Future of mobility – Driving differentiation in a world of disruption and creativity

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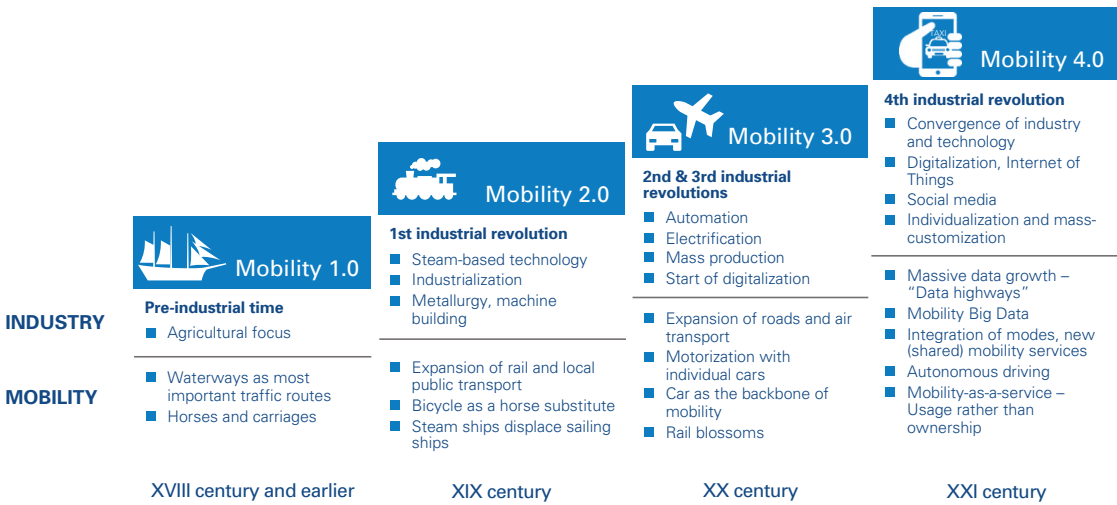Michael Zintel and Joseph Salem

The world is changing at a faster pace than ever, making the reform of mobility systems one of the key challenges facing cities today. The global demand for passenger mobility in urbanized areas is set to double by 2050, which puts increased pressure on existing systems. Even stronger growth is expected in the field of goods mobility, especially in cities, due to the increasing importance of e-commerce and the accompanying boom in demand for last-mile delivery.

Mobility systems face increasing pressures from rising demand and new market entrants. The latest Arthur D. Little Urban Mobility Index shows that mobility systems in the average city operate at less than half of their potential – this article explains the five key dimensions that players must embrace if they are to successfully transform themselves.

With rising demand and evolving needs, mobility solution providers therefore have to satisfy a requirement for services that are increasingly convenient, fast and predictable. In parallel, major technological developments, such as big data, artificial intelligence and the Internet of Things, as well as the emergence of innovative, compact forms of energy, have opened up a range of new options for individual mobility. This has led to the successful introduction and rapid penetration of new mobility solutions. Meanwhile, traditional mobility ecosystems have diversified, involving a wider range of players. The emergence of new concepts, such as mobility-as-a-service (MaaS), will force ecosystems to reorganize interactions among everyone involved to optimize how they operate.

Figure 1: **Mobility is being redefined again, driven by the 4th industrial revolution**

Current trends and new solutions may lead to very different mobility ecosystems in the future. This evolution triggers a number of opportunities, but also presents key challenges for transport authorities, as well as for mobility solution providers – whether they are traditional players or "new mobility" players. They need to master these challenges if they are to remain competitive in the short term and relevant in the long term.

The need for a paradigm shift

In many urban areas, the quality and performance of mobility services are deteriorating. While this does not apply to every urban center, there is clear evidence that we have reached a point in all megacities when steady improvement through incremental change will not be enough to cope with the challenges to come. This means cities need to undergo a transformative paradigm shift when it comes to urban mobility.

