



Digital Transformation: Enhancing IoT-driven Solutions for Smart Islands

The role of sustainable tourism in enhancing the smart islands

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Smart Island concept

The population is growing quickly generating behaviors that force us to face difficult challenges analysis and decision making. Given this scenario, tourist destinations have to deal with a complex environment that makes their competitive position can be maintained or changed, playing a key role in the Information and Communications Technology (ICT), whose function, as a strategic axis, has been consolidated, and therefore it is become as a coordinator of all activities and services, so that all citizens can be connected, better informed and engaged. The concept of Smart Destination is meant by a tourist area which integrates tourism planning and territory in the service of the visitor. Therefore, this will influence the motivation of tourists when they choose their holiday destination. Integrally, related to the discussion in previous lines, the concept of Smart Islands is born.

The role of sustainable tourism in enhancing the smart islands - 1

Concepts like technology, communication, innovation or quality come to mind when we think in «Smart»

Tourism is an important part of the service sector.

Developments in new technologies reinforce organizational and structural innovations.

The effort in tourism has concentrated in the exploitation of Information and Communication Technologies (ICTs).

«ICT could contribute in terms of generating value-added experiences for tourists, while also improving efficiency and supporting process automation for the related organizations».

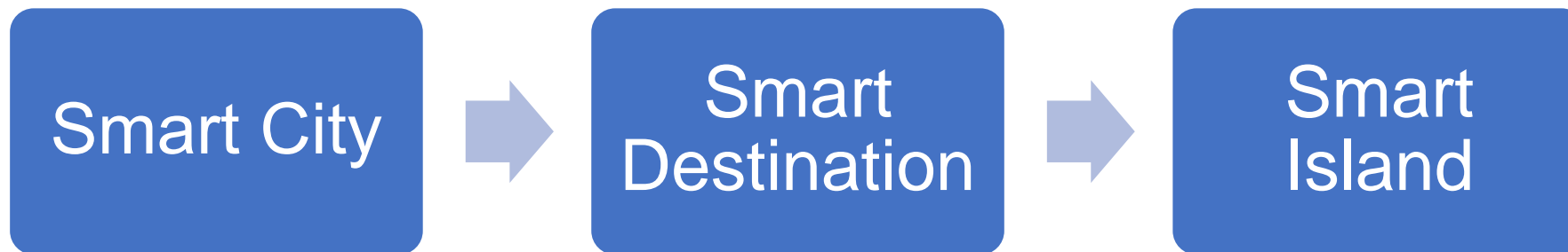
Concepts such as Smart Destinations, and Smart Islands are being studied and applied in the territory improve the quality of life for residents and tourists and to encourage responsible and sustainable management of the territories that promote human development criteria (UNDP)

The role of sustainable tourism in enhancing the smart islands - 2

Smart Tourism destinations usually take advantage of Technology embedded environments:

- responsive processes at micro and macro levels;
- end-user devices in multiple touch-points;
- engaged stakeholders that use the platform dynamically as a neural system supports this view.

This ultimate aim is to utilize the system to enhance tourism experience and improve the effectiveness of resource management towards maximizing both destination competitiveness and consumer satisfaction while also demonstrate sustainability over an extended timeframe.



The role of sustainable tourism in enhancing the smart islands - 3

The overall objective has been to develop a theoretical framework that englobes the three concepts of Smart, Smart City, Smart Destination and Smart Island.

1. The development of a methodology that any island could place themselves to be a Smart Island. (areas and smart indicators for verifying the implementation of Smart Island).
2. Responsible Management of islands ecosystems. The mechanism «Smart» is a tool to achieve this goal.
3. Application of philosophy «Smart» in island ecosystems (Unesco).

The ultimate goal is the management system and the approach of future scenarios to islands.

The role of sustainable tourism in enhancing the smart islands - 4

The overlap between the production space and consumption space is logical in the tourism sector. Destination must be understood like a subsystem configured by spatial elements (land resources, infrastructures...), administrative and productive elements and for its complex interrelationships and the effects they produce (Timón, 2004).

The rapid increase of urban population worldwide has triggered intricate challenges for cities around the world. Thus, Information and Communications technology (ICT) enhance the tourist experience in cities. The concept of smart city was created from the necessity to seeking better management and more liveable cities that encourage sustainability information and the best experience of being a citizen.

From this first approach, the Smart destination concept emerges (Buhalis, 2014). Parallel to this, the concept of Smart Island is developed with the objective of enhancing the citizens' quality of life and its services efficiency, such as optimizing the use of energy and better traffic monitoring (Vicini et al. 2012).

Smart Destination – 1

The Smart Destination concept emerges from the development of Smart Cities (Boes et. al., 2014).

While the Smart City concept is focused on citizens, i.e. not contain temporal visitor, the approach of Smart Destination includes this part of population i.e. tourists and travellers (Lamsfus & Alzua-Sorzabal, 2013).

A Smart destination is a territory where «the investments in human capital and traditional transport and modern ICT communication infrastructure meet the social, cultural, economic, leisure and personal needs of visitors. Visitors are short-term citizens of a Smart City (Lamsfus & Alzua-Sorzabal, 2013).

In accordance with Shaffers et. al. (2011), «the first task that destinations must address in becoming smart is to create a rich environment of broadband networks that support intelligent applications. The second step is to provide full coverage of the characteristic tourism products and services to improve and make the competitiveness of a destination sustainable in time».

Smart Destination – 2

There are three forms of ICT, which are crucial for setting up Smart Tourism destinations (Boes et al., 2014).

- 1) The Cloud Computing services are with the objective to reduce fixed costs and shift them into variable costs based on the necessities (Etro, 2009).
- 2) Secondly, ICT support smart destinations by providing information and analysis as well as automation and control (Chui et al. 2010). For instance, the chips embedded to entrance ticket allow tourism service providers to track tourist's locations and their consumption behavior real time so that location-based advertising could be executed (Lin 2011).
- 3) Third place is situated the End-User Internet Service System, refers to number of applications at various levels supported by combination of Cloud Computing and ICT.

Smart Island - 1

An island is an ecologically isolated self-contained territory (dependent on many occasions, outside energy, communications and inputs commodity) with a principal and network of smaller cities and villages. In many islands, in recent decades, tourism has formed the main source of income. The need to reduce long-term dependency, optimizing the use of resources and trying to ensure the quality of life of people, promotes the Smart motion applied to the island territories.

A generally accepted definition in the current literature of Smart Island is lacking. Nevertheless, the Smilegov (ESIN) project's members have provided a new definition in the «Islands strategy communication paper, 2013». They point out «Smart Island is an insular area that creates sustainable local economic development and high quality of life by excelling in multiple key areas of sustainability; such as the economy, mobility, energy, environment, human capital and excellence in governance». This definition does not move away from the smart destinations and smart cities meaning. The current literature about this research line shows that the concept of smart islands can be perfectly explained by taking into account the concept of other terms before mentioned, which are the base of the theory.

Smart Island - 2

A smart island destination is an innovative touristic destination, consolidated with a technological infrastructure, which assure the sustainable development in a touristic territory, as well as it is accessible for everybody, it makes easy the interaction with the visitors and it increases the user's experience. In addition, citizens in smart islands have their quality of life improved and local economies, as well. The main responsible factor is the investments in sustainable solutions in a number of essential sectors of the local economy, such as energy, water, transport, tourism, agriculture, fisheries and waste management. To get good outcomes it is important to manage a Multilevel Governance system and processes in order to improve the cooperation and the decision-making process across all levels of government.

ICT is the basic infrastructure of a smart island, used not only in cyber space, but also as communicating elements of physical infrastructure, transmitting real-time data on an island's status by way of sensors and processors applied within real-world infrastructure. However, all this technological infrastructure should have a proper connectivity that enables to run them (Romero, 2012).

Smart Island - 3

It is important for the government supported by various stakeholders to maintain adequate network coverage within the destination to avoid gap between commercially dense area and rural area (Buhalis, Amaranggana, 2014).

The implementation of strategic actions in islands is different from other destinations. The size, geographical location and economic, social and cultural factors play an important role in the ability of an island to plan sustainable programs and actions.

The members of the Smilegov Project have proposed to classify the islands in two main categories:

- Pioneer or leading islands, which already have experience in implementing sustainable actions and projects and have the capacity and the political will to continue undergoing significant technology and organizational transformation and continue leading by example.
- Ambitious or willing to learn islands, that have the ambition and the political will to continue on the path of acquiring expertise and the capacity to improve their living condition and continue on the path of sustainability.

Smart Island - 4

A smart island certification has been proposed, whose program is to be developed and communicated to all the islands that participate in the initiative. Thus, islands that fulfil the basic parameters will be entitled to a Smart Island certification.

