

The Road to Quixoticity Index

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Quixoticity

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A world in flux

Charles Dickens could easily be describing our modern, complex, contradictory world when he writes at the opening to "A Tale of Two Cities": "It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness."

The modern, idealised Western society constructed upon the ashes of two World Wars and based on one particular form of industrial and financial capitalism largely imposed by the United States at Bretton Woods - comprising well-defined nation-states, stable democracies, well-functioning labour markets and stable central bank-controlled currencies – is rapidly reaching its natural limits. As we stagger towards the end of the 2010s, the parallel physical, digital and virtual worlds we inhabit are in flux.

Centralised Governments; hierarchical market structures; large, fragile, crisis-prone, oil-based economies are all in urgent need of a complete overhaul as we all collectively try to understand what is to be done in these times of rapid technological change. Nothing will ever be the same again. The generations no longer understand each other. Complexity, confusion and uncertainty reign. What will happen next?

Everywhere we look, the established order is threatened, challenged, by an unorthodox, unexpected, contradictory coalition of visionaries and agents of terror. An array of technology start-ups and social entrepreneurs are challenging the status quo, attempting to construct a better, smarter alternative future. Terrorists, criminals, separatists and madmen are also challenging the status quo, attempting to tear down and destroy the old world, often with no clear plan for the future.

This new, rapidly emerging world appears to be growing larger and yet shrinking at the same time. We live in an age where nothing is quite what it seems to be; experts no longer appear to be able to provide answers; predictions

no longer count for much; numbers, statistics and eternal truths no longer guide us. We transmit enormous amounts of data, but can no longer trust the reliability of its sources or guarantee its intended destination. We are in urgent need of new tools, new methodologies, new ways of seeing the world: new mindsets.

Communications will play a critical role in this new world. In spite of all the potentially negative scenarios and nightmare outcomes, we must still remain optimistic that we can find a way to a better world by 2030, fulfilling at least partially the United Nations Sustainable Development Goals. We will need to focus on the better provision of basic public services, security and privacy and above all, a basic framework for public safety in all nations, respecting diverse individual circumstances, cultures and ways of life.

End-to-end, next-generation critical communications systems of systems will need to emerge and evolve over the coming decade. The Quixoticity Index, to be launched in November 2017, can play a central role in this process and herald a wider debate about the role of our industry and community within this new social construct.

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Critical communications

Humans have been communicating with each other for thousands of years. Initially, all communications were communal and face-to-face, although signals, drawings and basic, syntactical, spoken and written languages evolved to allow richer communications across time and space, allowing communities to transfer knowledge, wisdom, cultural norms and protect themselves from danger.

Modern communications took a massive leap during the 19th century as capitalist modes of production emerged first in Europe, spreading across the globe, opening up new trade routes, developing faster forms of transport, harmonising a global time, creating the first generation of Smart Cities with cleaner water, basic sanitation, heating,

healthcare and literacy, terraced housing and electrification, leading to telegraphy, telephones, mass-circulation newspapers, televisions and wireless communications.

Out of the devastation of two World Wars and increased military – defence – spending, information and communications technology took another massive leap forward in the 1940s and 50s. Initially, basic voice-based telephony and data communications took separate paths, although often using similar underlying technologies and physical components. Governments, armed forces, emergency services and critical national infrastructure started deploying bespoke, private land mobile radio networks, completely separate from the Public Switched Telephone Network (PSTN).

1G

During the 1980s, the first generation of cellular (mobile) networks were deployed around the world.

2G

The 1990s saw the rise and rise of the globally-successful GSM standard, which eventually allowed just about anyone, anywhere on the planet to communicate with anybody else.

3G

The third generation of mobile connectivity was introduced during the 2000s, initially stuttering as mobile operators struggled with massive debts from acquiring expensive spectrum rights, although the launch of the first true smartphone – Apple's iPhone - in 2007 changed everything.

4G

Increased data usage forced the global mobile industry to develop an all-IP 4G architecture, which is still being rolled out and improved upon today.