While movement of people and goods is a prerequisite for economic development, non-movement – i.e., traffic congestion – constitutes the biggest complaint of urban households and businesses. Between 2008 and 2016, the

overall rate of road-traffic congestion has been increasing by 2.6 percent per annum in urban areas across the world. Arthur D. Little recently released the third edition of its Urban Mobility Index[1], assessing the mobility maturity, innovativeness and performances of 100 cities worldwide, rated on 27 criteria. The mobility score per city ranges from 0 to 100 index points, with the best-performing city for each criterion receiving the maximum 100 points.

Ranking
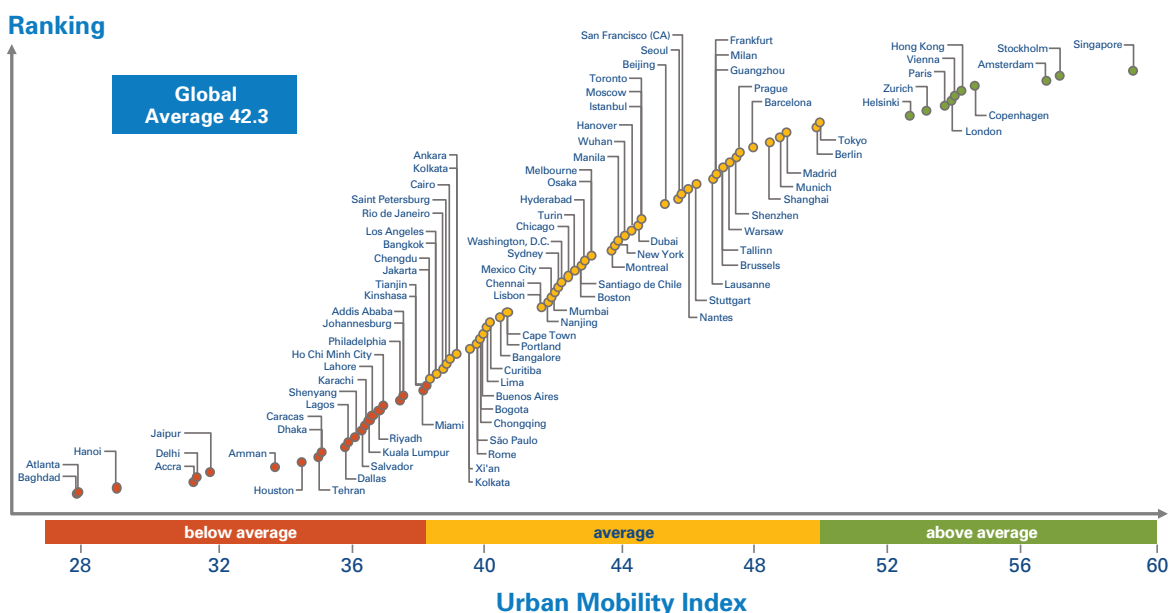
Global Average 42.3

Source: Arthur D. Little Urban Mobility Index 3.0; 100 index points for the city with the best performance on each criterion

Figure 2: **Arthur D. Little Urban Mobility Index 3.0 – City ranking**

The global average score of the cities surveyed is 42.3 out of the possible 100 points. These overall results show that most cities still need to work hard on improvements to their mobility systems if they are to cope with future challenges. Essentially, across the world the average city has unleashed less than half of the potential of its urban mobility system, a state of affairs that could be remedied by applying best practices across all its operations.

1.For more information on Arthur D. Little's Urban Mobility Index 3.0, including results per region and key countries, please refer to the extended Future of Mobility 3.0 report, available at www.adlittle.com/futuremobilitylab.

Only 10 cities scored more than 50 points, out of which eight are European and two Asian. The highest score was achieved by the city-state of Singapore with 59.3 points, followed by Stockholm (57.1 points), Amsterdam (56.7 points), Copenhagen (54.6 points) and Hong Kong (54.2 points). These scores indicate that even the highest-ranking cities have considerable potential for improvement. For example, Singapore's position in the index is due to the development of a clear vision and strategy at government level, including fiscal incentives to positively influence mobility behaviors. Unprecedented efforts have also been made in the field of "new mobility", among others, through development of shared mobility solutions and a pioneering approach to autonomous driving. This has been enabled by nurturing the creation of partner ecosystems combining both the public and private sectors.