Applying the Smart Tourism Destinations theory of Gretzel (2011), Smart Islands are not free from political influence, as it opens certain social options and closes others. In this regard, measuring the performance of islands as tourism destinations by attributing a higher score to specific settings could be used as a political tool considering that charts are politician's favourite to justify their political rationales. Further, the danger of using ranking as benchmark for measuring success is to subsequently develop policies based on a single model to be applicable everywhere with limited local adaptation (McCann 2011). It is necessary to point out that there is only little room for the technologically illiterate and the poor within destinations.

Creating Smart Tourism Islands requires the engagement of community participation and public and private entities. E-governance is defined by UNESCO as the ability to governance, through electronic infrastructure. This new type of governance facilitates the process of dissemination of effective information. This process is fast and transparent to the public and other agencies, to develop effective administrative activities by the government (Rodríguez et al., 2011). Smart Governance is related to the aspect of transparency within governance system through modernization of city administration by supporting data openness and public involvement (Cohen, 2012).

Role of ICT in Tourism on smart islands

In island contexts, technologies (ICTs) provide both get data making the intercom and relations between mainland territories and insular areas, favoring progress and resilience processes.

Being tourism a mainstay of island economies, bringing smartness into Tourism destinations requires dynamically interconnecting stakeholders through a technological platform on which information relating to tourism activities could be exchanged instantly.

Smart Tourism destinations take advantage of Technology embedded environments; responsive processes at micro and macro levels; end-user devices in multiple touch-points; and engaged stakeholders that use the platform dynamically as a neural system supports this view.

This ultimate aim is to utilize the system to enhance tourism experience and improve the effectiveness of resource management towards maximizing both destination competitiveness and consumer satisfaction while also demonstrate sustainability over an extended timeframe.

Smart Islands: Bringing Digital Experiences To Communities

The Smart Islands programme adopts an innovative approach to deliver connectivity and digital services to disadvantaged island communities in a scalable and sustainable manner. It aims to transform rural and coastal communities, improving their livelihood and well-being by connecting them to a range of digitally enabled services. The programme, built on the ITU-led Smart Villages initiative (piloted in Niger and under development in Egypt and Pakistan), leverages shared services delivery infrastructure capabilities to provide digital services over connected devices (tablet, mobile phone, computer etc.).

Small Island Developing States (SIDS) face a host of challenges, including geographic isolation, lack of human resources, low availability and quality of infrastructure, and vulnerability to external shocks. In remote areas and in outlying islands, access to information, government services, transport, health, finance, commerce, and education needs prioritized attention. The high costs of electricity and lack of affordable connectivity exacerbate the above challenges for SIDS. Not only does the absence of digital technology contribute to the digital divide, but it also deprives small island communities of the opportunity to leverage digital solutions to obtain better access to essential services. The Smart Islands programme adopts a whole-of-government approach that accelerates progress towards the Sustainable Development Goals (SDGs) through digital transformation.

Characteristics of the digital economy and society - 1

What are the characteristics of the digital economy and society? One way to form an answer to this question is to consider the historical evolution of information and communications technologies.

The earliest digital computers – used for code breaking in the Second World War – performed calculations on digital data. It was the **digitisation** of input data that enabled high-speed electronic processing of data. So, it is arguable that the first and most important characteristic of the digital economy is the digitisation of information and data. In the late 1950s, the U.S. Air Force created networking systems for its radar defence system computers. By 1965 packet switching was developed and reliable scalable computer networking was enabled and in 1974 team working under Vinton Cerf together with the team led by Louis Pouzin developed protocols on which the Internet is based. This enabled the second key characteristic of the digital economy: **connectivity** – the ability of digital processing systems to communicate digitally.

Digitisation and connectivity are fundamental to the digital economy and society. From these characteristics emerge others: **automation**, **accessibility** and **efficiency**. Ultimately, all of these characteristics contribute to greater efficiency in the creation, collection, storage, manipulation, processing, communication, presentation and publishing of information. The digital economy and society is driven by the ever increasing performance and ever falling cost of these information management functions.

Characteristics of the digital economy and society - 2

Each of these characteristics interacts with the other and together they drive economic development, productivity and competitiveness in the following ways:

Digitisation: essentially, when information is digitised it becomes readable and processable by electronic computers and this means data management and processing tasks that were previously undertaken manually can now be automated. The first types of information to be digitised were numerical but now all forms of information can be converted to digital formats and managed digitally including high resolution audiovisual content. Google has digitised many of the world's books in the process of digitising government records is ongoing and enables significant innovation in the provision of government services.

Connectivity: When computers are connected by increasingly fast and reliable networks, digitised data can be shared across multiple systems leading to further efficiency gains this means. Connectivity occurs at many levels: person-to-person, person to machine, and machine to machine. One of the results of the smart phone revolution has been the 'personalisation' of computing nodes at the edge of the network. Smart phone is an intensely personal device and this means that the user experience can be personalised and optimised and that an enormous amount of data reference to individuals can be collected at low cost.

Characteristics of the digital economy and society - 3

Accessibility: accessibility arises from a combination of digitisation in connectivity. Access to a vast landscape of data, information and content, often mediated by search engines, was essential characteristic of the explosion in public use of the World Wide Web that occurred in the 1990s. Access to digitised information over networks vastly decreases the cost of access and leads to further automation and new business models. For example, when a smart phone user calls for a ride on a ride sharing platform, all the user needs to do is specify a destination – the user's identity, location and payment method are all accessible to the ridesharing platform automatically.

Automation: automation is a core goal of the digital economy and, in addition to the examples described above, industry observers are now expecting a revolutionary era of automation in which increasingly sophisticated processes will be undertaken through extensive networks of cloud computing resources that are process using AI and machine learning techniques.

Efficiency: automation is not an end goal in its own right; what it achieves is higher levels of efficiency. Higher efficiency or productivity is ultimately directed to transforming scarce resources or inputs into products and services that consumers value. While greater efficiency clearly serves economic goals, it can also be a powerful contributor to the achievement of environmental sustainability. Because these digital economy characteristics drive productivity, they also drive national competitiveness which in turn drives economic growth and improvements in living standards.

Possibilities and risks in the digital economy and society - 1

What are the differences between the digital economy and society and the traditional world?

How does the transition to a digital connected world affect business, the functions of government and people's lives?

These are complex questions and refer to changes in the socio-economic fabric that go beyond the advent of connected digital technologies. All societies change over time with profound implications for individuals. For example, the transition from rural life in small communities to large anonymous cities represents a significant change in the human experience. Likewise the percent of total transactions conducted in cash in a country would seem to fall as country Internet penetration increases. This fundamentally changes the medium of exchange of the region's economies creating new opportunities for financial participation by groups who previously had no access to financial services.

Possibilities and risks in the digital economy and society - 2

The digital connected economy is the latest phase of humanity's ongoing drive to achieve improved living standards through technological change. Previous changes in technologies such as the steam engine in the English Industrial Revolution or the diffusion of electricity in the early 20th century have involved changes in physical production processes – processes that have to do with 'atoms', in the terminology of Nicholas Negroponte of MIT.

The digital revolution is to do with the manipulation of information or 'bits'. In fact, the digital revolution has shone a light on the, perhaps unexpected, extent to which traditional physical production and economic activity are underpinned by significant information manipulation processes. These technology-driven change processes are, however, by no means restricted to the commercial dimensions of society and economy – they also encompass governments and the ways that citizens with our lives.

Possibilities and risks in the digital economy and society - 3

Importantly as highlighted recently in GSR-19 digital connectivity can provide the canvas for achieving UN Sustainable Development Goals (SDGs) in our societies by 2030. Thus:

Technology paradigms and business models challenge existing regulatory patterns and frameworks. From the imminent entry in markets of 5G and the Internet of Things, to the profusion of cloud services and artificial intelligence, regulatory response requires a new perspective. Unleashing the full potential of digital will require an actionable, agile, collaborative, innovative, and outcome-based approach to regulation. In the increasingly complex and dynamic digital transformation, it is important to agree on common principles and put forward clear and simple rules – and follow them forward.

Digitisation and Business - 1

What factors influence nature and extent of the impact of digitisation on businesses? The impact of the shift to digital economy on any particular business will depend on many factors:

- what extent is the business dependent on information processing rather than executing physical processes?
- is the business willing or able to incorporate new technologies to boost its competitiveness?
- to what extent is the business vulnerable to new disrupting businesses adopting alternative business models?
- what are the skill sets of the existing owners, managers and workers in the business how quickly can these be adapted to the required forward-looking digital skill sets?
- does the business have the resources to transform its business model and require digital skills and assets quickly enough?
- does the business have a viable value creation business model in the digital world?

