

Technology – a platform for Society, Life and Health



Mike Quirk has lived and worked in several countries during his time with Beca. His tenure as MD Beca Asia and based in Singapore coincided with the international development of Smart Buildings systems.

In this thought piece, he takes some time out to think about the relationships between the physical /digital with the Societal frameworks. The adoption of Smart Buildings, and Smart Cities needs careful consideration.

Our Asia pacific neighbours, particularly within Singapore and tier 1 cities in China have accelerated adoption of technology. To understand the complexity, first we need a simple model and to encourage consideration of technology and societal norms to integrate.

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everyday
better.**

Will the pace of change in communication continue at its current rate?

As various social media platforms develop, more communication methods are becoming available and many are now mainstream. E-mail remains the main choice of communication, for business, however companies have started to migrate to integrated social media platforms as the tool of choice for all communications. The use of multi-platform emails will continue to decline as other social media platforms become more commonly used. As the media we choose to communicate with continues to change, will the change be of a big enough "scale" to influence international trends? WeChat in China is now the dominant communication channel and over recent years a platform for commerce. The blur between social media and business communication is growing, and predictions show that social media will eventually take over.

The above describes just one aspect of societal change, albeit at a rapid rate. The need for a high level understanding of the Digital and Societal framework will be more important as technology further underpins our way of life.

Common understanding

The term Smart Cities, Smart Buildings is being used with increasing frequency. It is a concept that is challenging to converge into a simple common understanding. Part of the challenge is having the discussion where participants come from different business sectors, cultures or have been exposed to different levels of embedded technologies.

There is a large amount of information available about this subject and a number of initiatives are currently underway within various countries. Singapore and Israel are examples of leadership via central government Smart Country objectives.



A city is smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.

Caragliu et al. (2009)

In the area of Smart Cities, the assets are generally socially owned asset or services from a central authority perspective. These might include, roading, parks, healthcare, social housing social groups etc.

The area of Smart Buildings is generally focused on the use of buildings information to enable a more efficient and improved user experience. It is typically focused on what the building operations are "today" with a nod to "the future". This nod, is normally by way of lower cost "flexibility" either space changes or churn and use of technology for new applications. There is a larger picture developing however. There are small and subtle changes occurring in the way we live, the most striking being in the way we communicate.

The significant uptake in telehealth in the USA over the 2020 year is an extreme example of social change. [Kythera Labs](#) track healthcare data, and with The Chartis Group '[Tracking of Telemedicine Adoption](#)'. The evidence shows an increase from <1% to approximately 20% uptake over the year to April 2021.

As our experience and comfort in using technology progresses, so too will the acceleration in applications of technology. This issue coupled with lowering cost will inevitably mean people's lives and how we live will morph to use these technologies.

Learned papers on the subject of Smart Cities identify a holistic approach, there however is a lack in the overall approach to generate total understanding of built or physical and societal interaction.

Limitations of the Physical Response

Current long term considerations for absorbing technology change – for living and working into the design of our built environment is generally limited. This is generally for a good reason – it is difficult to predict the future, added to the cost premium for large scale flexibility required.

This creates a significant dilemma. However, not considering the issues in closing our eyes to the inevitable. We owe it to ourselves and future generations to consider the issues and built environment framework. To initiate this change of thinking, perhaps we change the lexicon from 'flexibility in design' to 'adaptability for living'.

As our experience and comfort in using technology progresses, so too will the acceleration in applications of technology. This acceleration in use coupled with lowering cost will inevitably mean people's lives, and how we live, will morph these technologies into new applications that do not exist today.

Simplifying our Approach

To enable the discussions and understanding to occur we need to create a simple but holistic framework to develop the ideas. Smart Cities can be very complex to describe depending on what definition you follow. Studies by the Centre of Regional Science at the Vienna University of Technology using 70 middle sized European cities identified that smart cities have six dimensions. These being, smart economy, smart mobility, smart environment, smart people, smart living and smart governance.

Measuring the performance of that smart city is even more complex. Taking smart mobility as an example, it can be measured on how it is accessible locally and internationally, the availability and quality of ICT infrastructure, sustainability and safety of the transport system.

Smart Living partly consists of two concepts that need to be defined: the Physical and the Societal Framework. Where these two concepts "intersect" or overlap can be defined as Smart Living. All information gathered e.g. BigData about the Physical within the boundaries of the Societal Framework are manipulated and used to enable Smart Living.

