



Wireless in Buildings: What Building Professionals Think

Introduction

Today, there are an estimated two billion smartphone users globally, all expecting cellular coverage in order to connect with their loved ones, build relationships and complete work tasks 'on the go.'

We should no longer hope for cellular connectivity when indoors. In today's digital age, it's become an expectation.

With an estimated 80 percent of mobile traffic originating or terminating within a building, it is critical that residents, visitors and workers have access to strong and reliable cellular coverage in order to properly make use of their mobile device. Despite this, only two percent of commercial buildings have dedicated technology to ensure strong and reliable mobile coverage indoors.

There are many potential reasons for this, and consumers and wireless operators have been surveyed many times about their needs and the current situation regarding indoor wireless. But what about the professionals responsible for designing, building and maintaining the world's structures? What is their perspective and how do they see this problem being addressed?

CommScope launched dedicated research - carried out by Coleman Parkes Research - examining the current performance, attitudes and insights of building managers, architects and facilities managers regarding access to in-building wireless (IBW) connectivity – and to find out why so many buildings, and therefore tenants, remain disconnected.

Interviewing 600 respondents from Europe (represented by the UK, France and Germany) and the US, this report sets out to uncover some of the reasons behind the building industry's attitudes, provides recommendations as to how the industry can overcome the challenges and seeks to uncover the value of in-building wireless connectivity to property owners, managers and tenants alike.

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Chapter one: Attitudes towards indoor cellular connectivity

Cellular connectivity – the network access provided by wireless operators and connecting devices like smartphones and tablets to the mobile network – has become a consumer expectation.

Mobile connectivity also provides an opportunity for businesses to perform on a global scale, driving productivity and enterprise growth and ultimately supporting increased economic output.

As our research illustrates, the significance of providing in-building cellular coverage is clear, with the vast majority of respondents agreeing it is imperative that connectivity is available in all areas of a building.

Importance of providing cellular coverage:

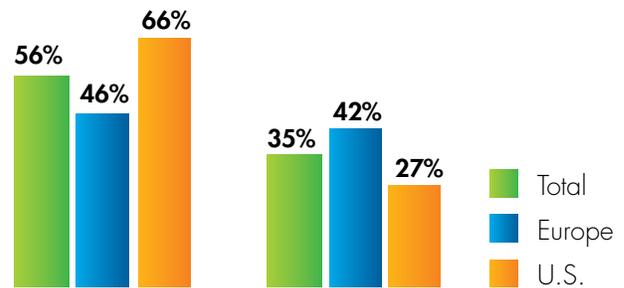
It is imperative that we have in-building cellular coverage in all areas of our buildings.



But, while appreciation of this connectivity may not be an issue, there appears to be a lack of understanding of how best to ensure the technology is in place to meet expectations, with only just over half of respondents always considering indoor cellular coverage when working on projects.

The provision of general wireless coverage within commercial buildings is an ongoing consideration, although greater prominence is typically given to Wi-Fi than to cellular connectivity. Indeed, it's unlikely to be much of a priority concern unless an organisation or a building's tenants are actually experiencing problems with their cellular coverage.

How often do respondents consider wireless coverage on projects?



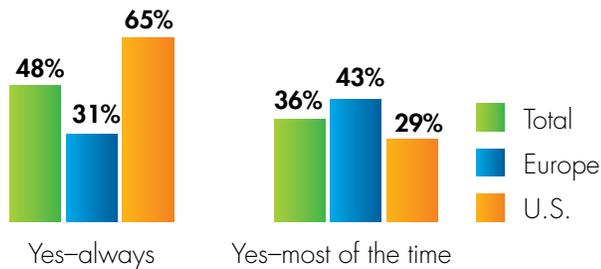
Always considered Sometimes considered

The explosion in high-speed, bandwidth-hungry data traffic resulting from the widespread adoption of smart devices poses significant stress and capacity demands on cellular networks. While moderately-sized buildings, of between three and 10 stories, and a relatively stable population are likely to have adequate capacity from outdoor cell sites, issues with capacity will generally arise in larger buildings with multiple stories and unpredictable population numbers.