Digitisation and Business - 2

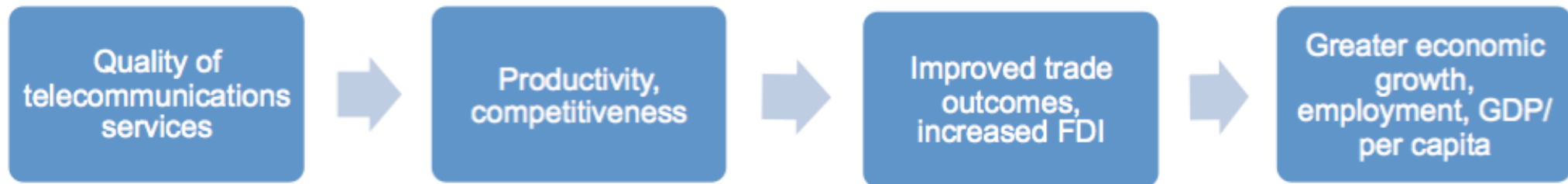
These are the challenges faced by almost all businesses in the transition to the digital economy. The disruptive power of digitisation is now so well established that some consulting organisations are claiming that the post digital era has already arrived the underlying concept being that, digitisation of business is universally compulsory and that now competitive advantage has shifted that operate within the context of a universally digitised marketplace.

Companies already face a new level of expectations from consumers, employees and business partners. Businesses have used the power of digitally driven mass customization to sell two different options of a good or service, then 10 different options, then 100 different options. Companies' success with this approach has fostered for them the illusion that they can meet any need, no matter how personal or custom.

Businesses will need to turn that illusion into reality if they want to meet rising expectations. The coming era will be characterized by massive pressure as customers, employees and society make their demands known. But it will also provide tremendous opportunities for those companies that can deliver the appropriate experience at just the right time.

Digitisation and Business - 3

In this vision of digital or post-digital business era, the consumer is the big winner. From a business perspective, the outcome is heightened and unrelenting competition. This perspective of benefits to consumers, however, needs to be balanced against potential increases in potential for market power in the digital economy. Large-scale digital businesses have the potential to realise significant economies of scale, network economies and financial power which can be used to resist competitive pressures.



Source: Windsor Place Consulting

In 2017, regulators around the world began to appreciate and act on competitive threats arising from the growth of 'big tech' companies such as Facebook, Google, Amazon and Apple. While the threat to consumers through a loss of competitive pressure is obvious in the case of these very large companies, loss of competition can also occur less obviously on a smaller scale in smaller industries or sectors. For example, a single vendor in a particular nation may dominate advertising for job vacancies. Governments and regulators need to be alert to potential for digital technologies to create greater returns to scale as well as greater competitive pressures.

Digitisation and Government - 1

Obviously, if it is possible for the private sector to execute its information-based business processes more efficiently using digital technologies the same is possible for governments. Indeed, it is arguable that many government processes are almost entirely based on information management processing storage and publishing. It is critical that governments investigate and adopt a proactive footing for the adoption of digital technologies that enable the cost of government services to be reduced over time. This is not only because efficiency is desirable in its own right, but also because there are a range of government funded activities which are extremely resistant to increases in productivity in general and increases in labour productivity in particular.

This tendency for productivity in government services to lag productivity in the private sector was first noted by US economist William Baumol who noted that there were large differences in productivity improvement across industries in the modern economy. He observed, for example, for string players are required to play a Beethoven string quartet today as was the case in the 19th century. Many services that are often government funded such as education and health care require relatively high labour inputs and are not as amenable to labour productivity increases as for example private sector manufacturing. Therefore, over time as real incomes increase in the public sector needs to compete with the private sector to attract labour, the relative cost of providing government services will tend to rise.

Digitisation and Government - 2

Digital technologies offer an important opportunity to offset the labour productivity challenges of the private sector. Again, the more cost-effective delivery of government services will benefit consumers the most, or in this case, citizens. Digital governments will enable their citizens to have better cheaper and easier access to a wide range of government services and information. This will inevitably lead to more of a 'self-service' delivery model but this does not mean that consumers overall will not be able to access government information and services more easily overall and in the non-digital world.

Such developments do, however, raise issues of digital literacy, access and the digital divide. Governments need to ensure that they continue to operate systems and services that enable non-digital access to essential services for those with insufficient skills or access to use digital channels.

Another obvious but sometimes overlooked benefit of digital government is that, if governments can operate services at lower cost it will be possible for these cost savings to be passed on at least in part to citizens in the form of lower taxation past, thus, a move to efficient digital government has the potential to increase real after-tax incomes.

Digitisation and Government - 3

There are other significant issues in relation to digital government for example security and privacy including the potential of governments to use access to citizens' digital information to subvert democratic political processes.

Beyond these general high-level comments, there is an enormous literature on opportunities for innovation in digital government which includes ideas such as government opening access to anonymized datasets for use by the private sector both by individuals and corporations. This is a field which remain an ongoing and open-ended area for innovation and development.

Digitisation and the Individual - 1

As in the previous cases above, the transition to the digital economy and society presents gains, losses, opportunities and risks. The sum of the effects of digitisation on individual lives is complex and ambiguous but is, nonetheless driven, by the idea of improved living standards in the broader sense.

The digitally connected world enables individuals to more easily communicate with each other. Communication is not only one-to-one, but also one-to-many and many-to-one and, in this way, communication blurs with the traditional concept of publishing. Consumers have cheaper faster access to a broad range of information on which to base decisions and choices. Consumers also have access to much larger catalogues of digital content for example movies, television shows and music and as well, access to new kinds of content such as podcasts, user generated content, instructional videos on YouTube.

Nonetheless, paradoxes arise in the individual's experience of the digital economy and society which are fundamental and intrinsic to digitisation and connectivity. For example, the flipside of enhanced connectivity, communication and increased capacity for sharing is inevitably some loss of privacy. Also, an increased use of digital channels for communication which displaces face-to-face communication appears to have significant deleterious effects on the skills for social interaction.

Digitisation and the Individual - 2

The principle of consumer sovereignty asserts that consumers know their own best interests and should be left alone to pursue them. The evidence suggests overwhelmingly that consumers and citizens have enthusiastically embraced the digital world. While consumer sovereignty is an accepted fundamental principle of market-based economies, there are broadly accepted limits or exceptions. The state intervenes in many instances to limit access to dangerous substances, for example, access to alcohol by children. The state also intervenes in relation to complex products such as pharmaceuticals to protect consumers.

Recently, particularly in Europe, there has been significant state intervention to protect individuals' privacy and misuse of their data. In the longer term, other negative consequences for individuals of the digital world may become apparent and governments need to be alert to wear further interventions may be required. In general though, the digital era has fully arrived and interventions are likely to be marginal in nature rather than deflecting now deeply entrenched trends.

Digitisation and Institutions - 1

‘Institutions’ is a somewhat ambiguous term but is a concept that has large significance for the ways in which economies and societies evolve and for the path that improvements in living standards take in various nations. There is a branch of economics – ‘institutional economics’ – entirely devoted to study of how institutions influence economic development. Within the framework of institutional economics, institutions include not only the arms of the state such as the courts, reserve banks, and regulatory organisations, but also state processes such as democratic political processes and, in addition, social conventions such as, for example, a tendency for a particular culture to be thrifty or not. Particularly over the long-term, such institutions have profound impacts on the economic development path of nations. If for example the rule of law is weak and the enforcements of contracts is ineffective, investment will be suppressed productivity will be stagnant and economic development slow.

An important development in the evolution of Western societies was the sharing of power between various groups. This sharing of power included democratic processes themselves, which granted executive power to elected representatives, the offsetting power of the courts and judiciary and the importance of ‘the fourth estate’ – the various organisations which make up what is now typically called ‘the media’.

Digitisation and Institutions - 2

It is only recently that the extent to which the transition to a digital economy and society disrupts these institutions has become better understood. We now understand, for example, that the structure of the newspaper publishing industry arose from a particular set of technologically driven cost structures that led to a relatively large scale oligopolistic or monopolistic market structure in which these large publishing companies were required to ensure veracity of their content or face legal consequences. It is only after the relative decline of the publishing industry in the recognition of the problem of 'fake news' that the importance of these structures become more apparent in the need for analogous mechanisms in the digital publishing world become more obvious.

These changes are also made more obvious the role of responsible publishing as core democratic processes. Global elections especially since 2016 have now brought home to governments and regulators the importance of increased regulatory oversight in the digital economy.

Digitisation and Institutions - 3

It is often claimed that technology moves faster than the regulators. To some extent, this is inevitable – regulators can't be expected to respond to something that hasn't happened yet – but the idea that regulators will always be responding insufficiently to technological change can easily be overstated.

For example, if the basic principle of Section 230 of the US *Communications Decency Act* – that platform providers are not publishers and are not responsible for the content of their users – were substantively overturned, this would mark a substantive and permanent change in the digital landscape.