Comparing those results with the previous edition of Arthur D. Little's Urban Mobility Index, carried out in 2013 across 84 cities, enables some interesting analysis:

- The average amount of transport-related CO_2 emissions per capita has decreased by 3 percent (from 1,506 to 1,464 tons). This is an insufficient improvement speed to meet the decarbonization commitments of the Paris COP 21 agreement.

- The share of public transport in the transport modal split has increased by 2 percent (from 29 to 31 percent), while motorized individual transport (i.e., cars) has decreased by 2 percent (from 42 to 40 percent). The share of non-motorized transport (walking and cycling) remained stable. However, at the same time, due to the overall increase in demand for mobility driven by developing regions, motorization increased by 5 percent over the period.

- "New mobility" solutions have gained traction since the last report, with an increase of 54 percent in car-sharing and bike-sharing by a factor of 10.7 (although this started from a very low basis). There was a 27 percent increase in the penetration of mobility cards (or their digital counterparts).

While these are positive evolutions, there are significant questions around whether the pace of change will be fast enough to adapt to the changes required in mobility.

What is holding back change?

Mobility visions and policies do not cover consumer requirements. This means many mature cities do not yet have clear visions of what their mobility systems should look like in the future, or coherent strategies for getting there. Moreover, there is a lack of integration between transport modes, between different urban policies (environment, land planning, energy, social policy) and across regions, which has led to sub-optimal outcomes in terms of performance.

In addition, urban mobility management often still operates in an environment that is fragmented and hostile to innovation, failing to bring together key players to work jointly to foster lateral learning and develop innovative mobility solutions.

In order to address future mobility challenges, cities and mobility solutions providers must adopt more comprehensive and coordinated approaches to managing mobility supply. They must also move towards more proactive approaches to demand mobility management in order to better influence behaviors in space and time. The mobility systems of tomorrow should be intermodal, personalized, convenient and connected, and encourage the use of more sustainable modes of transport (public transport, cycling, walking), while integrating new mobility solutions, such as autonomous vehicles (AVs)[2]. Convergence through digitalization constitutes a major opportunity to reinvent mobility systems as they gradually evolve to embrace MaaS – moving from ownership of individual transport modes towards usage of multiple mobility modes as services. This means that:

2. For more information on pathways to progress and strategic directions for transport authorities, please refer to Arthur D. Little's and UITP's extended report, "Future of urban mobility 2.0 – Imperatives to shape extended mobility ecosystems of tomorrow", 2014, available at www.adlittle.com/futuremobilitylab.

"The mobility systems of tomorrow should be intermodal, personalized, convenient and connected, and encourage the use of more sustainable modes of transport while integrating new mobility solutions."

Convergence through digitalization constitutes a major opportunity to reinvent mobility systems as they gradually evolve to embrace MaaS. Digitalization will be one of the main drivers upgrading the mobility system to a completely new level – mobility will therefore become a truly connected system.

Regulation is expected to play an important role in driving the changes required, as it is generally geared towards creating the necessary framework for the sound introduction of new mobility solutions and ensuring these will help deliver optimal system performance. It will also be a critical driver to foster sustainable innovation.