5G

The talk about a fifth generation (5G) that will unify all communications and power the Internet of Things (IoT) and a new connected society has now started and global standards are being specified by a growing number of global standards bodies such as 3GPP, ITU, IEEE, IETF and multiple spin-offs, including open source communities.

TETRA/P25 alone are not sufficient to cope with the rise in data traffic and the increasing demands of modern work-forces and societies

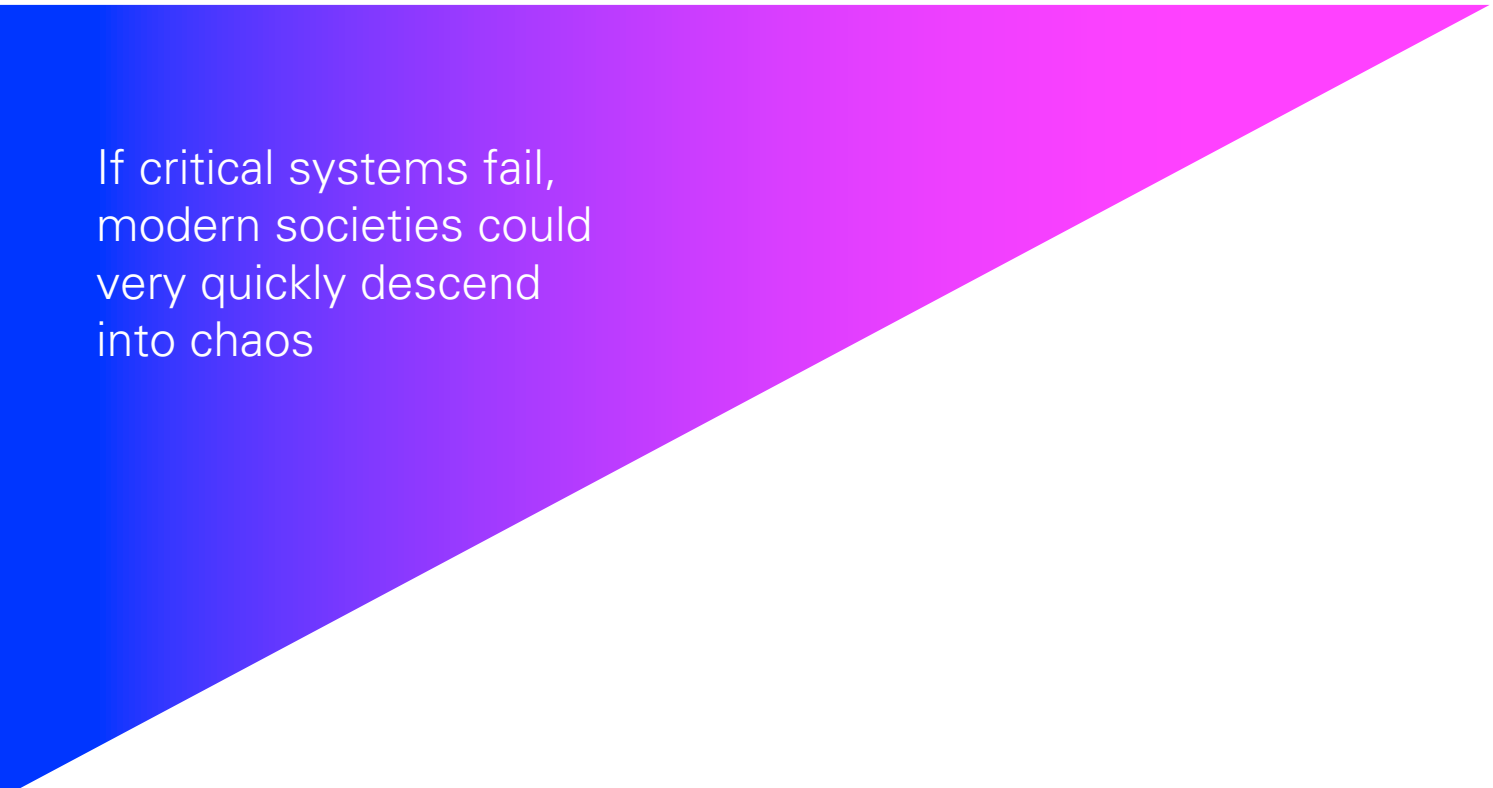


The high-end, specialised, land mobile radio community serving a number of critical verticals such as national security, public safety and emergency services, railways, utilities, oil and gas, mining etc., also developed their own industry standards such as ETSI's TETRA, TIA/APCO P25, more proprietary, publicly available specifications (PAS) such as Tetrapol and highly reliable, increasingly functional, non-mission-critical standards such as DMR, dPMR and a few Asian variants. Digital mobile radio standards currently available are considered to be 2G or 2.5G, as they are digital, but can only transmit narrowband data.

Almost all developed nations and many developing nations now have wide-area, national or regional TETRA/P25 mission-critical networks in place, which provide well-understood, tried-and-tested, stable, mature mission-

critical voice and short data services, as well as control room connectivity, location, image and other less data-hungry applications, often working together with other ICT solutions over core networks that are increasingly IP-based.

However, it has been very clear now for a number of years that TETRA/P25 alone are not sufficient to cope with the rise in data traffic and the increasing demands of modern work-forces and societies. Fortunately, our industry, community and decision-makers are aware of this situation and are working on long-term solutions.



If critical systems fail,
modern societies could
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into chaos

The challenges facing the critical communications community

When we visit rapidly-evolving Smart Cities such as Dubai, Singapore or Bristol, one can easily imagine the unlimited possibilities that the future might have in store for a more connected, better informed, happier society plugged into new services, applications and infrastructure. Each new generation grows up adapting to new realities, pushing the boundaries of what's possible. Observing the dynamic, youthful, bustling megacities and mega-nations of China and India, it is not hard to envisage a fundamentally different world by the 2030s.