Overall, regulatory and institutional responses to the digital economy and society are one of the most important areas for government focus in maximising the opportunities and limiting the risks and harms in the transition to digital world.

Policy design principles are at hand for regulators to help develop an understanding of new technology paradigms and guide them towards appropriate regulation. Led by these principles, regulators can fine-tune their regulatory response, ensuring optimal impact on the market. The recent GSR-19 identified the key design principles to respond to new technology paradigms and business models stemming from collaborative regulation as detailed in Core design principles for collaborative regulation.

Digitisation and Institutions - 4

- **To achieve digital transformation, policy and regulation should be more holistic.** Cross-sectoral collaboration along with revisited regulatory approaches such as co-regulation and self-regulation, can lead to new forms of collaborative regulation based on common goals such as social and economic good, and innovation.
- **Policy and regulation should be consultation and collaboration based.** In the same way digital cuts across economic sectors, markets and geographies, regulatory decision making should include the expectations, ideas and expertise of all market stakeholders, market players, academia, civil society, consumer associations, data scientists, end-users, and relevant government agencies from different sectors.
- **Policy and regulation should be evidence-based:** Evidence matters for creating a sound understanding of the issues at stake and identifying the options going forward, as well as their impact. Appropriate authoritative benchmarks and metrics can guide regulators in rule-making and enforcement, enhancing the quality of regulatory decisions.
- **Policy and regulation should focus on building trust and engagement:** Collaborative regulation provides the space for co-creating win-win propositions, working towards regulatory objectives while increasing the engagement of industry. Trust becomes the foundation of the regulatory process, underpinning the growth of digital.

Digitisation and Institutions - 5

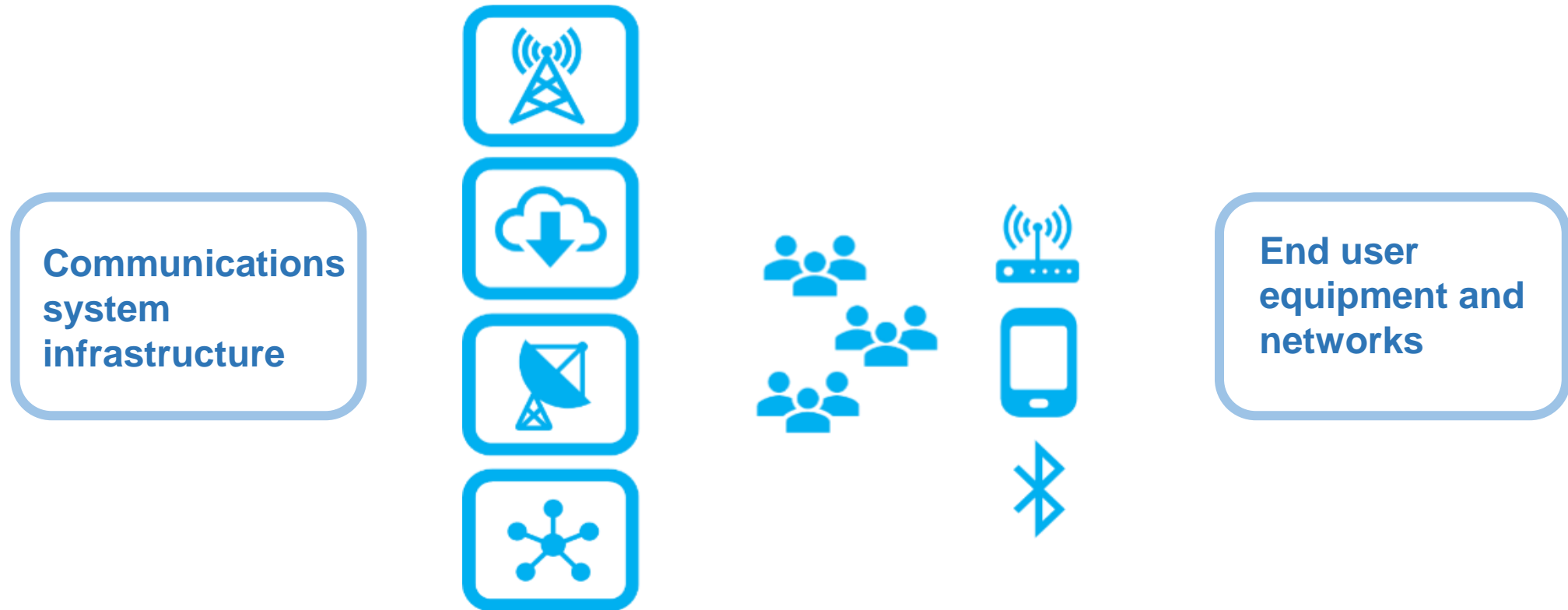
- **Policy and regulation should be outcome-based:** Regulators need to address the most pressing issues, for example market barriers and enabling synergies. The rationale for any regulatory response to new technologies should be grounded in the impact on consumers, societies, market players and investment flows as well as on national development as a whole.
- **Policy and regulation should be incentive-based:** Collaborative regulation is driven by leadership, incentive and reward. Regulators should keep a wide array of investment incentives at hand to provide impetus for markets to innovate and transform while maximizing benefits to consumers.
- **Policy and regulation should be adaptive, balanced and fit for purpose:** Regulation-making is about flexibility – continually improving, refining, and adjusting regulatory practices. The balance in regulatory treatment of new services is more delicate than ever. A close, continuous link to markets and consumers is important to get digital on the right glide path to achieving social and economic goals.

What is digital infrastructure? - 1

Digital infrastructure is the key to enabling the benefits of the digital economy and society. Digital infrastructure is the physical hardware and associated software that enables end-to-end information and communications system to operate. Digital infrastructure includes:

- Internet backbone including national and trans-oceanic fibre cables;
- Fixed broadband infrastructure such as analogue coaxial and optic fibre cable networks;
- Mobile communications infrastructure and networks including Fixed Wireless Access, transmission towers, radio and optic fiber backhaul networks;
- Broadband communications satellites;
- Data and cloud computing facilities;
- End user equipment such as mobile handsets, PCs, modems and local Wi-Fi and Bluetooth networks;
- Software platforms including computer and mobile device operating systems as well as application programming interfaces; and
- Network edge devices such as sensors, robots, autonomous and semiautonomous vehicles, and other Internet of things facilitating devices and software.

What is digital infrastructure? - 2



Source: Windsor Place Consulting, 2019

What is digital infrastructure? - 3

At any point in time, different parts of the system a digital infrastructure will be at different stages of development compared to other parts and bottlenecks will be being experienced at various points. This means that areas of priority development will shift around the network as technologies change and network build-outs and upgrades occur. For example, as greater numbers of mobile communications towers are established, the demand for backhaul fibre will increase. Another example is the need to replace legacy copper networks with fibre networks as consumers demand faster and higher speed broadband services which are beyond the capacity of copper to provide.

Private sector communications companies can be expected to undertake much of the work associated with developing the network but governments have an important role to play in:

- setting the broader strategic context for digital economy and society development including areas such as spectrum policy, skills development, digital literacy, access for less advantaged groups and so on
- developing effective pro infrastructure deployment regulatory frameworks
- directly investing or undertaking private public partnerships to deploy major digital infrastructure systems.

What is digital infrastructure? - 4

While it is almost impossible to completely ‘future proof’ digital infrastructure systems and strategies, governments need to be alert to evolving technologies in order to optimise their infrastructure development pathways. Forward-looking spectrum policy is a critical area in which governments need to incorporate expectations about the capabilities of emerging wireless technologies.

Developing an optimal infrastructure development strategy - 1

It is obvious that the quality, quantity and extent of digital infrastructure plays a decisive role in a nation's capacity to realise the benefits of the digital economy and society. The problem of digital infrastructure strategy, however, is much more complex than simply defining the characteristics of what type of digital infrastructure a country requires at a particular point in time. What is required is a dynamic infrastructure deployment strategy that takes into account:

- each country's history and current circumstances
- average levels of per capita income and likely levels of average revenue per user
- current and possible future regulatory settings
- population, country size including geographic characteristics
- the state of communications technology and its expected development pathway.

Such a dynamic infrastructure deployment strategy will consider all of these factors and chart a pathway to best practice infrastructure for each particular country over the relevant planning period. This deployment strategy should be thought of as an evolutionary path from the present to a future planning horizon.

Developing an optimal infrastructure development strategy - 2

While the optimal infrastructure development path will be different for each nation, we can broadly characterise these development pathways for developed and emerging nations. Developed and emerging nations have very different starting points: developed nations have much greater fixed network infrastructure, higher levels of income, more capital for investment and better developed regulatory systems and structures.

A critical point to emphasise is that emerging nations are making major investments and infrastructure in an entirely different historical and technological context from the developed nations. Developed nations have been making investments in telecommunications infrastructure for over a century and much of this investment was in the form of last mile copper infrastructure.

