CIONET
What's next.

EMERGING TECHNOLOGIES

CIONET IS PLACING THREE BIG BETS FOR THE FUTURE

Roger Camrass
CIONET UK

Discussion Documents

January 23

Emerging Technologies – placing three big bets for the future

By Roger Camrass, Research Director at CIONET

It's sometimes easy to forget that the digital transformation of the past two decades has been enabled by just four technologies – **S**ocial media, **M**obility, data **A**nalytics, and **C**loud computing (what MIT refers to as **SMAC**). However, we believe a tipping point has now been reached and a far more radical shift is afoot.

New research by CIONET suggests the digital transformation that's gone before is merely a prelude to a revolution brought about by three emerging techniques – Artificial Intelligence (AI), Immersive technologies, and Decentralised Autonomous Organisations (DAO). Such is the potential impact of this revolution that we believe these three technologies could initiate a digital renaissance that is equivalent to – or which even surpasses – the Renaissance in Europe 500 years ago.

Looking back before looking forwards

Let's be clear from the outset: the SMAC technologies have helped transform every aspect of human life, from the way we work to how we manage our money, shop, travel and socialise. These technologies have delivered an era of *hyper-connectivity* and *hyper-personalisation*, which is helping to simplify corporate structures and enrich our individual experiences.

But the benefits of this transformation are not exclusive to enterprises and individuals. In fact, we believe the main beneficiary of two decades of digitisation has been Big Tech (namely the 'MAAAM' group of Meta, Apple, Alphabet, Amazon, and Microsoft). These five US companies have a combined monetary worth that now exceeds the total value of European equity markets. Today, Big Tech owns our data and is applying powerful analytic techniques to generate fresh sources of revenue. Few of us recognise just how powerful this franchise has become – and the real pay-off is yet to occur.

What are our big bets for the future?

All businesses face a packed pipeline of emerging technologies. These developments include the Internet of Things (IoT), fifth- and sixth-generation mobile communications, low-Earth orbit satellites, edge and quantum computing, artificial intelligence (AI) and machine learning, augmented and virtual reality (AR and VR), Web 3.0, decentralised business models, 3D printing, genomics, and much more. Few organisations have the capacity to experiment across this broad landscape of technological change. Most businesses will need to be selective, picking just two or three emerging technologies to test and exploit specific use cases.

At CIONET, we have spent the past year speaking with digital leaders. The general consensus is that three technologies stand out from the crowd. These are: **A**rtificial Intelligence (including machine learning); **I**mmersive techniques (incorporating AR and VR); and **D**ecentralised autonomous organisations (enabled by Web 3.0). In combination, we refer to these game-changing technologies as **AID**.

Of course, these three AID innovations will not operate in isolation. The digital leaders we've spoken with recognise that other technologies, such as IoT, 3D printing, and fifth- and sixth-generation mobile communications, will help to accelerate digital transformation programmes. However, digital leaders also believe that these other technologies are an extension of the existing status quo, or what we refer to as 'modernising the factory'.

AID, on other hand, represents something different and far more radical. We believe AID technologies could be the catalyst for a revolution that will help to reinvent business models, societal structures and personal experiences, leading to fresh innovations in the workplace and at home. This AID-assisted revolution will be all about 'creating the new'.

Taking a closer look at these three big bets

So, how will AID power a revolution at work and at play? Here's a summary of the three technologies that we believe will lead to ground-breaking changes in the not-so-distant future.

1. Artificial Intelligence – As humans, we develop our views of reality and our ability to solve problems over a long period of time by absorbing knowledge and experiences through our five senses. AI employs machine-learning techniques to capture and analyse vast amounts of information to detect patterns, understand consequences and produce models. Modern computers can draw on a range of inputs, including images, words and information sourced from the web, to power these models. The results can be spectacular, such as when AlphaZero, the game-playing AI created by Google sibling, DeepMind, beat the world's best chess-playing computer program in 2017.

   Advances in compute and storage power over the coming decades will mean AI develops models of reality that could differ from – and possibly even enhance – those of humans. AI will complete this work at speeds that are unimaginable right now. Let's return to AlphaZero, which learnt an unbeatable chess strategy in just four hours. Now, imagine that power being developed exponentially for years to come. The potential impact is inexorable. We expect a new type of partnership to emerge between humans and machines, which could have startling effects in every aspect of our existence, from healthcare and education to employment and onto family life.

2. Immersive technologies – The social-distancing requirements of the coronavirus pandemic meant billions of people had to abandon their office desks and resort to home working. At the same time, face-to-face meetings between family and friends were also placed on hold. Rather than meeting in-person, we communicated with family, friends and work colleagues via web-conferencing services, such as Microsoft Teams and Zoom. It was a shift in communication and working styles that was completed in days, thanks to the power of cloud computing. However, the impact

of this transition has persisted well beyond lockdown. We continue to rely on virtual communication, but also recognise its limitations in terms of in-depth collaboration and innovation.

The metaverse is an environment that promises to overcome these limitations. Big Tech firms – most notably Meta – have already committed billions of dollars to help build the metaverse, which could become a virtual meeting place that uses AR and VR to enhance experiences and blend characteristics of physical reality. However, current manifestations of the metaverse are held back by inadequate terminal technologies and processing power at the point of use. Microsoft has produced more advanced devices, such as HoloLens 2, that can be applied in an enterprise setting. Yet these technologies remain at a nascent stage of development and come at a cost that is well beyond the means of the average consumer.