The decisions made today by our political, civic and business leaders will have an enormous impact on what can be achieved over the coming decade or two. Traditional cultural, religious, political and financial structures are struggling to satisfy the diverse demands of a new generation living through a period of rapid technological change. Institutions are under threat; our climate is under threat; our public services are under threat; hundreds of millions of jobs are under threat; our very way of life is under threat. There is always a danger that the costs of societal change might outweigh the benefits. A better future for the majority of humanity is far from guaranteed.

The critical communications community brings together men, women and other emerging forms of intelligence dedicated to keeping modern societies running smoothly, safely and seamlessly, providing vital public services and generating enormous social value. If critical systems fail, modern societies could very quickly descend into chaos. And yet, because such vital services are mostly hidden away in the fabric of modern towns and cities, it is only when something goes wrong that most of the public – and their elected representatives – comprehend their true importance. Within current economic and financial

structures, it becomes harder to explain their true value to decision-makers and make sure such services are properly funded.

Critical users also have special communications requirements, so it has not been practical in the past to use commercially-produced solutions extensively for life-critical situations. However, rapidly diminishing budgets and the need to keep up with latest technological trends has seen the community join and contribute to global standards efforts.

Since early 2015, a special group within 3GPP – 3GPP SA6 – has been dedicated to developing mission-critical voice, data and video standards within the overall 3GPP framework. 3GPP Release 13 – including a full suite of mission-critical applications - was completed in March 2016, with products expected very soon; whereas the recently completed Release 14 takes mission-critical application development to the next level, separating out functionality common to all services and more specific services. Future releases will focus on important interoperability issues as well as incorporating requirements from other critical user groups such as railways and utilities.

As we move towards a converged 5G future over the coming decade, society will face new, unexpected, unpredictable challenges. Critical communications will eventually become part of the very fabric of the future Internet – a truly mobile, secure, reliable, flexible, automated, service-based architecture – helping deliver the 5G promise. However, we still have a long way to go and many dangers still lurk in the shadows before we can reach our desired destination.