It is often pointed out that developing nations have been able to ‘leapfrog’ almost entirely the era of fixed line infrastructure deployment. While this idea may have been relatively true in the period when mobile voice was the predominant service, this era has undoubtedly finished.

Developing an optimal infrastructure development strategy – 3

2025 Targets: Connecting the Other Half

- #1** All countries should have a funded national broadband plan or strategy, or include broadband in their universal access and services definition
- #2** Entry-level broadband services should be made affordable in developing countries, at less than 2% of monthly gross national income per capita
- #3** Broadband-Internet user penetration should reach: 75% worldwide, 65% in developing countries, and 35% in least developed countries
- #4** 60% of youth and adults should have achieved at least a minimum level of proficiency in sustainable digital skills
- #5** 40% of the world's population should be using digital financial services.
- #6** Un-connectedness of Micro-, Small- and Medium-sized Enterprises should be reduced by 50%, by sector
- #7** Gender equality should be achieved across all targets

Source: [Broadband Commission, 2018](#)

Developing an optimal infrastructure development strategy - 4

These targets which intended to be both aspirational and achievable should also be embraced by the Asia-Pacific region. In doing so they ought to adopt a digital agenda or strategy to achieve such targets. Such strategies will require all stakeholders to commit to them and to take positive actions towards their achievement.

There is also considerable value especially in Asian markets with large urban areas (with generally lower costs of provisioning) to set even more challenging targets for high speed Internet access (ie gigabit access). For example, ASEAN markets could have common broadband objective in major urban areas such that there is universal residential broadband of 30Mbps and mandate all households in major urban areas should be connected by 100Mbps broadband services with the capability to upgrade to further by 2025. FWA for regional and rural customers should also be a policy priority because reusing existing wireless networks and tower resources could reduce the costs of broadband construction and provide affordable Internet access to regional and rural populations. It is also critical that broadband services be affordable especially for whom live in rural areas and income below the poverty line. In areas where infrastructure is available to support broadband services, services must be priced at affordable levels. Such affordable pricing must also take into account the cost of a user device, e.g., smart phone or tablet, installation charges (where they may apply) and the financial impact of a minimum term contract for fixed services.

Developing an optimal infrastructure development strategy - 5

Affordability is particularly problematic for many Asia-Pacific countries given their relatively low GDP and GNI per capita. The ITU's objective of 25 percent more affordable of Internet access compared to 2017 and 3 percent of average monthly income for the entry level broadband service in developing countries by 2023 are achievable with effort of all sector stakeholders. Entry-level broadband services should be made even more affordable in developing countries with the pricing of such services, falling to less than 2 percent of monthly gross national income per capita by 2025.

Further, governments in all countries should enable environments ensuring accessible telecommunications and ICTs for person with disabilities and gender equality in Internet usage and mobile phone ownership. Although the licensing schedule of 3G and 4G services varied from country to country across Asia-Pacific, facilitating 5G deployment forward (including making key IMT spectrum available) and encouraging its deployment by Mobile Net Operators is a must. While some countries are aiming for timeline of 2021, all countries, depending on demand, should aim to their licensed MNOs to deploy 5G by 2023 to 2025 in line with their national aspirations.

The Demand for Bandwidth Always Grows - 1

A defining characteristic of the digital economy and society is increasing connectivity and bandwidth. There is the ongoing interplay between bandwidth supply and demand. Each time there is an improvement in the quality, capacity and availability of broadband, new opportunities emerge to make use of this improved connectivity. There are many historical examples of this phenomenon:

- in the mid-90s, development of ADSL technology made broadband connections possible over existing copper telephone lines to households which led to the explosion in access to the World Wide Web and the dot com boom which encouraged the development of new higher-bandwidth services
- in the mid-2000 3G and 4G connectivity made the era of the smart phone possible by providing widespread mobile access to data – consumers quickly responded, demanding more sophisticated bandwidth hungry mobile applications
- over the past decade up to 2019, improvements in household broadband speeds and data allowances, associated with fibre reaching or coming closer to homes, have enabled the TV streaming revolution.

The Demand for Bandwidth Always Grows - 2

There is no obvious end in sight to this process. For example, new 5G technology is desirable because of its very low latency is a requirement for enabling autonomous vehicles and complex time-critical telepresence applications such as remote surgery. Thus, each generation of new broadband technology enables new digitally based economic activity, enables new business models, and creates the increasing national competitiveness that drives economic growth and rising living standards.

The challenge for governments is to design policy and regulation that encourages sufficient investment in digital infrastructure to ensure that the nations digital services remain globally competitive. This is an on-going process.

Setting of Broadband Targets

The Broadband Commission was established in May 2010 as a joint initiative between the ITU and the United Nations Educational, Scientific and Cultural Organization ('UNESCO') to promote Internet access. The Broadband Commission was initially working towards achieving the United Nation's ('UN') Millennium Development Goals ('MDGs') by 2015 through digital development.

However, in September 2015, the Sustainable Development Goals ('SDGs') were adopted and superseded the MDGs. Considering the more recent SDGs, in 2018 the Broadband Commission launched a revised framework *2025 Targets: "Connecting the Other Half"*, which outlines seven targets.

The report also highlights that based on data for 196 countries, as at 2018, 159 countries have adopted a broadband plan or strategy or are planning to.⁸ This is a huge increase from 2006 when only 31 countries had such broadband plans.

Conclusions and Recommended regulatory policies and measures in order to ensure optimal national outcomes - 1

Digital infrastructure is the key to enabling the benefits of the digital economy and society. Digital infrastructure is the physical hardware and associated software that enables end-to-end information and communications system to operate. Digital infrastructure includes:

- Internet backbone including national and trans-oceanic fibre cables;
- Fixed broadband infrastructure such as analogue coaxial and optic fibre cable networks;
- Mobile communications infrastructure and networks including FWA, transmission towers, radio and optic fiber backhaul networks;
- Broadband communications satellites;
- Data and cloud computing facilities;
- End user equipment such as mobile handsets, PCs, modems and local Wi-Fi and Bluetooth networks;
- software platforms including computer and mobile device operating systems as well as application programming interfaces; and
- network edge devices such as sensors, robots, autonomous and semiautonomous vehicles, and other Internet of things facilitating devices and software.

Conclusions and Recommended regulatory policies and measures in order to ensure optimal national outcomes - 2

It is obvious that the quality, quantity and extent of digital infrastructure plays a decisive role in any nation's capacity to realise the benefits of the digital economy and society. Improving on digital infrastructure in order to secure the maximum benefits of the digital economy and society is the central focus of this ITU Discussion Paper on Digital Infrastructure Policy and Regulation in Asia-Pacific Region.

The key recommended regulatory policies and measures needed include specific recommendations on *inter alia* :

- The key challenges and bottlenecks to the deployment of digital infrastructure already identified;
- Driving national competitiveness and productivity in emerging Asia-Pacific markets;
- The need for flexible sector legislation and regulation to respond to quick moving industry and technology. In addition, there is a need for agile regulation which facilitates partnering with the industry playing a collaborative / facilitator role.

Conclusions and Recommended regulatory policies and measures in order to ensure optimal national outcomes - 3



1

Set broadband targets for digital infrastructure

Develop national plans for affordable broadband targeting 65% in developing and 35% in least developed nations



2

Ensure legislation is updated and fit for purpose

Promote independent regulatory bodies, fair non-discriminatory rules, open access and rights of way



3

Incentives for the deployment of digital infrastructure

Balance regulatory and tax imposts of operators to encourage infrastructure deployment

Conclusions and Recommended regulatory policies and measures in order to ensure optimal national outcomes - 4



Issue new rules addressing rights of way

Overcome barriers to rights of way processes to facilitate more rapid infrastructure deployment

4



Facilitate fixed broadband and 5G infrastructure deployment

Encourage sharing infrastructure for 5G, build check-before-you-dig national database, one-stop approvals

5



Releasing more IMT spectrum for wireless broadband and 5G

Expand allocations to at least 840 MHz in contiguous blocks to encourage investments by operators

6

Conclusions and Recommended regulatory policies and measures in order to ensure optimal national outcomes - 5



Facilitate switch-off of legacy 2G/3G services

7

Promote orderly migration to newer technologies for benefits such as spectral efficiency and lower capex and opex



Improve quality of broadband services

8

Require accurate advertising and assessment of actual broadband speeds, encourage higher speed targets



Improve regulatory skillsets

9

Build skillsets in economics, finance, content regulation, cybersecurity, law, competition analysis, tax and cross-government experience.

Conclusions and Recommended regulatory policies and measures in order to ensure optimal national outcomes - 6

The final comment is that open competition is the best mechanism to ensure affordability and quality of broadband services.