Strategic directions and imperatives for mobility solutions providers

In the Future of Mobility 3.0 study we identified five key dimensions for mobility solution providers to consider when defining their visions and strategies to keep pace with technological advances in order to stay competitive in the short term and relevant in the long term. While those dimensions are critical to traditional providers, these also apply to "new mobility" players. Even if they are, by their nature, more agile and customer centric, they will need to keep pace if they wish to preserve their competitive advantage and avoid being overtaken by the next disruption.
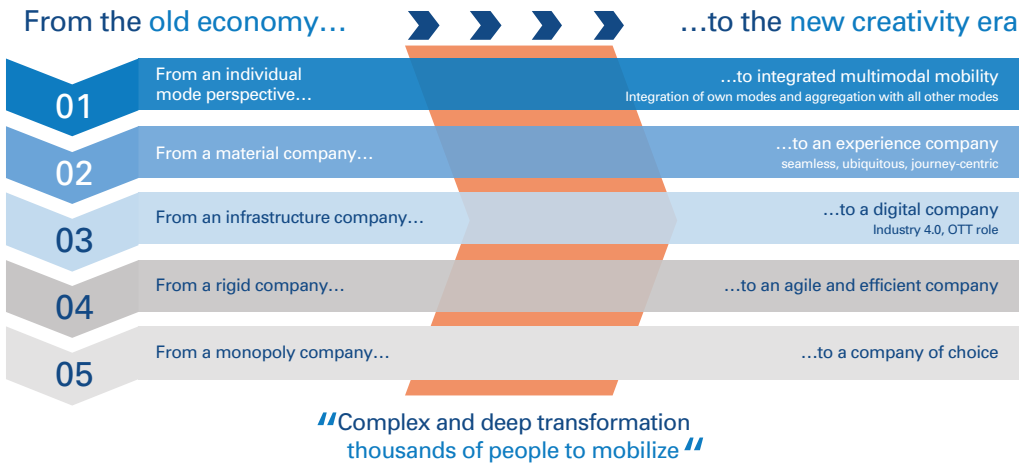
Source: Arthur D. Little & the UITP, Future of mobility 3.0

Figure 3: **Strategic directions for mobility solutions providers**

1. Sense of purpose

Defining a sense of purpose, or "What is our company bringing to the world?" is becoming a necessity for all companies as they face challenges in their business environments. It consists of defining the company's identity, as well as the original and differentiating understanding of its role and making clear what the company brings to the world.

As they are facing major challenges and disruptions (such as regulatory liberalization and increased intra- and inter-modal competition), mobility solutions providers are not exempt from the need to improve their "WHY" definitions and activations. If they are to effect complex and deep transformations from the old economy to the "new era of creativity", they must both be true to their existing mission statements and value sets (and revisit them as needed), and further activate their WHYs through all levels of their organizations.

From the old economy… ❯ ❯ ❯ ❯ …to the new creativity era

01	From an individual mode perspective…	…to integrated multimodal mobility Integration of own modes and aggregation with all other modes
02	From a material company…	…to an experience company seamless, ubiquitous, journey-centric
03	From an infrastructure company…	…to a digital company Industry 4.0, OTT role
04	From a rigid company…	…to an agile and efficient company
05	From a monopoly company…	…to a company of choice

"Complex and deep transformation
thousands of people to mobilize"
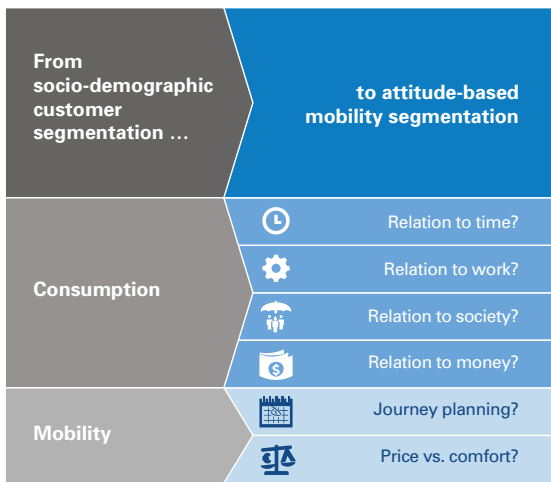
Source: Arthur D. Little

Figure 4: **Transformation from old economy to new era triggering the need to redefine "sense of purpose"**

Providing meaning is essential if a company is looking to hire millennials, which makes the WHY both a necessity and an attractiveness lever[3]. The WHY strategy creates an empowered organization with a clear orientation, strong cultural cement and an effective filter through which all company actions must pass. It provides – in the process – a common language for customers, hiring staff, empowering people within a clear framework, and creating a strong culture.

2. Branded customer experience

Societal and market evolution require mobility solutions providers to maximize customer experience and further differentiate their products in order to strengthen their competitive advantage. They must increase customer stickiness by transforming customers into fans.

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3. Arthur D. Little, "The WHY strategy: There is no strategy without meaning", viewpoint, 2017.