The Physical

Encapsulates the physical environment and physical assets

Smart Living

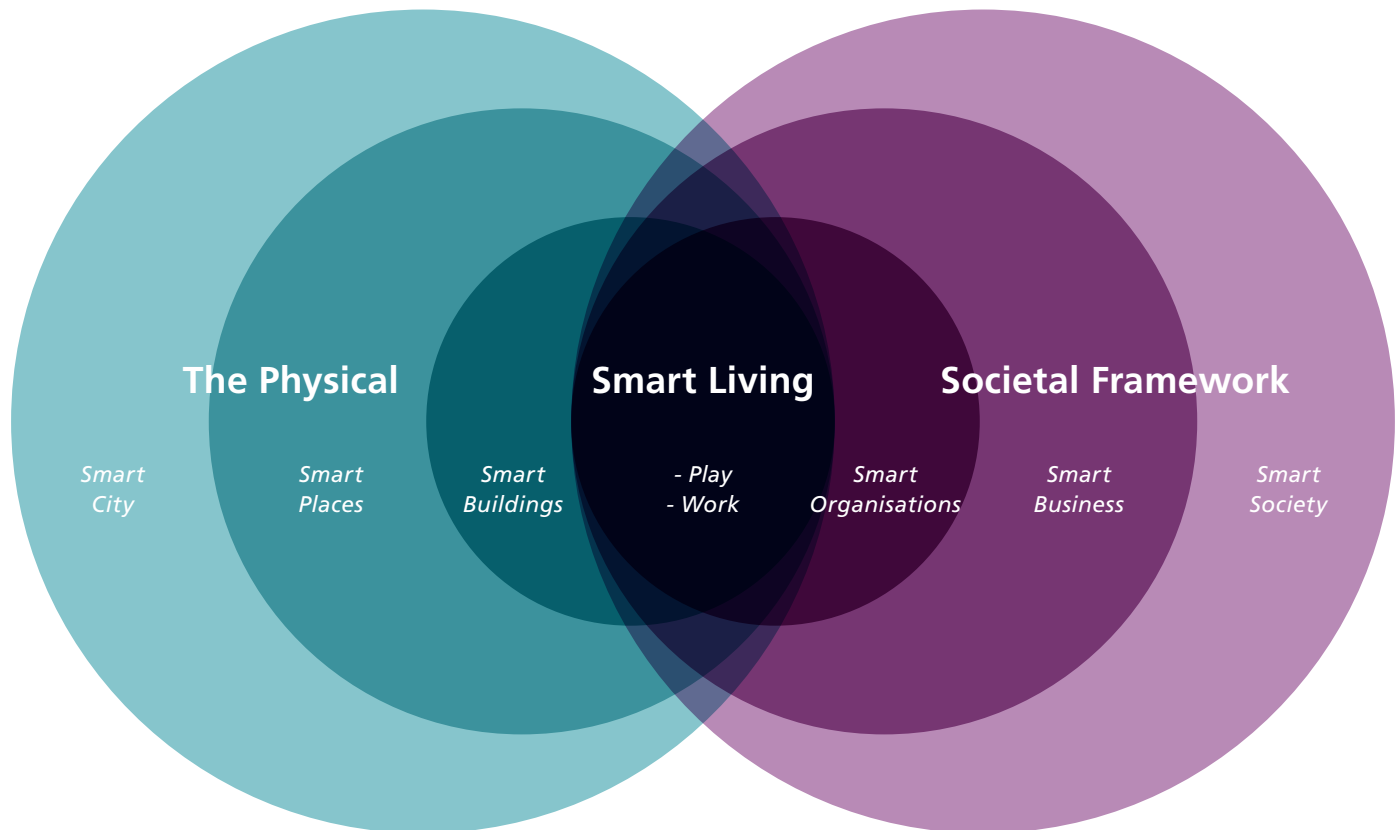
The connection is Smart Living

The Societal Framework

The Societal Framework covers a number of areas such as legal frame work of the "place" (country, city, campus etc), culture, way of life, society's priorities etc