Regulatory measures should be carefully enforced to ensure sufficient and fair competition to avoid market monopoly and oligopoly, in the same time also protect private sector investment on the digital infrastructure.

Regulation on network wholesale prices may be required but heavy-handed regulatory control on retail prices, especially price floor regulation is typically unnecessary and may be counter-productive.

Some examples of Smart Island – European Small Islands Network – ESIN

Big data and tourism : Palma de Mallorca

The municipality of Palma de **Mallorca** is currently the second largest “wifi” city, after Miami (USA). Wi-Fi Palma is a project run by Universitat de les Illes Balears on big data and tourism. The project is being developed in cooperation with the Supercomputing Centre in Barcelona, the most powerful supercomputer in Spain. In order to increase its attractiveness as a tourism centre, the Majorcan authorities have provided free WIFI access across the entire island since 2014. In some areas work is still under way, but in Palma de Mallorca, especially in the city centre, and on Playa de Palma, people have free WIFI access. The hotspots were technically improved so everyone could move around the city without losing connection.



Big data and tourism : Palma de Mallorca

Providing wifi on the beach promenade of Playa de Palma is intended to identify new trends (shopping, cultural and sport activities), which will help Palma to propose tailored activities for tourists. The project also has considerable potential for user groups who need special attention (i.e. people with mobility impairments), as users' behaviour can be monitored. Potentially, it may be possible to see whether fully accessible venues (i.e. for people with disabilities, elderly people using mobility devices, families with baby strollers) are more likely to be visited than venues which are not accessible to these target groups.

The project processes data confidentially. Data protection is a key topic in such projects and needs to be addressed considering that, if handled carelessly, online storage of data can have serious and undesired implications.



Website for the smart project developed by Palma: <http://smartoffice.palma.cat>

Big data and tourism : Palma de Mallorca Emergency Quick Response Code

The Balearic Islands have a long tradition of tourism, which is reflected in its wide range of tourist facilities and services. In August alone at the peak of the tourist season, Mallorca usually has over 13 million tourists. The emergency and police authorities are involved daily in 150 to 200 interventions, of which 50 to 80 can be resolved swiftly. The main problems are lost children, people who have lost their bearings and injured cyclists. In order to promote the Balearic Islands as a destination, the Balearic authorities, including the port authorities, are giving due consideration to the issue of security, combining public, medical and environmental safety.

To improve the security and safety of tourists, the port authorities and the authorities of the Balearic Islands asked the University of Palma to develop an emergency system. A QR code (abbreviation for Quick Response Code) system is being developed for this purpose. The QR code is a machine readable optical label that contains information about the item to which it is attached. It consists of black modules (square dots) arranged in a square grid on a white background, which can be read by an imaging device (such as a camera or scanner).

Big data and tourism : Palma de Mallorca Emergency Quick Response Code

In practice, the system has been used from summer 2016 for cruise tourists disembarking for a short period in Palma. The MSC Company will include the QR code in the medical questionnaire shared with the Spanish emergency system (112, hospitals, doctors). The QR emergency system is particularly suitable for groups with special needs (people with disabilities, minors and senior citizens, sportsmen, etc.). 2 045 characters can be stored on the square code. The system is totally safe since the information (identity, medical information, contacts and GPS location) is not stored online but encrypted and printed in the square. The information is only readable using the requisite application and can always be updated by the person providing data about him/herself.

Using the QR code is also better than calling an ambulance or the police in all cases, as that will cause a serious disturbance in a tourist area. One challenge is to convince visitors to start using the QR codes on themselves, as this cannot be made compulsory. The project has great potential for island destinations which receive many seasonal visitors, often by cruise ships, who stay for a short time and would not become sufficiently familiar with the destination to be able to help themselves easily in an emergency.

Website de Ports de Balears: <http://www.portsdebalears.com/es>

Tourism development - Redevelopment of the old processing factory

The Tonnara of **Favignana** was a tuna processing plant, with an adjoining facility for storage, boiling and canning located in Favignana. With its 40 000 square meters, of which 3/4 are covered, it is one of the largest tuna processing plants ever built in the Mediterranean. All the surface of the former tuna processing factory has potential for many more functions. Apart from the building, the most remarkable features of the project - run since 2015 by the municipality and co-financed by the Region of Sicily - are the exhibition on the tuna processing plant, the part of the building documenting the ancient practice of “mattanza”, an old tuna fishing method which ended in 2005; and the “antiquarium of Favignana”. The antiquarium combines displays of archaeological remains, in particular of the Battle of the Egadi during the Punic Wars, with the latest interactive technologies to capture the attention of visitors. It is designed as a museum inside, with multimedia rooms, video accounts , and also shows historical films provided by the Istituto Luce. The municipality aims to attract 57 000 visitors here from June to November. During the 2016 summer season, the museum will remain open until 11 p.m. This project will raise the profile of the Egadi Islands and attract tourists. This is a very interesting project for the protection of cultural and architectural heritage.

More information on the Florio di Favignana facility: http://www.comune.favignana.tp.gov.it/po/mostra_news.php?id=623&area=H

Tourism development - Hiking and exploration trails

The development of sustainable tourism throughout the year is something the **island of Yeu** has been working on for several years by safeguarding natural areas and, very recently, creating a 23km long coastal footpath around the island and five shorter (two and a half hour) routes for hikers, taking in the island's interior, architectural heritage and economic activities (fishing, crafts and agriculture). Other projects are currently being studied, such as the development of cycling on the island (establishing dedicated cycle paths, setting up cycling events, etc.), economic discovery tourism and the development of tourist packages. The last two years have seen the development of many originally themed tours to promote the discovery of local heritage (tasting tours, nature discovery tours with specialised guides, etc.).

These tours could be further developed and others set up. There are many sites of interest on the island that are not given any attention due to lack of financial support (e.g. the moulin du grand chemin windmill, the Pointe du But foghorn and the citadelle). Moreover, there are no real educational spaces on the island, except for the 'little' fishing museum, which however needs extensive renovation work to meet current norms and the needs of today's clientèle. Île d'Yeu has been successful in preserving its natural areas, but it needs to do more if it is to become a real 'green tourism' destination adapted to both long and short stays.

More information on the project: <http://www.ile-yeu.fr/Visite-de-l-ile/Randonnee-pedestre>

Tourism development - Recreational fishing

On **Île d'Yeu**, several fishermen have started to diversify by adapting their boat for recreational fishing and a dozen of SMEs have been set up. This activity takes place during peak season. The municipality is also encouraging tourists and hikers to enjoy beachcombing.

More information on beachcombing: <http://mairie.ile-yeu.fr/wp-content/uploads/2016/07/brochurevisitespatrimoineinternet-1.pdf>

Tourism development - Ecotourism, preserving the heritage of renewable energy

The island of **Kythnos** set up the first wind farm in Europe in 1982. Few people know about that and that is a heritage that can and should be highlighted. With the support of the Aegean Energy Agency, the islanders are planning to set up a Renewable Energy Sources Museum and a Smart Training Centre. The initiative will present the technical solutions of the very first wind farm in Europe, show the remaining facility from 1982 and demonstrate the renewable energy solutions which are currently in use.

The museum and exhibition centre could be located in the old power station, part of the industrial heritage of Kythnos main town Chora, along with a training centre to be located in a neoclassical building in the very centre of the town.

The project would combine preservation of architectural heritage with highlighting the history of Kythnos in the field of renewable energy. Similarly to the Samsø Energy Academy, the planned exhibition and visitor centre on Kythnos will be a competence centre for people interested in energy, environmental protection and renewables. As the island is not too far from the mainland, visitors from Athens could reach the island and the centre's training programmes could focus on training and educating young people.

Tourism development - Preservation of the local architecture

In all island communities the preservation of local architecture is key for attracting visitors, keeping the islanders in their environment and keeping up crafts skills. Strict rules are applied to keep the roofing, size and colours of the houses close to the original. In several locations, heritage protected buildings have been or will be adapted for new, modern use for tourist or business development purposes.

On the island of **Kythnos**, a tourism project to promote the island's sustainable energy history is planned to be housed in currently abandoned venues, which will be redeveloped and demonstrate the island's heritage. Ideas for adapting the old windmills of **Mallorca**, which transported water, to renewable energy windmills are emerging. The project would not be only about renewable energy, but also about landscape conservation. On **Favignana**, the old tuna factory has been redeveloped to house a museum and possibly other relevant functions in the future. This example could be useful for Île d'Yeu that also owns an old canning factory in the harbour, which is currently not in use.

Tourism development - Cultural and heritage centre

Wind has been used for economic purposes on most islands. On Saaremaa, on Angla, the wind has been used for milling. Several farmers set up their windmills in the same windy setting. All the windmills were built to catch the wind, as wind direction changes from winter to summer.