From socio-demographic customer segmentation …	to attitude-based mobility segmentation
Consumption	Relation to time?
	Relation to work?
	Relation to society?
	Relation to money?
Mobility	Journey planning?
	Price vs. comfort?

Source: Arthur D. Little

Figure 5: **Behavioral and attitudinal segmentation to cover mobility as a whole**

Customer experience covers how a customer engages with an organization across all touch points during their end-to-end journey. This will include the core transport service, as well as other interactions they experience as part of their journey. Customer experience goes beyond these basic hygiene factors. It also includes the interactions customers have with companies while not traveling, such as the operator's website, as well as its customer-contact center, apps, social media, refund procedures, direct mail, consultations, advertising campaigns and safety initiatives.

Customer experience improvement typically follows a structured approach that proceeds from an understanding of performance and needs, to the implementation of required actions. It implies:

- Firstly, a better understanding of customers' habits through innovative marketing segmentation approaches (for example, based on attitude and behavior)

- Secondly, review of the commercial offering, to maximize its attractiveness to key segments. This requires a comprehensive review of all its key components – transport plan, products and services, pricing, distribution, and customer relationship management and loyalty programs

- Finally, an analysis of the company touch points throughout the customer journey to identify initiatives to "fix the basics" of dissatisfaction, and also to secure consistency and create "wow factors" that exceed expectations.

Developing a superior customer experience also calls for focus on the staff experience. Only employees who are fans can deliver the necessary emotional experience.

3. Improve operational effectiveness

The business and environment in which mobility solutions providers are operating are changing rapidly, and actors must continue evolving to stay ahead.
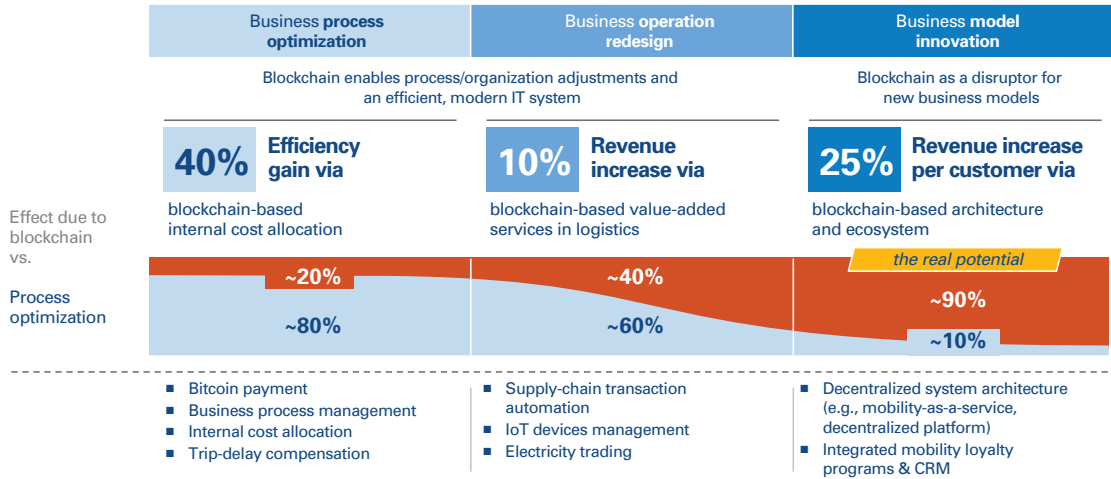
- While the main unit costs (wages, infrastructure fees, energy) have risen continually in recent years, travel fares have often not kept pace. This has put many players, especially incumbent mobility solutions providers, under additional financial pressure, despite many of them recording notable productivity increases.

- At the same time, incumbent mobility solutions providers are facing fierce competition from new mobility players and solutions. These often operate from lower cost bases and are able to act with higher levels of agility. In order to maintain or strengthen their competitive positions in this new world, mobility operators need to change the way they work to reduce operating costs.

- As ridership levels increase, mobility operators need to expand their networks while maintaining and improving service levels. At the same time, as their assets age, operators will have to replace much of their inventory. This will lead to increasing investment requirements, which will drive down their operating margins or put further strain on taxpayer resources.