Similarly to the rise of mobile technologies in the past, full immersion will only take place when usable and affordable devices are available. Just as the launch of Apple's iPhone and its App Store led to widescale third-generation mobile adoption, so we await the 'killer application' that will support a new age of metaverse experiences. We expect such developments will take place within the next decade and they will make it possible for us to live physical and virtual realities simultaneously.

3. Decentralised autonomous organisations – Many of the most successful digital organisations today, such as the members of the MAAAM group, depend on centralised data and content to operate their business models. As we stated at the outset of this paper, this operation is not without side effects. Our personal information is being swept up into monopolistic sanctuaries, where we have a very low level of control over our intellectual property.

We believe a fast-emerging third generation of Web technology (Web 3.0) presents an opportunity to demolish centralised structures and enable decentralised autonomous organisations (DAOs) that better suit the human condition. The key components of Web 3.0 and DAOs include blockchains, non-fungible tokens and cryptocurrencies. In combination, these new components and organisations could challenge the existing order (known an Industry 4.0). We believe Web 3.0 could support the emergence of a new economic landscape (Industry 5.0), which consists of small, highly adaptive enterprises that can compete effectively with Big Tech behemoths.

Now, let's place our three big bets on AID technologies within a broader context. Computing will continue to advance at breakneck speed due to Moore's Law, which predicts a doubling of processing power every two years. However, we also believe that we're fast approaching a point of singularity, where combined compute power across the globe exceeds the processing capabilities of the entire human race. This point might be no more than 25 to 30 years away. If that's the case, then our three big bets could herald a digital renaissance across the planet. We must start preparing now.

What are the problems that technology can help to solve?

Despite significant progress in digitisation during the past 20 years, the quality of life for many people around the globe has not changed significantly. Yes, we might be able to produce goods and deliver services at greater speed, lower cost and higher quality, but poverty remains endemic and Generation Z has little prospect of matching the wellbeing of the Baby Boomers. Mental health issues, meanwhile, are reaching epidemic proportions and 90% of the global workforce dislike their jobs. As we head towards a global population of nine billion, more than 70% of people will be converged in just 500 mega cities. In under 50 years, climate change is likely to warm the planet by two-to-three degrees, leading to the displacement of billions of people. Something radical needs to happen soon if we are going to avert a disaster.

Our research suggests that digital leaders recognise their role as co-partners in seeking out and solving the big problems of the day. We believe the three AID technologies can help in this endeavour. Here are just two examples of how our big bets might create solutions to intractable challenges.

How might we improve our sense of belonging?

For most of the the world's population living in huge metropolitan areas, we believe the lack of a sense of community and belonging will be a critical issue, especially as many people spend most of their time in homes rather than social spaces. The advent of truly immersive technologies could offer a solution to a growing sense of isolation. These technologies will enrich the quality of interactions, both in family and work life. They might also stimulate new and vibrant communities of interest.

Perhaps the most significant consequence might be the development of digital villages, where people can meet daily with friends, workmates and family members. Back in the 1980s, architects strove to create physical spaces that combined offices, retail outlets and cafes. British Airways' Lakeside office in West Drayton is one example. Now, imagine these kinds of all-encompassing spaces within a VR environment, where everyone can work and socialise with like-minded people across the globe. Village life was originally a practical solution to the need to develop self-contained communities. Perhaps we could emulate the village model in virtual worlds and help reduce some of the challenges associated to the oversized cities of the future?

How might we introduce creativity into our working lives?

We recognise that many day-to-day work activities are mechanical and repetitive. Few people derive satisfaction from this monotonous routine. Help comes in the form of robotic process automation (RPA), which could eliminate a third of repetitive work activities. Adding AI might also help eliminate or transform a further third of work activities. It's important to note that this automation presents a challenge and an opportunity to humans. We could abandon work and leave it to machines or adapt and pursue new opportunities based on our personal passions.

Decentralised business models will offer individuals the possibility of creating new forms of employment based entirely on their intellectual property. Many of us pursue hobbies that could be converted into commercial activities. For example, my personal trainer reconditions vintage Hi-Fi equipment in his spare time and is a member of an online forum of similar enthusiasts. Web 3.0 could allow him to build up and monetise his intellectual property across a global audience of many thousands of people. His passion could become his main source of personal income.

In a recent CIONET research paper entitled 'The rise of the digital artisan', I hypothesise the prospect of a return to village life, set in virtual reality, with crafts replacing mechanical and professional skills. Such a new and invigorating world might be no more than 10 years away.

Conclusion: Get ready for a Digital Renaissance

Now is the time to think very carefully about how we will embrace the AID technologies to improve our lives and our opportunities. CIONET welcomes you to debate the prospects for positive change as part of our community of over 10,000 digital leaders across Europe. As a starting point, we invite our UK CIONET community to attend our forthcoming conference on Emerging Technologies on the 25 January at the Institute of Directors in London.

Register at cionet.com/en-gb/cionet-uk/events

Roger Camrass
Lead researcher

A pioneer of today's Internet as an ARPA research fellow at MIT in the seventies, Roger has spent over forty five years helping corporations harness the power of new technologies such as cloud, mobile communications, e-commerce, voice recognition and satellite. He was a partner at EY responsible for e-commerce during the dot.com boom. He is a graduate of Cambridge University and MIT, and a visiting professor at the University of Surrey.

See **rogercamrass.com**