Four of the five Angla windmills are typical trestle windmills characteristic of Saaremaa. They were built at the beginning of the 20th century. A Dutch-style windmill, slightly taller than the others and built in 1927, stands in the middle of the group. All the five windmills, which were on the verge of vanishing, have been restored and are open to the public.

Angla Windmill Park and the Heritage Culture Centre are operated as a single unit.

Website for the initiative: www.anglatuulik.eu

Tourism development - Geoparks

A geopark is a unified area that promotes the protection and use of geological heritage in a sustainable way, along with the economic well-being of the people who live there. There are global geoparks and national geoparks. Around the world, there are 120 global geoparks and many national geoparks, including Saarte Geopark on Saaremaa island.

“Geoconnect” is a set of tools enabling geoparks to communicate with each other. A geographical system is being developed to get the information using one single application. Saarte Geopark is the geological park on Saaremaa, which is leading the development of linking up the world’s geoparks. The tested and developed application may bring more visitors to Saaremaa, as the linked up information would encourage geopark visitors to seek out the one on Saaremaa.

Website for the initiative: www.saartegeopark.ee

Smart island tourism and strategic marketing: the case of the island of El Hierro

Tourism and technology grow quickly generating behaviors that force challenges and dynamic decision-making. Tourist destinations have to deal with a complex environment that makes their competitive position dependent on Information and Communications Technology (ICT). As all citizens can be connected, better informed and engaged, the concept of Smart Destination needs to integrate tourism planning and territory services for the visitor. This will influence the motivation of tourists when they choose their holiday destination. The aim of this work is to create a theoretical and practical conceptualization of Smart Island, using the case of El Hierro (Canary Islands, Spain), one of the first Smart Island in the world.

The case of the island of El Hierro - 1

Tourism is an important part of the service sector. Developments in new technologies reinforce organizational and structural innovations. During the last years, the effort in tourism has concentrated in the exploitation of Information and Communication Technologies (ICTs) (Buhalis, 2003). More and more people live in cities and more and more people travel to enjoy it. Werthner (2003), suggest that «ICT could contributes in terms of generating value-added experiences for tourists, while also improving efficiency and supporting process automation for the related organizations». Concepts like technology, communication, innovation or quality come to mind when we think in «Smart». Nowadays concepts such as Smart Destinations, Smart Cities and Smart Islands are being studied and applied in the territory improve the quality of life for residents and tourists and to encourage responsible and sustainable management of the territories that promote human development criteria (UNDP) (Malik, 2014).

The case of the island of El Hierro - 2

In island contexts, technologies (ICTs) provide both get data making the intercom and relations between mainland territories and insular areas, favoring progress and resilience processes. Being tourism a mainstay of island economies, bringing smartness into Tourism destinations requires dynamically interconnecting stakeholders through a technological platform on which information relating to tourism activities could be exchanged instantly. Zheng Xiang (2014) who writes that smart Tourism destinations take advantage of Technology embedded environments; responsive processes at micro and macro levels; end-user devices in multiple touch-points; and engaged stakeholders that use the platform dynamically as a neural system supports this view. This ultimate aim is to utilize the system to enhance tourism experience and improve the effectiveness of resource management towards maximizing both destination competitiveness and consumer satisfaction while also demonstrate sustainability over an extended timeframe (Boes, Buhalis and Amaranggana, 2014; Boes, Buhalis and Inversini, 2015)

The case of the island of El Hierro - 3

This work takes as a case study the island of El Hierro, for being considered the first island Smart even without implementing an important part of the operational indicators defined and applied in Integral Revitalization Plan of Tourism of the island of El Hierro (PRITIEH 2013) conducted by the authors of this paper. The paper reviews conceptually the construct Smart City and its various applications (Smart destination, Smart Island). It was taken as a starting point to Cohen (2012) and the consequent development enhanced by European Smart City. While important areas of implementation Smart used, it was considered necessary to conduct a more thorough review of the literature, establishing a set of Smart factors applied to island ecosystems. It is from them that these factors proceeded to contrast with BRSmart program, leading to the definition of a set of 80 operational indicators and sensors 209 information.

Mass tourism and globalisation

The process of diffusion or “democratisation” of tourism originated at the beginning of the twentieth century, the growth of population wealth and the consequent increase in consumption were the basic signals of the birth of mass tourism.

Over several decades this mass tourism has consumed, without discernment, without respecting the bathing areas, the urban and heritage areas and even the natural reserves and mountain areas.

In the last decades under the “tourism umbrella” many other branches arose like: spa, surgical, dentistry, even criminal and more.

The typical approach of city managers was mainly oriented to increase the number of tourists visiting the area; no specific focus was posed on excursionists (daily tourists) and resident tourists as well as on the typology of tourists involved. Few locations carefully planned which “typology” of tourists to attract thanks to: facilities, accommodation and attractions or sport opportunities.

Some authors consider this trend as the birth of “overtourism”

Understanding Overtourism Drivers - The phenomenon

- The origin of this was associated to mass tourism, globalisation, low cost air-carriers and tour operators, AirBnB
- Recent analysis showed that almost 50% of the tourists is due locals and a relevant part of tourists are daily excursionists.
- Tour operators trends shows that they prefer to use minor destinations close to key destinations both for airports and hospitality moving daily to key destinations.
- The phenomenon impacts different fields:
 - Infrastructures
 - Points of interest
 - Citizens lifestyle
- Is the defining characteristic of overtourism the existence of resident protest?

Understanding Overtourism Drivers - Terminology

- Carrying capacity
- Tourismphobia
- Resilience
- Anti tourism
- loving places to death
- dealing with success
- levels of acceptable change framework (LAC)
- visitor pressure

An exclusion of residents and other local stakeholders and the touristification and museumfication of popular tourist areas

“Overtourism: Will the World be able to Handle Two Billion Tourists?”

This term was probably invented in 2016 by the travel magazine Skift to depict the touristic situation of Iceland!
<https://skift.com>

We use the term overtourism a phenomenon that far broader

Understanding Overtourism Drivers - Overtourism Myths

- a) Overtourism is not a recent phenomenon
- b) Overtourism is not the same as mass tourism
- c) Overtourism impacts are not city-wide
- d) Overtourism is not a tourism-only problem
- e) Technological or smart solutions alone will not solve overtourism
- f) There is no one-size-fits-all solution for overtourism
- g) Overtourism is not just an issue in cities

Overtourism enablers - 1

If we focus on the enablers of the increasing number of people visiting touristic locations we can refer to:

- Travel has become more affordable
- Tourism has become a new opportunity in some countries
- The number of travellers is growing constantly
- Wider access to online media and information
- Destination management platforms and related offers
- Lack of common policy among different tourism stakeholders
- Competition for amenities, services and accommodations
- Dominance of traditional grow-focused approach

The offer, due mainly to low cost air carriers and low-cost bus services, sometimes together with better economic conditions, acted as a driver for the growth of tourism all over the world.

Overtourism enablers - 2

The competition among destination manager platforms, digital travel agencies, with multiplication due to online touristic teasers , photo albums shared by travellers, social media and performance indexes like TripAdvisor, did the rest.

The diffusion of the Internet boosted the DIY (do it yourself) tourism once limited to the “Lonely planet” addicted travellers.

Sea and river cruise tourism is seen as a potential problem in cities like Venice, Barcelona, Cannes, Genova, Amsterdam, Copenhagen, Lisbon, Salzburg and Tallinn. Ships are becoming bigger and bigger, MsC and Royal Caribbean cruise line ships have a typical capacity of nearly 5,000 passengers. This increase in size of cruise ships caused negative side effects on harbours and maritime infrastructures and, last but not least, accidents.

As cruise ships get larger, more people can flow into a destination at one time causing negative effects on local population. In this specific case there are not so many economic benefits for locals due to the fact that cruises are accommodated and have meals on the ship.

The extremisation of such an effect is usually termed bio-piracy when tourists use and consume local resources without compensation. Findings like this confirm criticism on using carrying capacity as an “objective” means for measuring tourism impacts.

Overtourism enablers - 3

Tourism is considered by many stakeholders, including governments, a relevant source of incomes; countries having reduced opportunities to rely on industrial production or trade, if possible, they focus on tourism as one of or the key income generator.

When profit is the key objective of the strategic agenda very often there are no specific plans concerning job creation, increasing quality of life, poverty alleviation and community well-being. Profit-oriented tourism plans the objective is almost always focused on increasing the number of tourists instead to further develop third parts related business.

The increasing number of tourists is due to the easing of visa restrictions for many travellers and the better economic situation of some countries. New tourists' segments are emerging e.g., before the Olympics Chinese airports were populated mainly by foreigners and few locals, after this event the situation is reversed: airports are crowded by Chinese travellers.