- But not only that – as technology is developing rapidly, the assets that operators will have to manage will also be different in the future. New competencies will need to be developed, for example, in digital technologies, to manage these new assets of the future while retaining the important competences of retiring workforce members.

Mobility solutions providers are evolving in an asset-intensive and long-cycle industry. It is essential for an operating model to be able to maximize the use of both new and existing assets and deliver effective and efficient solutions. An imperative is thus to "improve the machine" by increasing the productivity and usefulness of operations while enhancing asset utilization.

New technologies, enabled by the fourth industrial revolution, are booming in the mobility sector, with their benefits around intelligence, foresight and interactions well documented. But before implementing solutions, the challenge for mobility operators is to select and prioritize their digitalization pathways by understanding the range of opportunities, and then defining the right target picture in terms of operating improvements, taking into account company-specific factors. This will allow them to focus on prioritizing implementation of levers that will have the most positive impact on both cost and improving customer experience.

Arthur D. Little recently looked into specific use cases of the blockchain for traditional mobility operators. (See Figure 6.) Beyond the substantial benefits that can be obtained from blockchain-enabled business process optimization and operation redesign, we found that the highest potential was likely to be achieved through blockchain-enabled business model innovation, such as decentralized system architecture and loyalty management.

Business **process** optimization	Business **operation** redesign	Business **model** innovation
Blockchain enables process/organization adjustments and an efficient, modern IT system		Blockchain as a disruptor for new business models

Source: Arthur D. Little

Figure 6: **Blockchain – Optimizing organization and creating future business**

4.   Network mobility systems towards mobility-as-a-service

The analysis of the maturity and performances of mobility systems has shown that, due to the complex nature of today's problems, optimizing performance at sub-system levels has strong limitations, and only system-level improvement will sufficiently transform overall mobility performance. However, in today's mobility systems, modes of transportation are often still divided, and public and private stakeholders do not work together closely enough on the development of seamless and networked mobility ecosystems.

Alongside regulation, we expect digitalization to be one of the main factors driving convergence and upgrading mobility systems to a completely new level, enabled through the gradual realization of the concept of mobility-as-a-service.

"Mobility can now be seen as an information service with physical transportation products, rather than a transportation product with additional services." (The Role of Regulation in preparing Transport for the Future: Study for the European Parliament, 2016).

The MaaS concept aims to provide consumers with integrated, flexible, efficient and user-oriented mobility services. It implies a shift away from the personal ownership of cars and non-integrated means of transportation, towards the use of integrated, multimodal mobility solutions consumed as services on a one-stop-shop principle. The high expectations of MaaS are fueled by the anticipated evolution of on-demand mobility services to cover the so-called "first and last miles" of the journeys, which are expected to become significantly more affordable once self-driving vehicles are widely available.

Full development and implementation of MaaS at city or national level requires the presence of several components:

- Well-integrated physical, multimodal mobility infrastructures and solutions are a prerequisite. Achieving this requires long-term alignment between mobility stakeholders on a common mobility vision and strategy (such as through the development of a multimodal transport master plan, ensuring the optimal allocation of transport modes in space and in time), as well as a coordinated approach to investment.

- At the center of MaaS is the integrated mobility platform and application(s). These will allow for creation and management of journeys and act as an interface for consumers.

- Multimodal tariff integration and its associated requirements in terms of risk-sharing governance, especially in the case of evolution towards a full "usage" mobility subscription model, in which the MaaS operator would take responsibility for the overall journey, including parts that are provided by third-party mobility operators.

Several MaaS market evolution scenarios and business models are possible, with different levels of involvement from public and private actors[4]. Public transport authorities have critical roles to play in the enablement of the MaaS concept at city or national level by ensuring the necessary conditions for success are in place. Both transport authorities and operators must therefore carefully evaluate their available options.