In addition, architectural considerations, such as the use of low emissivity (Low-E) glass for windows to conserve energy, may improve a building's ecological impact, but will also make it less receptive for mobile coverage from outside the building regardless of capacity requirements generated from inside.

There is a common perception, however, that installing an indoor cellular system - or in-building wireless (IBW) or mobility solution - to address these issues might require complex engineering skills and a detailed understanding of radios, cabling and associated networking infrastructure. Add to this the risk of investing in rapidly changing technology and the fear of a 'rip and replace' situation, and it's perhaps unsurprising to see mobility as being a consideration for a project from only around half of all respondents.

Architects consideration for cellular networks:



And, of course, attitudes to mobility will nearly always be affected by the potential cost to building owners of funding the installation and the ongoing maintenance of any new system. There will always be cost implications though, and these should be managed by engaging with operators at the earliest opportunity.

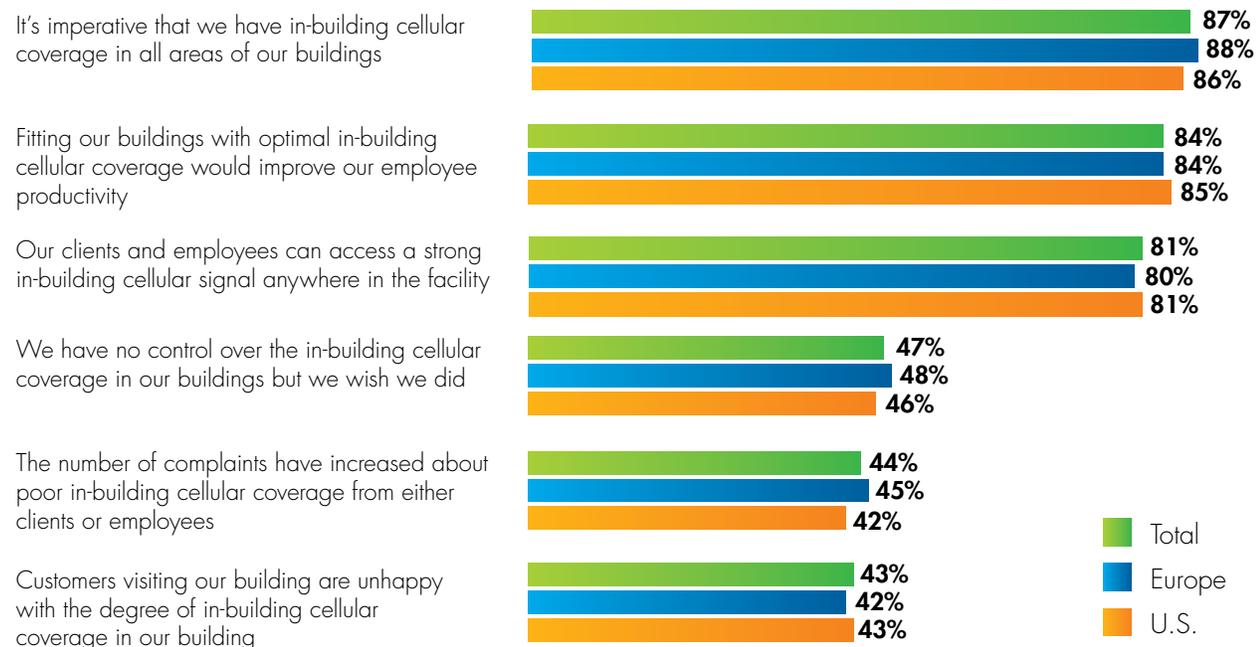
Today, the operators, who own the vital, licensed radio spectrum ultimately hold all the power, controlling the ability for subscribers to connect to their services. As our research shows, nearly half of respondents cited having 'no control' over wireless coverage, but wishing they did.