Interpretation of Smart Living

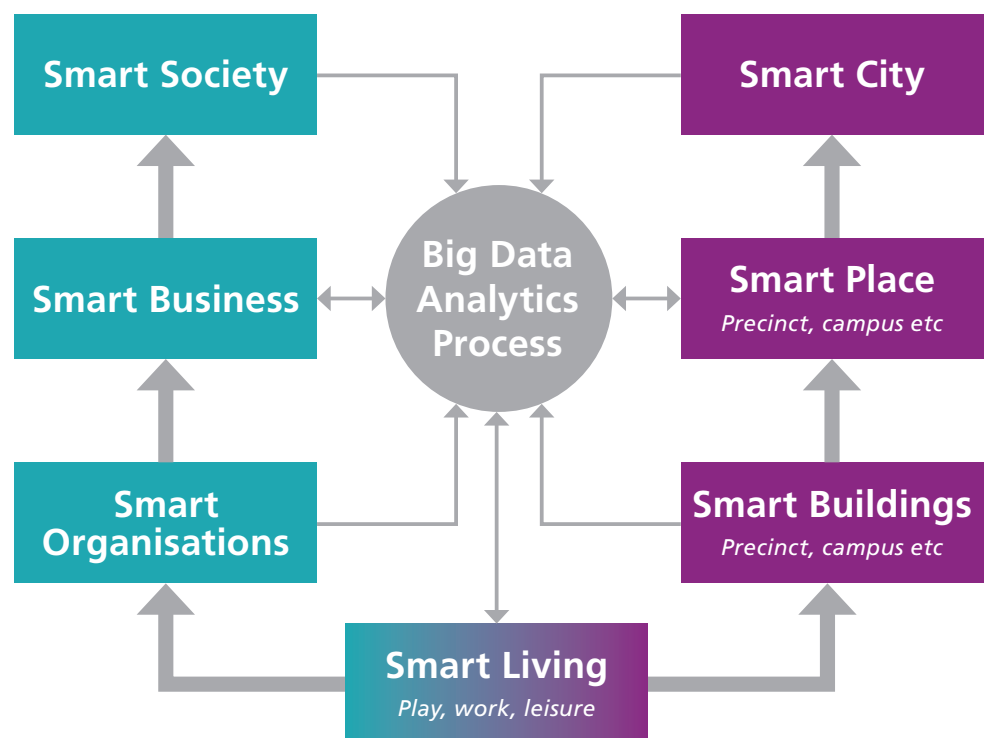
The Physical and Societal Framework components are noted on the diagram by means of spheres increasing in size as their ability to influence larger audiences increases. They are not shown in an order to suggest that one component is more important than another but purely for illustrative purposes.



Smart Consulting Framework

Smart Design encapsulates all aspects of Smart Living, from Smart Buildings or the Physical to Smart Cities and Nations described as the Societal Framework.

Smart consulting can be defined as individuals or organisations that are culturally aware, commercially sensitive to a variety of business types, have no preconceived ideas for a solution, innovative and creative, have a good understating of technology and applications of technology, being able to listen and interpret clients requirements and actively seeking opportunities to enhance either the people, places, or technology in their client's organisation, business, City, or even Nation.



Definitions

The Physical



A city connecting the physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure to leverage the collective intelligence of the city.

- Harrison et al. (2010)