5. Embark on a transformation journey to the era of creativity

As mentioned earlier, transformation is currently all the rage within mobility ecosystems. However, in an evolving ecosystem, reinvention in and of itself is not enough. A visionary strategy will only succeed if it is implemented in a sufficiently agile way.
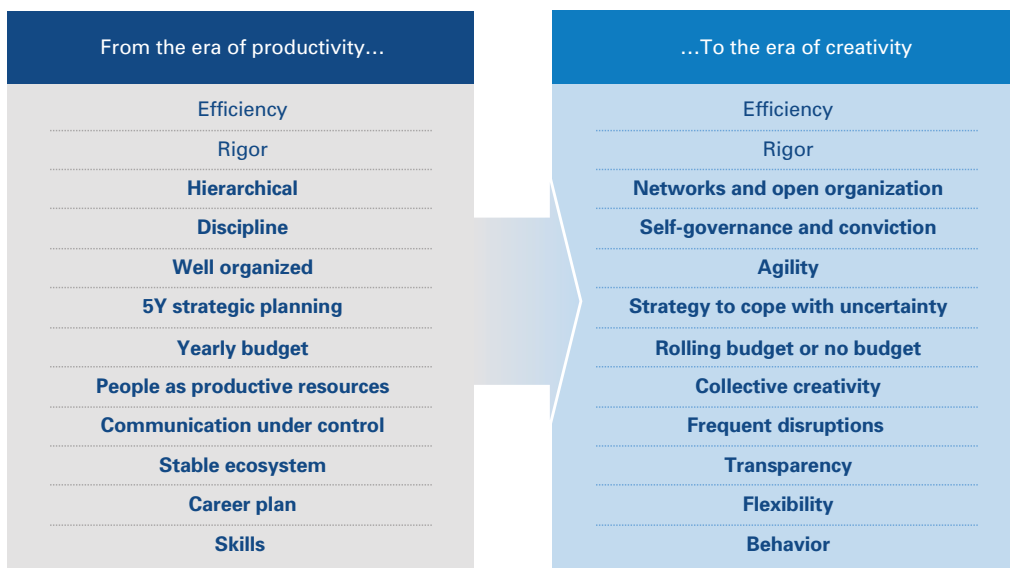
The reason organizational transformation is so complex is the need for businesses to address three key questions simultaneously:

- What are the major disruptions that are likely to impact the mobility industry, and what strategic responses are needed?

- How can these strategic responses be turned into rapid, practical actions to effectively drive change?

- How can we use the ability of the organization to deliver lean day-to-day operations, while at the same time thinking "outside the box" in order to continuously identify the next breakthrough solutions to sustain and build competitive advantage?

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4. Please refer to the "Future of Mobility 3.0" report for an extensive review of possible market evolution scenarios.

We believe providers should hold back from total transformation. Instead, critical to building lasting differentiation and competitive advantage is carrying out the required adaptations, while at the same time preserving, enhancing and expanding the core business. Reaching this point involves overcoming two issues:

- Firstly, the business operating model needs to be adapted to match the speed and scale of new mobility solutions players (or, in the case of new mobility solutions providers, to maintain their speed and scale).

- Secondly, organizations have to transform their legacy business models and operations, making their value chains as lean and agile as possible.

From the era of productivity…	…To the era of creativity
Efficiency	Efficiency
Rigor	Rigor
Hierarchical	**Networks and open organization**
Discipline	**Self-governance and conviction**
Well organized	**Agility**
5Y strategic planning	**Strategy to cope with uncertainty**
Yearly budget	**Rolling budget or no budget**
People as productive resources	**Collective creativity**
Communication under control	**Frequent disruptions**
Stable ecosystem	**Transparency**
Career plan	**Flexibility**
Skills	**Behavior**

Source: Arthur D. Little

Figure 7: **Embarking on the journey from the past to the new world**

Successfully managing transformation implies a change of paradigm for mobility solutions providers. It will be driven by the ability of organizations to develop the capabilities and energy to become "viable systems" that can adapt continuously to the changes in their ecosystem, with minimal effort and while remaining true to their "sense of purpose" and value sets.

Further reading

Our extended report, "Future of mobility 3.0 – Reinventing mobility in the era of disruption and creativity", provides more details on these five dimensions, as well as detailing 12 imperatives for mobility solutions providers to consider when defining their sustainable visions and strategies. The report also includes case studies of mobility solutions providers demonstrating good practices. It can be accessed at www.adlittle.com/futuremobilitylab.

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