Quixoticity Index



Quixoticity's Founder, Peter Clemons believes a Global Index is urgently required to fill a number of gaps in the current analysis and understanding of global critical communications

As society continues to put ever greater faith in technology to solve more of its complex challenges - with varying degrees of success -, we are currently witnessing the beginning of "the great convergence of everything". Global systems of all shapes and sizes are vacating their proprietary vertical and horizontal silos and moving into more open, interconnected, collaborative, standards-based platforms and ecosystems. Everyone and everything is gradually, steadily, inexorably being connected to a global network of networks.

This great convergence will require a period of "hybridisation" where different markets choose different routes to a common future based on particular needs, possibilities and expectations. IT and communications technologies are becoming increasingly indistinguishable; the commercial and critical communications worlds are rapidly converging and learning from each other. Our physical, virtual and digital worlds are becoming unified by an Internet of Everything.

As common methodologies, topologies, frameworks and APIs are developed, standardised and deployed in real-world environments, industry incumbents will struggle to stay ahead of more agile, innovative start-ups. Only the strongest, bravest and smartest enterprises and organisations will survive.

There is always the danger during this period of transition that the global critical communications community will become fragmented, isolated and lose its focus.

Obstacles to more rapid progress could emerge from many different directions:

- Incumbent critical communications suppliers and operators could try and slow down progress to maintain a tight control over an increasingly niche market.
- Large global commercial mobile vendors and operators could refuse to adopt certain key features of the standards related to critical communications, imposing sub-optimal, commercial solutions on critical users.
- Governments and critical communications operators might lack the necessary resources, funding or know-how to develop and deploy global standards-based critical communications broadband solutions.

Quixoticity's Founder, Peter Clemons therefore believes a Global Index is urgently required to fill a number of gaps in the current analysis and understanding of global critical communications:

- Governments, critical operators and end-users are facing a lot of uncertainty regarding which specific model to follow.

- Traditional analyst reports tend to focus on monetary size and value of markets, extrapolating a static snapshot of current and historical conditions, rather than carefully studying, interpreting and clearly communicating the dynamics of the complex processes themselves.
- Key decision-makers need to be educated and informed, as well as held accountable for their decisions.
- How complex modern societies can be kept safe by developing more advanced critical communications systems is perhaps one of the most important discussions of our time and protagonists needs to be "nudged" in the right direction by bringing together a wider global community.

A constantly evolving, adapting Quixoticity Index will be able to map out, manage and monitor "in real-time" a path to 2030 for each country or authority, allowing necessary, beneficial modifications to be made as the environment changes.

The Index will also help Quixoticity achieve its main "raison d'être" by contributing valuable input to the wider debate about the kind of world we want to live in in 2030.



SUSTAINABLE DEVELOPMENT GOALS



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Quixoticity believes that the UN 2030 Agenda for Sustainable Development offers an alternative model for the future

The 2030 Sustainable Development Goals

The United Nations was founded in 1945, to bring peace, stability, sanity and perhaps even prosperity to a world devastated by two global conflicts that had wiped out the best and brightest of two generations.

The organisation has definitely been through its fair share of ups and downs over the past 7 decades. In spite of this, it remains today a critical institution and global reference – perhaps the only one – for most of the planet’s inhabitants living in countries on the margins of the global economic and financial system, coping with innumerable challenges in often dangerous, devastated, unequal, unfair and unacceptable surroundings and circumstances.

As is the case with many vital institutions working away in the background on countless projects of high social value, the United Nations is often attacked by the rich and powerful when it dares to act against their wishes for the benefit of oppressed and neglected communities. A global organisation comprising 193 countries, where 5 powerful nations hold vetoes over any major decision is never going to make as much progress as many would like or keep everyone happy all the time, but there have been notable successes through the years, such as the 1992 Rio Earth Summit and the Millennium Development Goals that undoubtedly lifted many millions out of poverty.