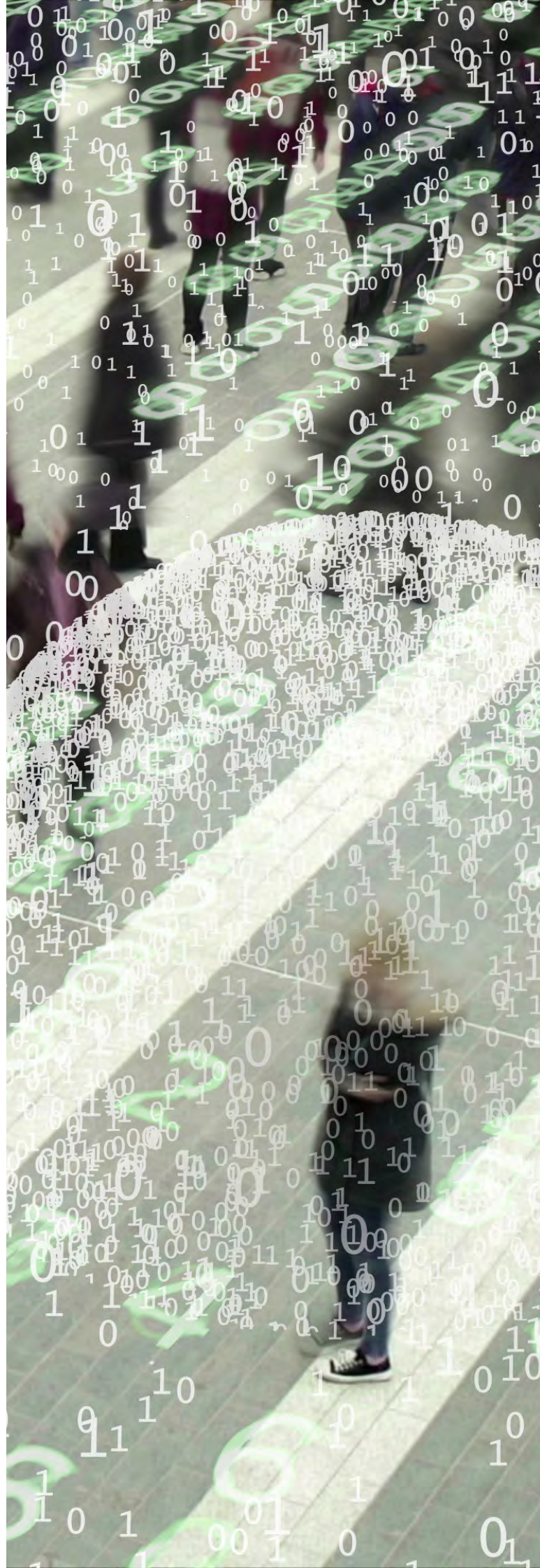
The Smart City approach requires a combination of effort to affect an improvement for the inhabitants' sustainable quality of life (QoL). The QoL in any city is a key dimension of how well inhabitants of the city perceive their own sense of wellbeing. The World Health Organisation's definition of QoL is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." Despite this adding such a complex dimension; converging ICT and the physical elements of a city, as noted below, means they can become smart.

- Promotion of sustainable economic growth,
 - Protect the environment from degradation at least, but preferably improvement over time
 - Aspect of physical foundations are:
 - smart energy
 - smart buildings
 - smart transportation
 - smart water
 - smart waste
 - smart physical safety and security
 - smart health care
 - smart education.
 - ICT based concepts such as big data, open data, Internet of Things (IoT), data accessibility and management, data security, mobility, embedded sensors (data collectors) within networks are predicated to be part of Smart City ICT infrastructure. These are predicted to improve quality of life (QoL) and promote overall sustainability.
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The demand for community infrastructures will continue to expand significantly in the decades ahead, driven by major factors of change, such as population growth, and urbanization. According to the OECD report "Infrastructure 2030," total cumulative infrastructure requirements amount to about USD 53 trillion over 2010/2030.

When the interaction of the Physical and Societal Framework is developed by the participants, the opportunities for development leading to useful Smart Living can be realised.





Smart Places

The research into this descriptor Smart Places generally aligns across the range of thought leadership.



A small community of multi use areas creating a “localised eco system”. A large shopping mall for example might be classified as a “Place” (be it smart or not). It has multi use areas, a local community with good knowledge of the Place, and the most who will benefit from improvements are likely to be the local community.

By implementing technology strategies such as data capture facilities with analytical data processing capability for improved efficiency to places within a “local neighbourhood” allows that neighbourhood to function with improved QoL. Other areas that can also be classed as “Places” and that could benefit from the implementation of technology may include:

- University campuses
 - Multi building Hospital sites
 - Large residential developments with or without common facilities
 - Multi sport facilities etc
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Smart Buildings



Any structure that uses automated processes to automatically control the building’s operations including heating, ventilation, air conditioning, lighting, security and other systems.

A building can generally be described as a single place of single use type. By its nature the users will be very familiar with the use of the space, and the efficiency of the space can have a very direct impact on the QoL of the users. Smart Buildings have the most immediate and direct influence on leveraging any Smart applications.

Due to competition between building owners and developers, the creation of ideas for users of smart buildings is fast developing across the world. Typical buildings could include:

- Office
- Health
- Institutional
- Transport
- Residential
- Industrial

The opportunity to capture and manipulate data to make a positive impact on the lives of the users/stakeholders within a building is significant.