Is overtourism due to tourism? - 1

Referring to the typical effects of overtourism is it correct considering overtourism only as a tourist problem, rather than a social and urban one?

Numbers without the contexts and effects are meaningless, the focus must be shifted from numbers to the perception of benefits and drawbacks. Both benefits and drawbacks are tightly connected with the responsibilities of political managers, stake-holders and tourists themselves.

We prefer to speak of visitor pressure or overcrowding typical of the spring months, while in the summer peak the cities empty themselves of the residents. Getting more in detail, looking at stats and data collected by local authorities we discover that “visitor pressure” or overcrowding is not only due to foreign tourists but even to locals and neighbours exceeding the resilience of the location.

This phenomenon is favoured by the extension of the tourist season, more flexible work arrangements, the dilution of holidays in shorter and more repeated periods during the whole year, so it makes the inhabitants of some cities perceive the phenomenon throughout the year.

Is overtourism due to tourism? - 2

Analysing the “pressure” in detail:

- It is relatively easy and reliable to foresee the impact of tourists on the physical environment,
- It is much more difficult and less reliable to estimate the impact on the social side, due to different perception of disturbance in different areas and different level of tolerance of the host community.

Some case study outline that the top-down promotion of a touristic point of interest may impact the level of tolerance of the local population, they may suffer because of the “invasion” of their territories and impact on their life style due to others will.

Overtourism describes an exclusion of residents and other local stakeholders and the touristification and museumfication of popular tourist areas.

Is overtourism due to tourism? - 3

Key aspects characterising “pressure” are concentration, timing, visitor behaviour, location, experience with tourism, local etiquette and more.

Analysing the “pressure” in detail, on the one side, it is relatively easy and reliable to foresee the impact of tourists on the physical environment, while it is much more difficult and less reliable to estimate the impact on the social side, due to different perception of disturbance in different areas and different level of tolerance of the host community. Some case study outlines that the top-down promotion of a touristic point of interest may impact the level of tolerance of the local population, they may suffer because of the “invasion” of their territories and impact on their life style due to others will.

Displacement due to Airbnb and similar platforms and excessive pressure on the local environment are separate causes of concern. Airbnb looks like an appealing source of revenues, real estate owners increasingly prefer to rent their properties for a short period of time through Airbnb than to rent it to locals.

Is overtourism due to tourism? - 4

This trend induced two main effects: a quick increase of real estate value and displacement of locals outside the “hot” areas.

If residents are forced to move out of the city due to tourism improvement, this puts further pressure on the city infrastructure: “People are leaving the city [because] rental prices are way too high. There are many people moving to the surroundings and then commute by car every day. It is a circle that never ends.

Actually, some local administrations are working on new regulations to manage this problem (e.g. Berlin, Paris) setting limitation on the number of days a property can be rented out, the fact that a house-owner needs to live in the rented place, taxation, registration systems, etc.

The “pressure” or overcrowding, looking at the stats it appears that day visitors, coming both from neighbouring cities and from abroad, constitute up to 50% of the people that visit the city for leisure purposes, they blend in relatively well and are often not viewed as tourists by residents, they also cause overcrowding and bothers.

Is overtourism due to tourism? - 5

Drawbacks on local societies are often associated with global platforms as it happens with Uber, Amazon, Expedia, etc. The relevant increase of online shopping further impacts the perceived crowdedness, as an increasing number of different delivery vehicles blocks roads and causes congestion and pollution.

Time ago, governments and key stakeholders preferred not to regulate tourism opting to open market a kind of self-regulation. This choice powered a rush to big numbers.

In dealing with overtourism issues, recent researches emphasise the need for regulation and government leadership. Before pointing a finger at certain alleged culprits, administrators of cities should think about toilets, waste disposal, electric vehicles, parking lots and green areas, as well as optimise control and surveillance activities.

Dealing with complexity - 1

The complexity of overtourism reveals itself again when looking at the effects of policy measures. It is revealed that these have been, at times, different from what was expected. To plan for sustainability in a tourism context is to plan to operate within the carrying capacity limits of the destination and its resilience capabilities, and avoid a state of overtourism.

Posing the focus on the concept of sustainability, the links between the level of tourism and the quality of social and environmental factors in a destination are evident with the logical conclusion that tourism levels should not exceed a point at which immitigable impacts occur and where tourism becomes “unsustainable”.

The touristification of city centres and online accommodation platforms also needs further clarification, tourism has strongly impacted city centres and suburban neighbourhoods, but this impact can at least partially be attributed to real-estate developments.

This implies the responsibility of “managers” because of the direct impact on the carrying capacity and the resilience to overtourism due to tourism management. It is evident that there are different causes that merged together to create the “overtourism” effect so the solution could not be based on tourism alone.

Dealing with complexity - 2

There is a need for a global approach to the problem putting around the table all the stakeholders and authorities involved in the process; single initiatives, such as admission fees, expensive tickets for parking and local transportation, do not solve the problem.

In recent times there is an increasing number of decision makers and stakeholders that, driven by the anti-tourism sentiment, curbs the growth of measures to regulate traffic, creating coach free zones, or to regulate tourist behaviour, for instance, in tourism hotspots at night, taxes for daily visitors, cruise ships restrictions and more.

Nevertheless, as it usually happens, policy measures and regulations play often the role of followers, and have up to now had difficulty keeping pace with the rapid development seen within this sector.

Understanding Overtourism Drivers - Broad view

Overtourism is caused by an overuse of the resources, infrastructure, or facilities of a destination, or parts thereof. Socio-political aspects involving:

- City managers
- Town planning
- Infrastructures design and managment
- Stakeholders (hotels, restaurants, entertainment, etc)
- Touristic Institutions
- Cultural institutions
- Destination managers
- Tour operators
-

Understanding Overtourism Drivers - Management

- Politics at national and local level left the duty to manage touristic flux to the responsibility of destination managers and tour operators, allowing “the market to act as a form of governance”.
- Withdrawing government from direct involvement and instead seeking “to encourage the tourism industry to move in particular directions” through, for example, financial incentives and education
- voluntary and economic measures in managing tourism impacts (e.g., admission charges, education)

Understanding Overtourism Drivers - Issues that are attributed to tourism

- Overcrowding in city's public spaces
 - Overcrowding on streets and pavements, as well as public transport, heavy traffic, loss of local identity
- Pervasiveness of visitor impact due to inappropriate behaviour
 - Noise, disturbance, loss of local identity
- Physical touristification of city centres and other often-visited areas
 - Loss of amenities for residents due to mono-culture of tourist shops and facilities
- Residents pushed out of residential areas due to AirBnB and similar platforms
 - Less availability of housing, loss of sense of community and security
- Pressure on local environment
 - Increased waste, water use, air pollution

Understanding Overtourism Drivers - Developments contributing to issues related to tourism

- **Overcrowding in city's public spaces**
 - Rise of tourist numbers; cheaper flights, increase of cruise tourism
 - Increase of residents and commuters; flexible work arrangements; increase of residential leisure; increase of online shopping
- **Pervasiveness of visitor impact**
 - Rise of tourist numbers; tourists moving deeper into city in search for authentic experiences; increase of cruise tourism; tourism spreading policies
 - Increase of residential leisure; greater connectedness of residents due to social media; popularity of Instagram and social networks

Understanding Overtourism Drivers - Developments contributing to issues related to tourism

- **Physical touristification**
 - Rise of tourist numbers; increased dominance of large tourism businesses
 - Real estate speculation; city modernization; increased costs of city amenities; limitations on restrictions of urban planning
- **Residents pushed out of residential areas**
 - Rise of tourist numbers; rise of online platforms like AirBnB; tourist desire for authentic experiences;
 - Real-estate speculation; increase of internet holiday booking; residential gentrification; rising costs of living; limitations on restrictions of urban planning
- **Pressure on local environment**
 - Rise of tourist numbers; greater use of resources per tourist
 - Increase of residents and commuters; increase of extreme weather events.

The opposite side of the coin - Undertourism

While there is still a lot of confusion about overtourism, a new keyword is on stage: undertourism.

This represents the places still little visited or not performing enough in relation with their beauties.

The risk is that the less visited destinations face too many illusions about being able to overturn their tourist fortunes with marketing campaigns and messages such as “come to us, there are fewer people, but the experience is more authentic, etc”.

The already famous ones boast about the fact that without promotion flows can calm down. Fertile ground and excellent starting points for conferences and academic articles, they are always happy to insist on concepts such as relocation and experiential tourism, but risk diverting attention once again from the real problems of hospitality and tourism.

The problems that actually limit the growth of the less visited places are the infrastructural ones, which, together with an often ineffective, if not non-existent, marketing, are the main factors of what we can define as the structural and ancestral sub-tourism. Thinking about overtourism, especially in cases like Venice, is important, but not as much as trying to really solve these critical issues.