In 2015, three ground-breaking agreements were signed, reinforcing each other and providing a framework for global social, economic and environmental development with ambitious targets for 2030:

- Sendai Framework for Disaster Risk Reduction 2015-2030
- 2030 Agenda for Sustainable Development
- UN Framework Convention on Climate Change (Paris Agreement)

Between 2005 and 2015, over 700,000 people lost their lives, 1.4 million were injured and some 23 million people were made homeless by natural disasters, with over 1.5 billion people affected and an estimated economic loss of \$1.3 trillion. The Sendai Framework calls on Governments and businesses to work together to anticipate, plan and reduce disaster risk. The global critical communications community clearly has an important role to play helping the United Nations achieve its targets.

The 2030 Agenda for Sustainable Development – building on the original Millennium Development Goals – presents 17 Sustainable Development Goals (SDGs) and 169 targets (shown above) which aim to “stimulate action over the next 15 years in areas of critical importance for humanity and the planet”. Once again, our community is called to play an important role in this process.

The Paris Climate Change Agreement builds on SDG 13 by recognising that “climate change represents an urgent and potentially irreversible threat to human societies and the planet,” calling on all nations to communicate Intended Nationally Determined Contributions that will hold the global average temperature to well below 2°C above pre-industrial levels. Better designed, fully virtualised, automated, more energy efficient communications and industrial control systems can help move us closer to this goal.

Quixoticity believes that the above documents comprising the UN 2030 Agenda for Sustainable Development offer an alternative model for the future, which combines seamlessly with many of the long-term goals of the critical communications community to guarantee a better, smarter, greener future for this planet’s inhabitants. The SDGs will therefore be incorporated within the Quixoticity Index.

The Key Building Blocks of Quixoticity Index

The Quixoticity Index will study a large number of factors – building blocks – that will help us construct a more complete picture of how each country, Government and market are addressing complex critical communications requirements and issues, as we move from the 2G world of yesterday/today towards the fully-developed 5G world of 2030.

As the Index develops over time, incorporating new countries and programmes, adjusting to a rapidly evolving technological landscape, new criteria will be added and less relevant ones removed, with the relevant weight – importance – of each factor adjusted dynamically to reflect changing circumstances. Some of the more important criteria to be included in the initial Index are briefly explained here:

- End-to-end mission-critical features – such as coverage, reliability, availability, redundancy and resilience, graceful degradation and all security/privacy aspects – are non-negotiable components of future critical communications systems for serious nations concerned with national security and public safety.
- The legal, political and regulatory framework
- The creation and preservation of economic, social and environmental value
- Access to sufficient spectrum
- Government/end-user control of key assets, services and interfaces
- Open standards, interfaces and protocols at all levels of an end-to-end solution
- A rich services and applications environment tailored to public safety and other critical users
- A continuous, seamless migration strategy with long-term vision and planning taking into account human factors, change management, business and operational continuity
- Multi-sector integration/cooperation, including state-of-the-art control rooms
- A local, national and international vision, leadership and ecosystem
- Best-practice, creative financing of public safety systems with innovative business models focused on service delivery and creation of social value
- Best-practice information management, data integrity and cybersecurity
- And above all, a clearly defined, well-articulated, technically sound, financially sustainable, long-term plan for moving during the 2020s from the existing patchwork of solutions to fully integrated, end-to-end, next-generation, mission-critical systems that can be effortlessly upgraded and perfectly adapted to changing circumstances.

The Quixoticity Index will therefore move the debate away from a narrower ideological, technical and business-case approach to the provision of public safety and critical communications solutions, by searching a much richer landscape of possibilities and taking stakeholders in new directions towards better outcomes by influencing high-level decision-making processes.

Critical communications is clearly not immune to the wider debate within Government and civil society regarding public sector funding, value-for-money services and the need to justify public spending and the search for greater efficiencies. However, Quixoticity believes that critical communications is such a core component of national security and public safety initiatives - as well as the future 5G society and economy that will develop over the coming decade or so - that it requires new, more sophisticated and special analytical tools and metrics to be developed, such as the Quixoticity Index.