However, our current short term thinking needs the overlay adaptive environments for long term Smart Living.

The Societal Framework

The term is targeted to capture both the small and large group/communities, how they interact and how the frameworks in which they live (laws, social norms, cultural considerations etc) works. We need to also consider the components of the Societal Framework, and the fact that these components can change over time. This change can be technology use, gender, ethnicity, globalisation etc.

Smart Nation

There appears to be no single definition of a Smart Nation concept, however there are consistent themes that surface from the investigation into this area.

They include:

- A Nation whose efforts are focused on better living for all through tech-enabled solutions
- Rally collective efforts of people, businesses and government to work together to support “better living” by harnessing information-communications technologies (ICT)
- Utilising networks and big data as an enabler through strategic deployment of technology across the nation
- Leveraging on investments in digital infrastructure and the development of a “tech savvy population”

There appears to be various routes to the objectives of a Smart Nation, be it central government leadership and investment or market (business driven) efforts.

Smart Business



A Smart Business utilises technology to enhance overall business performance.

The use of technology may not necessarily need to be applied directly within a business, but if implemented can add significant benefits.

A smart business can be a business doing what they are good at, whilst getting input from others who are “better” at it. In this case better may be more cost effective or higher quality. Better can also mean a Smart Business can outsource their work to another Business who has better resources and availability of capital for a specific type of business activity.

This theme can be further enhanced by the formation of automatic B2B operations. This is an area of development over the last few years, and has major implications for society at large.

In summary the definition can include:

- Using technology to improve business
- Using technology to interconnect organisations within the (overall) business, thus improving response to changes in the business markets
- Utilising big data to improve business. e.g. using data trends to focus on what the customers want (immediate feedback loops)
- New products and services using technology
- Development of disruptive businesses

There have been articles written around smart businesses using a “test and learn” approach to business improvements. With the availability of vast amounts of data and the added ability to analyse that data based on past experiences, businesses have the opportunity to make Smart decisions around any testing should it be required in order to influence future outcomes.

Worldwide Trends

Society's demographical change is one of the mega trends

A worldwide trend is the increasing age of the world's population. Some economies will be more advanced than others when it comes to acquiring and carrying the cost of technologies available for wider public use. For example, the ability to pay for the increased demand on healthcare expenditure will reduce the capital available for a nation to invest in technological issues.

Typically urban areas are becoming ever more pressurised, crowded and expensive. These mega trends are challenges and also opportunities for Smart solutions across the physical and societal framework.

Climate change and resource scarcity

Scarcity will be a driver for businesses to innovate and improve efficiency. The interesting business decisions will revolve around the convergence of “demand led desire for efficiency” and the cost of delivering it. The reduction of cost needs to be carefully balanced in order to meet the supply-demand curve.

The pace of efficiency gains – in many areas will be an important aspect to reducing the rate of climate change and possibly reversing it.

Smart Organisation



A Smart Organisation can be defined as a business or social unit of people that has a framework or formalised structure targeted to create managed outcomes or collective goals.

The Smart Organisation utilises technology or technology infrastructure to improve the effectiveness of these goals.

To illustrate the above definition, these may include:

- Sporting groups (either by size, geographical spread or national/international authority)
- Social groups or clubs (with strong or loose operational frameworks)
- Lobby groups
- Business groups that may make up part of a larger enterprise, typically within a small (relative to size of the business) cluster
- NGO's.

Smart Living



Smart Living as a concept is where people benefit from new ways of living or enhancing their lives through the use directly or indirectly, of technology.

It can involve making life more efficient, controllable, productive, informed, integrated and sustainable. Technology can also increase the “fun” in life. This is a concept that should cover all aspects of day to day life, from domestic, social and work.

The concept of Smart Living is where the Physical and The Social Framework intersect.

In short, Smart Living involves improved standards in any aspect of life, whilst striving for efficiency, economy and sustainability.

