a customer-centric way. To support this reconsideration and reinvention, businesses should pursue a new strategic focus, build new expertise and establish new ways of working (see Figure 3).

Pursue a new focus

Transportation businesses will need to develop new ways of realizing and monetizing value. Initiatives might include devising new business models, tapping new forms of financing and developing better, more holistic ways of assessing risk. Digital Reinvention leaders will also need to create strategies and execute plans to deliver deep, contextual experiences for the transportation industry.

Build new expertise

The most innovative industry leaders must digitize products, services and processes that help redefine experiences. They will need to augment these steps with predictive analytics and cognitive computing, along with IoT and automation, to create fully integrated, flexible and agile operating environments.

Establish new ways of working

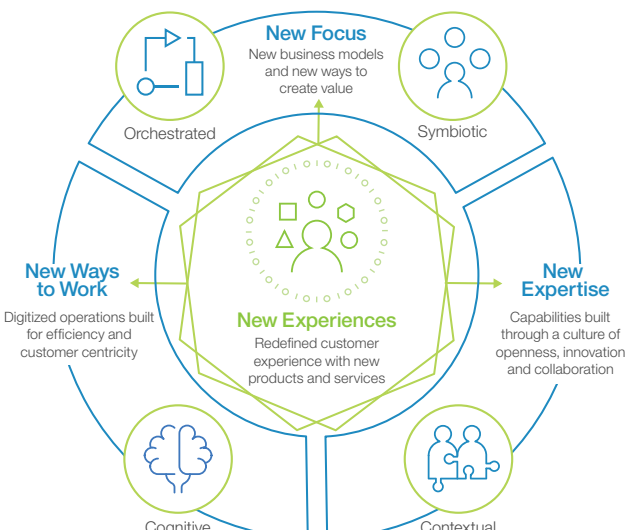
Transportation leaders must identify, retain and build the necessary talent to create and sustain their digital organizations. They will need to create and perpetuate innovation-infused cultures incorporating design thinking, agile working and fearless experimentation. And they will need to contextualize organizational priorities within business ecosystems, seeking new forms of partnering and new ways to build value within overall systems of engagement.

Adopt a self-funding approach

Sector leaders must deploy technology to drive optimization and support scalable growth and market share. They will need to pursue digital investments related to their previous successes in growing revenue by penetrating new markets.

Figure 3

The Digital Reinvention operating environment revolves around new experiences



Source: IBM Institute for Business Value analysis.

Reconceiving international supply chains from beginning to end [18]

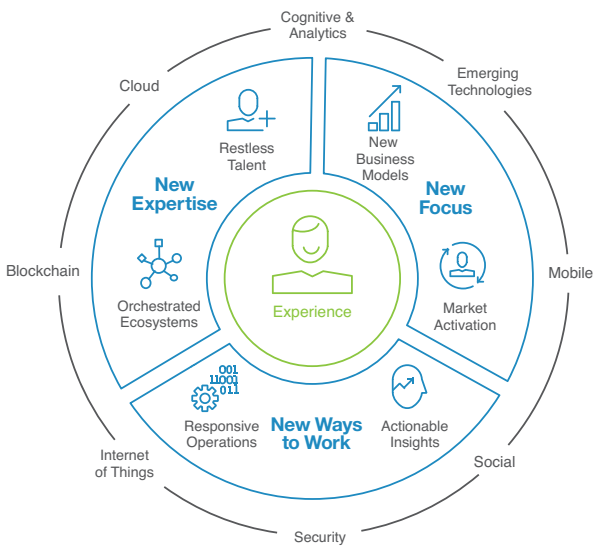
Global container transportation and logistics giant Maersk is using digital technologies to maintain and expand its industry leadership. Embracing new technological expertise around big data, cloud, blockchain and AI, Maersk is working to translate structured and unstructured data into insights that both improve operational efficiency and create new product and revenue streams. Maersk is digitizing end-to-end supply chain processes to expand transparency, remove manual steps, reduce errors and fraud, and improve security in information sharing between trading partners across emergent transportation ecosystems. By providing vastly improved transparency and access to new products and services, Maersk is improving predictability of customer supply chains, reducing costs, improving customer experience and promoting business model innovation.

Embrace digital drivers

And leaders will need to become deeply proficient in digital technologies. By embracing Digital Reinvention rather than incrementalism, leaders can map a path to adopt experience-first approaches to planning that employ the strengths of ecosystem partners to help achieve mutual goals (see Figure 4).

Figure 4

The Digital Reinvention framework combines the strengths of ecosystem partners



Source: IBM Institute for Business Value analysis.

Beginning at the end

To accelerate their Digital Reinvention journey, transportation industry executives can take four immediate steps: envision possibilities, create pilots, deepen capabilities and orchestrate environments.

Step 1: Envision possibilities
Conduct envisioning sessions based on design thinking to produce a definitive reinvention blueprint. Through deep conversations and in-depth marketing analysis, develop a better understanding of business customer and end-consumer needs, aspirations and desires. Brainstorm new ideas to enhance engagement and visualize unexpected customer scenarios. Incorporate external stakeholders in these sessions to encourage thinking that goes beyond business-as-usual.

Step 2: Create pilots
Develop prototypes using agile development, test them with policyholders and get them to market quickly to promote feedback and iteration. Establish communities of interest to create "safe" environments to beta test innovations, and include them as a central part of design and development processes.

Reimagining the global logistics industry from the ground up [19]

Germany-based global logistics leader DHL is redefining its traditional logistics business through innovation and technology. DHL has introduced robots at its warehouses to increase order-picking productivity. Its Resilience360 platform is leveraging big data analytics that significantly improve efficiency and resilience of its supply chain. Complementing its robotics investments, DHL is expanding the use of big data to automate parcel delivery processes, including the introduction of augmented reality (AR) glasses in warehouses resulting in pick productivity improvements of up to 15 percent. In addition, the company is successfully improving the experience of both customers and employees, promoting greater loyalty among both critical stakeholder groups.

Combining streamlined operations with improved experience [20]

Australia's Qantas Freight is replacing legacy systems with digital technologies in an effort to fundamentally rethink work processes and operations while improving service. To accelerate capabilities around business analytics, automation and mobile app development, Qantas Freight is actively seeking partnerships with leading technology firms. The company's new operational platform provides real-time information on shipments, reducing processing times for customer freight pickup at warehouses, and removes any need for physical paper. Qantas Freight continues to leverage digital technologies to continue to improve service delivery, shipment visibility and tracking, staff productivity and customer satisfaction overall.

Step 3: Deepen capabilities

Augment digital capabilities with strategic initiatives, and continue to build and deploy necessary applications aligned to the target Digital Reinvention operating model and ecosystem strategy. As pilots evolve, impediments to development will emerge, highlighting limitations in existing capabilities. Enact a continuous, iterative strategy to address these limitations by building new or extending existing capabilities.

Step 4: Orchestrate ecosystems

Execute through holistic reinvention rather than a series of point solutions, maintaining a clear focus on deep needs, business imperatives, aspirations and desires of business customers, partners, consumers and others. Use ecosystems to expand and align a broader set of capabilities and to help create and deliver on customer promises.

Key questions

- How can you accelerate digital strategy to address imminent and actual disruption buffeting the transportation sector?
- What steps can you take to become more agile and better equipped to predict and respond to unexpected challenges and opportunities?
- How can you make your workforce open and flexible enough to quickly embrace new ways of working and new strategic priorities?
- What actions can help your leadership become more visionary in conceiving what business customers and end-consumers want before they know it themselves?
- How can you better employ automation technologies, IoT and robotics to improve operational efficiency, risk identification and management?

Authors

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