To date, it's largely been left to the operators to control the ability to connect to their networks. However, through a process of education, building owners and their tenants will, to some extent, become more empowered and able to make more intelligent and informed decisions in their investments in this space.

Increasing awareness of the returns that an indoor cellular system could deliver, for example, is likely to change attitudes towards it, leading to a greater desire to take responsibility for its implementation.

Fundamentally, there is a need to educate key stakeholders - be they architects, real estate managers, facility managers or consultants - in the most effective ways of implementing indoor cellular coverage to deliver the widespread mobile connectivity desired by a building's tenants, and the user-experience and business benefits that this represents.

Percent of respondents that agree with the following statements:



Chapter two: Responsibility and management

When it comes to providing cellular coverage within large high-rise buildings that often contain multiple tenants with varying connectivity requirements, the issue of responsibility can be a complex one.

With operators concerned with providing macro coverage for the area as a whole, building owners only investing where they can see an obvious return on their spend, and enterprise IT departments facing increasingly squeezed budgets, it's clear that addressing this issue will require drive and consideration from all sides.

Our research reveals that only around one in five respondents believes that building managers are responsible for providing cellular coverage, with more than a third suggesting the responsibility should lie with network operators, and a quarter holding the enterprise's IT department to account.

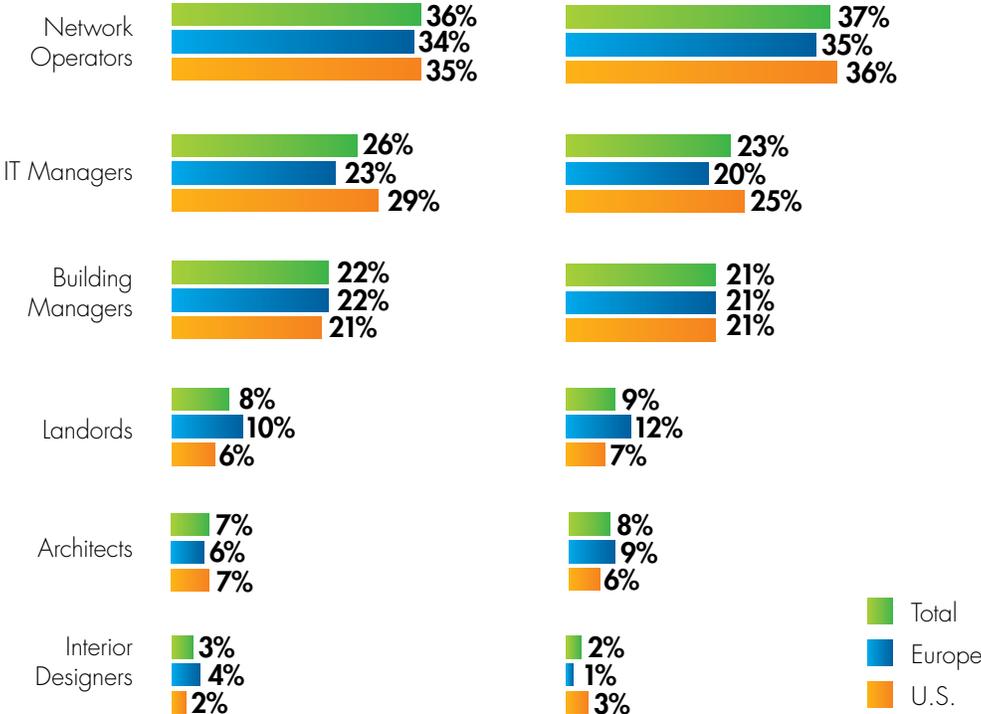
A shift in responsibility from operators to enterprises is expected eventually but, as it currently stands, most deployments are funded by operators. Fundamentally, building owners aren't procuring IBW systems for cellular services because they don't see the value and return they offer.