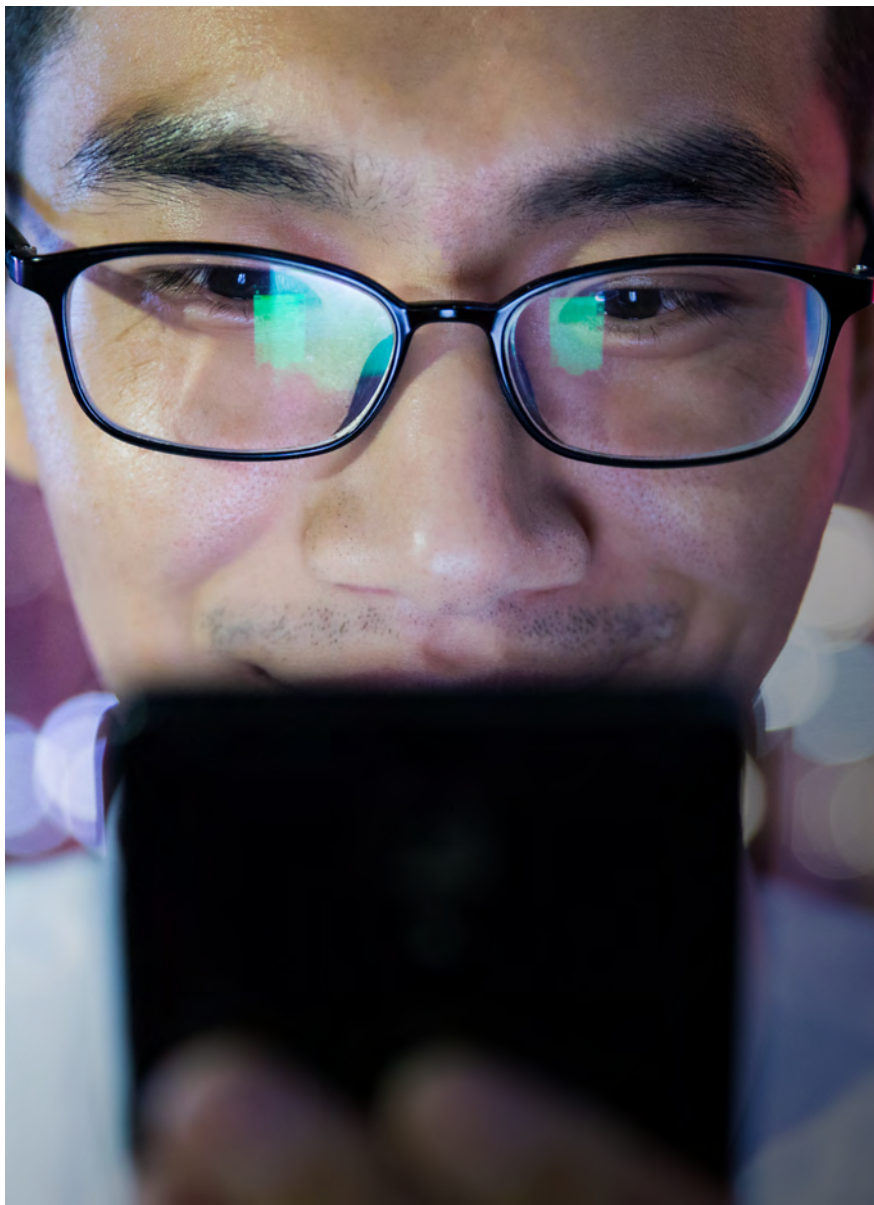
Some aspects of Smart Living may include the following:

- **How we live:** Examples might include aspects such as the use of technology to monitor our health and diet. It can also include options for balancing work and social time, sleeping patterns etc. The most obvious change currently is how people communicate.



All generations can participate in Smart Living

- **The environment within which we live:** both the physical and social e.g. regulatory aspects, also strongly affects the environment and freedom to explore life and related living aspects.
- **The Quality of Life (QoL):** using technology to improve the quality of life which may include the use of information to help us make informed food decisions e.g. quality and make up of food, cost options for products and services.



The Opportunity

A common language leading to a common understanding opens the door to opportunities.

This common understanding allows us to formulate ideas, many of which are complex. Technology forms a vital part of everyday modern life. Integrating technology and creating an environment with the right team of smart people is a recipe for a successful smart consulting business.

There are different approaches to creative ideas.

Sparkling imagination, shared issues and problems, is common in these start-ups. It is uncommon for a single individual to have the full range of attributes and skills to singlehandedly create the idea and to develop the concept all the way through to a service offering or product.

WHAT'S THE TRICK?

Maybe it's sharing the idea and fostering a creative environment to spark the unimaginable...



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