

SMART BUILDING NETWORKS

Ian Taylor and Andrew Comer

Ian Taylor is a former MP and is ex-Chairman of the P&SC. He is Chairman of Living PlanIT SA. Andrew Comer is a Partner of Buro Happold and sits on the Living PlanIT board.
www.living-planit.com
<http://www.burohappold.com/thelivingcity/>

INTRODUCTION

The debate on Smart Buildings should be conducted in a positive context. There is little accrued benefit to users, developers or public administrators if a smart building is a construction isolated from the urban built environment. If we get the balance right, the potential is awesome:

- By the year 2050 more than 70% of the world's population will live in cities consuming the bulk of the world's resources.
- The battle for environmental sustainability will be won or lost in our cities which consume more than 75% of the world's energy as well as contributing approximately 70% of greenhouse gases. (Intel)
- Urbanisation will happen despite the economic climate today – the test will be how intelligently it is designed, planned and executed. The main competitive edge for a city will be not just location but accessibility, its ability to enable people to connect and to live and work more creatively, with imagination and with better service delivery.

... ability to enable people to connect ...

- A city can have a neural system – interacting and connecting millions of sensors gathering the data and interacting with essential services.

Living PlanIT SA has endeavoured to find ways of coping with the leap forward in technologies by integrating them across urban areas and between and within smart buildings. The

PlanIT Urban Operating System UOS™ enables a new class of applications to deliver innovative services and opportunities, embedded in the structure of the city with control systems, telemetry and real-time data. We provide the software integration which can ensure clever buildings become really smart and improve the way people work, live and play.

WHERE WE ARE NOW?

The term *smart buildings* is commonly associated with technology solutions such as Building Management Systems (BMS). Thirty years ago the

... reduction of construction costs for building ...

price of microprocessors became economically viable enough to use them to control the equipment in buildings, which led to the creation of a new technology and market for BMS. In a typical BMS case small microcomputers are installed throughout a building to control associated equipment.

In addition to BMS, Building Information Modelling (BIM) has been introduced sporadically over the past decade, is now a key design process feature and by 2016 will be mandated by

UK policy across all public sector building projects in the UK. Originally introduced to support design and construction efficiency, and the reduction of construction costs for building structures and mechanical, electrical and plumbing plants and networks, BIM is now being used as a basis to support specialist simulation analysis such as people movement and occupancy, microclimate and

carbon reduction.

The term integrated Building Management System (iBMS) is used by Buro Happold to highlight an integrated intelligent system in a building. This system will reduce carbon emissions and control performance automatically. In addition, it will present actionable information to users that enables them to interact with the building in the most energy efficient and productive manner.

THE OPPORTUNITY

Living PlanIT and their consulting engineering partner,

Buro Happold, both agree that the application and integration of technology will be key for smart buildings of the future.

The continuing reduction in microprocessor costs and size has made it possible to migrate the intelligence into increasingly smaller devices; it is now possible for a device to have its own on-board intelligence and support communication with surrounding devices. This ultimately allows machine to machine (M2M) communications and the opportunity relating to the **Internet of Things (IOT)** connecting devices, people and things. An example of this is highlighted in a Children's Hospital in Birmingham. McLaren Electronic Systems (Living PlanIT's strategic partner) implanted a communication system that transmits real-time patient information to doctors and nurses of the intensive care unit. While a child is being taken to the hospital, data are sent to specialists awaiting their arrival.

Predictive data analysis is already proving invaluable.

Buildings of the future gather individual user data, aggregate behaviour of people and use this information to respond to their needs. In conjunction with geo-spatial databases like GIS (Geographic information

subsequently been replicated in most of the large retail developments in the UK. Two other examples include the TfL HQ at Palestra, Southwark and One Angel Square, the new Coop headquarters in Manchester.

A project we are engaged in at London City Airport to

building debate to ensure that the opportunity is maximised:

- Buildings should aim to minimise their carbon footprint and be environmentally responsible through sustainable design, construction and operation through the lifecycle of the building
- Buildings should collect appropriate data about both user behaviour and themselves (covering systems, environment and its structure) so they can respond accordingly.
- The use of BIM should be maximised and support operation and maintenance
- Automation and optimised control of building performance via an iBMS should enable users to focus on other areas of interest that may derive greater enjoyment, value and experience to themselves or their business

• Developing a new economic model to ownership and tenancy of buildings to ensure that there is an accrued, long-term benefit to investment in the planning and design of sustainable buildings

The smart building movement has to link with wider opportunities to create maximum potential, namely ramping up the opportunity to initiate smart districts and smart cities. A smart building should not focus only within the building or plot demise. It should have the ability to share knowledge and experiences via the IoT and/or a City Operating Platform with other buildings and infrastructure within the city. This has its own considerations not least regarding: governance: business and economic planning: data privacy and security: resilience; creating transparency and trust; managing resources and the environment: ICT, infrastructure, citizen engagement and delivery of public services. However,

... airports require a common open operating system ...

Systems) they will also be able to use real-time tracking information (from sensor and social networks) to optimise their operational management, ambient noise levels, mobility and connectivity, security and fire response. Buildings will be

implement a 'Smart Airport Experience' has been sponsored by the UK Technology Strategy Board. It aims to leverage the UOS™ as underlying technology to help the airport improve both efficiency and customer experience. Just like a city,



The smart building of the Future © Buro Happold

able to predict and even influence people's behaviour to minimise queuing, enhance retail and advertising revenues, and optimise use of resources, waste-to-energy and building systems dynamically. Buildings might enable feedback to their operators and managers to provide appropriate staffing and improve service levels.

PROJECTS

Thirty years of development have resulted in some modest examples based upon traditional approaches. Bluewater retail park in Kent used integrated intelligent systems as a key business enabler and this has

airports require a common open operating system that allows for the sharing of data between inanimate objects, and presenting those data as information in the right way to the benefit of consumers.

We have also recently begun a project in Brazil with a major developer, Convida, which fully appreciates the value of smart buildings in an urban context.

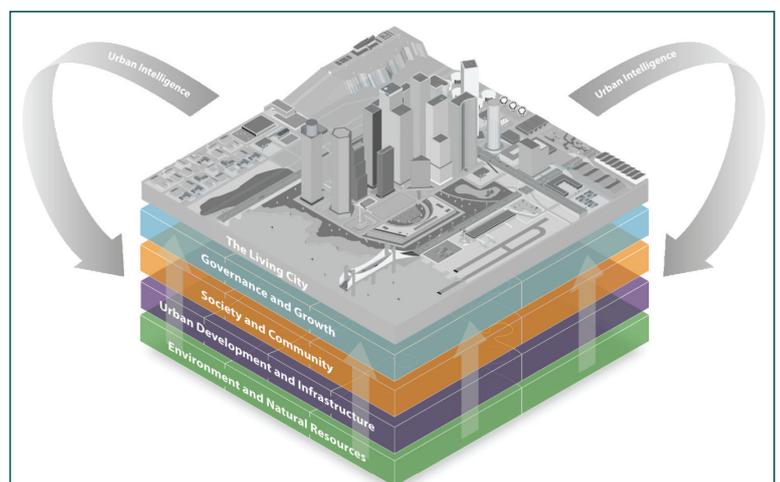
CONCLUSION

We believe that the following areas require focus in the smart

... accrued, long-term benefit to investment ...

- The integration of fast, efficient ICT infrastructure (using common platforms) within the building and public realm

these challenges and risks can be overcome through appropriate planning, design and operation. The benefits are huge.



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