Quixoticity believes that critical communications requires new, more sophisticated and special analytical tools and metrics to be developed, such as the Quixoticity Index

Initial Countries to be Studied



Most developed countries are moving towards more comprehensive, nationwide programmes for their next-generation critical communications solutions. This trend, of course, also depends on demographic and geographical factors as well as political, legal and regulatory frameworks. Almost all European nations have developed nationwide, multi-agency TETRA/Tetrapol networks; United States and Canada are moving towards a nationwide mobile broadband solution, after many decades of fragmented land mobile radio solutions, particularly in USA. China or India's population and geography and Australia's extensive outback probably makes one nationwide public safety network an unrealistic goal in the shorter term for such nations.



Many of the most advanced, innovative solutions currently being developed by the public safety community are to be found in these markets

Quixoticity's Founder, Peter Clemons, has had the opportunity to work with a wide range of Governments, equipment suppliers, operators, organisations and end-user groups spread out across the globe, allowing him to understand and appreciate the similarities and differences of different regions, cultures, operational models and situations on the ground. Based on our experience within the global critical communications industry over more than two decades and considering current programmes and projects being undertaken in a wide variety of markets, we have decided to focus on the following countries – listed below in alphabetical order - while compiling the inaugural Quixoticity Index:

- Australia
- Canada
- Finland
- France
- Germany
- Korea (South)
- Saudi Arabia
- United Arab Emirates
- United Kingdom
- United States of America

Many of the most advanced, innovative solutions currently being developed by the public safety community are to be found in the above markets. These include USA's FirstNet, UK's ESN (Emergency Services Network), Korea's SafeNet, as well as Nedaa's 5G-ready network being developed together with Nokia in Dubai, UAE. Many of the other countries on the list have developed long-term migration strategies or are looking at innovative ways of incorporating more advanced public safety services into their existing networks.

The above countries provide an excellent sample of current best-practice within global critical communications. The more detailed analysis of exactly what is happening in each market and a closer look at how the most significant programmes are developing will allow Quixoticity to advise organisations within these countries about how they are progressing and whether or not they remain on track to achieve their longer-term goals. Quixoticity will also be in a strong position to advise other countries' authorities, suppliers, operators and end-users about which model is best suited to their situation, allowing better decisions to be taken, saving money, resources, and most importantly, lives.

Long-term goals

There can now be little doubt we are moving towards a very different world by 2030 driven by the convergence of a wide range of powerful, enabling technologies. This process will transform the basic infrastructure and fabric of modern towns, cities and nations in ways that we can only imagine today. It is surely in every nation's long-term interests to make sure this transition is as smooth and frictionless as possible. It is surely in everyone's interests to build a better, safer, smarter society.

It is Quixoticity's belief that critical communications must be at the heart of future societies, helping to deliver the 5G promise by working towards achieving the UN Sustainable Development Goals by 2030.

The Quixoticity Index intends to provide a framework for understanding current and future trends within critical communications and making sure that best practice is followed wherever possible. The Index can be a reference point and provide trusted benchmarks for our local, national, regional and global communities, encouraging shared experiences and technology transfer on a global scale.

Right here and now, in 2017, humanity stands at a crossroads, with many challenges ahead and much work to be done. Generational change is never easy, nor painless, as we move from a world we know, understand and feel comfortable within to another very different one where old dogs must learn new tricks. Increasingly complex, interlocking systems operating on multiple levels need to adjust to the new reality. It is also vitally important that we carry everyone with us this time: increasing inequality is totally unsustainable and unjustified, given the advanced level of technical know-how and financial sophistication that should be put to better use in this new world than it has been in recent times.

As things currently stand, there is absolutely no guarantee we will be able to complete such a transformation successfully. However, the consequences of failure are incalculable.

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Quixoticity

It is our hope that the Quixoticity Index will offer a positive contribution to this transition to a better, safer, smarter society underpinned by national security, public safety, strong, vibrant, innovative public services and a more cohesive, integrated, all-inclusive community spirit.

The first edition of the Quixoticity Index will be launched from Melbourne, Australia at the Comms Connect 2017 event on November 22nd. I look forward to meeting many of you personally there or discussing the contents of the Index and what is required to achieve our common goals over the coming weeks, months and years.

Peter Clemons,
Founder, Quixoticity

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