



# Technology Market Research

## Digital Transformation

### Evolving Vectors: Responsible Digital Transformation

After relentless 'digitization' over the last 20 years, the pandemic brought both an interruption and opportunity to rethink digital transformation. Enterprises and technology providers need to reimagine 'digital' for a more anxious world.

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From 2000 to 2020, there was a continuous, relentless drive to connect everything, digitize everything, and move everything to an Internet-enabled service. Thus, came acronyms like SaaS, SMAC (Social, Mobile, Analytics, and Cloud), IoT (Internet of things), and more. These massive transformational opportunities, partly enabled by liberal doses of capital, created a large footprint of new technology both for the consumer and the enterprise (including government). Whether it has generated ROI and made peoples' lives better can be objectively evaluated only over the long term. Near-term results are mixed. Technology costs have not necessarily gone down due to the adoption of these services, but they promise new benefits not experienced earlier.

Based on our research, the transformational trends of the last 10-20 years can be

summarized as below (categorized by industry). Many of these trends are still happening on the ground and not yet reached maturity.

- **Retail:** Enabling digital purchase and sell experiences, remotely managed delivery, gathering more data about customers, targeted advertising based on their needs, evolving the brick-and-mortar channel to work with the digital channel.
- **Manufacturing:** Leaner and intelligent supply chains, connected production environments, collecting more real-time data about production, supply chain, and inventory, digitally enabled sales and field service organizations.
- **Agriculture:** Precision agriculture based on data analysis of crop expectations, crop inputs, and crop environment.

- **Banking, Payments and Financial Services:** Real-time digital payments, digital banking, protection against online fraud, crime, and theft, superior customer experiences, overhaul of legacy financial infrastructure.
- **Communications, Media and Entertainment:** Seamless entertainment experience on desktop/mobile, infrastructure for handling large amount of image and video content, digital creative goods, increasing content choice for the consumer, enabling mobile access to all types of consumer and enterprise applications.
- **Utilities and Energy:** IoT, digital payment, digitally enabled supply chain, connected field support services, digitally enabled renewable energy infrastructure.
- **Healthcare:** Personalization of health care through patient data, real-time availability of data and diagnosis, treatment, remote diagnosis and treatment, connected healthcare workforce.
- **Transportation:** Mobility as a service, tracking of connected vehicles, self-driving vehicles, connected field and sales force, digital sales.
- **Education:** Connected classrooms, explosion of free and paid digital educational content.
- **Government:** Digital services to citizens, e-procurement.

The **Covid-19 pandemic** (2020-22) put a short but hard stop to this transformation and made us reimagine it for new realities. It gave rise to further horizontal, industry-sweeping trends like remote work, keeping remote employees motivated and engaged, increased at-home entertainment, remote delivery of services and goods, remote closure of commercial transactions, remote healthcare, remote digital education and assessment, and so on.

Many of these trends are revolutionary in their industries, and some have rightly been described as disruptive. The benefits of these

trends to customers and users have already been documented.

Due to the ongoing evolution of **Artificial Intelligence** algorithms, data, training, and computing power, we now also stand at the cusp of a long-awaited AI transformation both in work and personal life. We have already seen acceleration in the use of Conversational AI and Generative AI.

Our research shows that precisely due to the disruptive nature of these trends, and their adoption at such a large scale and speed, we need to be cognizant of their impact on people's lives, societies, and economies. e.g.

- What is the optimal combination of in-person and remote (digital delivered) work for the office? for healthcare? for education? for entertainment? Is there value in in-person delivery of these services, and if so what is it? Based on human psychology, what benefits do in-person and digital delivery of each of these services bring?
- What has remote work meant for employee engagement, motivation, commitment, collaboration, work-life balance, and work-life boundaries?
- At the net level, have digital services saved time for humans and allowed them to engage into truly well-being-producing activities? Has the saved time been consumed by newer digital services and apps? If so, what is the optimal digital consumption in a given day?
- To what degree are the various digitally delivered services (and their crowding on our mobiles and desktops) leading to a fragmentation of human attention, and what are the long-term implications for human concentration, memory, psychological stability, empathy, well-being and happiness?
- Have the digital transformation trends been equally beneficial to all the

stakeholders in the supply chain? We have seen reports ranging from the problems faced by various types of 'gig workers' to conditions of worker in mines of technologically-critical materials and assembly line workers who manufacture digital devices.

- What impact AI and automation will have on the knowledge breadth and depth of various jobs? While it is true that automation will create many technically-oriented jobs, will all those losing jobs in the existing environments be capable of the re-skilling required?
- Even in the technology supply chain, have all the proceeds of digital transformation been equitably distributed? Do large digital conglomerates tend to benefit more due to their position of being a preferred platform, monopoly, or equivalent?
- Is all the content and data being created out there, on which the algorithms run, true and reliable? i.e. Do we have data integrity?
- Customer privacy and targeting concerns about digital apps, which are already well-documented.
- How secure is the digital infrastructure and what sort of innovations and tools bad actors might develop to abuse and interfere in its legitimate working?
- How reliable is the digital infrastructure given the increasing scale of users, frequency of use, and complexity of use cases? When digital services become a lifeline, what recourse do users have when such services are down?

- Overall, is intense digital transformation creating more or less equity of opportunities and wages?
- What will be the ecological footprint of the growing digital transformation and do we have ways to mitigate it (including the end of life waste issues for devices and infrastructure)? In what ways can it help reduce ecological footprint of other aspects of our lifestyle and work?
- Do we need more thoughtful control on what kind of entertainment/news content is being delivered, where and to whom?
- What are the long terms pros and cons of the 'digital influencer economy' (brands, other commercial influence and political influence)?
- Impacts of digital addiction, especially on children (well documented).

Such considerations will have an impact on the design, user experience, cost, availability, frequency of use, infrastructure, delivery, security and privacy of digital services.

We believe the ongoing decade (2020-2030) is about paying more attention to these issues and carrying out digital transformation **responsibly**. The current decade will be about more debate, more rationality, thoughtful innovation, and not accepting all things digital as an automatic boon to our life and work. It will be about carefully observing the impact of digital disruption on humans and their environment and creating a more sustainable, equitable digital transformation.

*At Attagis Solutions, as part of Technology Market Research services, we have helped mid-sized and large tech companies, enterprises, and consultancies to do a bespoke analysis of several aspects of digital transformation. Our experience spans telecom, retail, software, IT services, travel and hospitality, digital media, and start-ups. Please contact us at [info@attagis.com](mailto:info@attagis.com) to know more and engage.*