Building owners aren't always pushing for IBW, in part, because there is a lack of clear evidence that they'll lose prospective tenants by not offering connectivity. And, while residential tenants expect cellular coverage in their homes, business enterprises tend to put more value on IT infrastructure, sometimes forgetting that connection to a 3G/4G wireless network is just as critical.

The Provision of In-building Wireless

Who **is** responsible

Who **should be** responsible



It's important to demonstrate some kind of payback, somehow quantifying the benefit of making a space more attractive to prospective tenants, commercial or residential. If they're going to invest in something as significant as an IBW solution, building owners and operators need to know they're going to see a reduction in their operating expenditures (OpEx), for example, or they're going to enjoy a higher value on their property per square footage.

One model that's currently being given a great deal of consideration, and is already being used successfully within large venues such as shopping malls and stadiums, is the employment of a neutral host management provider.

In such cases, the ownership of the system is shifted from the carrier to the third-party service provider who then assumes all financial, regulatory, legal and technical responsibility for deploying, installing and maintaining the system. Access to the system is leased to one or more operators which, as well as generating more revenue, ensures that more tenants and visitors are able to access their carrier's network without the need to roam.

It's likely that building owners would be willing to adopt this model, as it's flexible and delivers a tangible return on investment, but its success would depend on the size and nature of the venue itself. The larger the venue, for example, the more people could be concentrated in a given area, making it more attractive for the neutral host and the operators involved.

Building owners who may be tempted to replicate this neutral

host model themselves should be aware that maintaining it requires a specific skillset. Established neutral host providers know the financial models needed to make it profitable, and how it needs to work; they know the formulas. It is their core competency, after all.

An additional benefit is that increased awareness of the neutral host model and its potential returns is likely to lead to greater discussion by businesses of wireless coverage in general.

A final consideration is the role that the IT department plays in maintaining an IBW system, particularly within a large, multi-tenant building. There's likely to be ongoing confusion as to whether the responsibility for wireless coverage lies with the wireless operator, with the building owner, or with the IT manager of the primary tenant.

When we think about technology, we tend to think of the IT manager as being responsible, but this is no longer necessarily the case. With an increasing amount of technology making its way into a building's day-to-day operations, we're starting to see the roles of IT and facilities managers combining and converging.

What is clear is that the appreciation of the importance of wireless connectivity within a building is now at the forefront. The quantifiable return on investment (ROI) and flexibility that the neutral host model offers may soon see building owners take charge, and a deeper understanding will break down barriers between traditional roles as each stakeholder sees the benefits – financial, commercial and practical – of a dedicated in-building wireless system.

Chapter three: Challenges to overcome

In today's 24-hour, globalised and connected world, everyone understands the importance of mobile connectivity. With reliable mobile coverage, families, friends and loved ones can connect anywhere across the globe, and businesses are empowered to work efficiently, collaboratively and innovate within their teams.

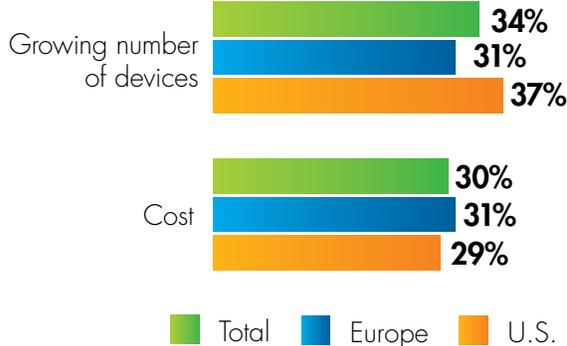
We believe that 98 per cent of commercial buildings worldwide still don't have a dedicated indoor cellular network in place. In a world in which approximately 80 percent of wireless data traffic originates or terminates within a building, knocking down the barriers that stand in the way must be a priority today.

So what are those obstacles? When asked why they believe the vast majority of buildings are still not connected, issues such as cost, complexity of technology, building regulations, operator capability and lack of skilled resources were cited.

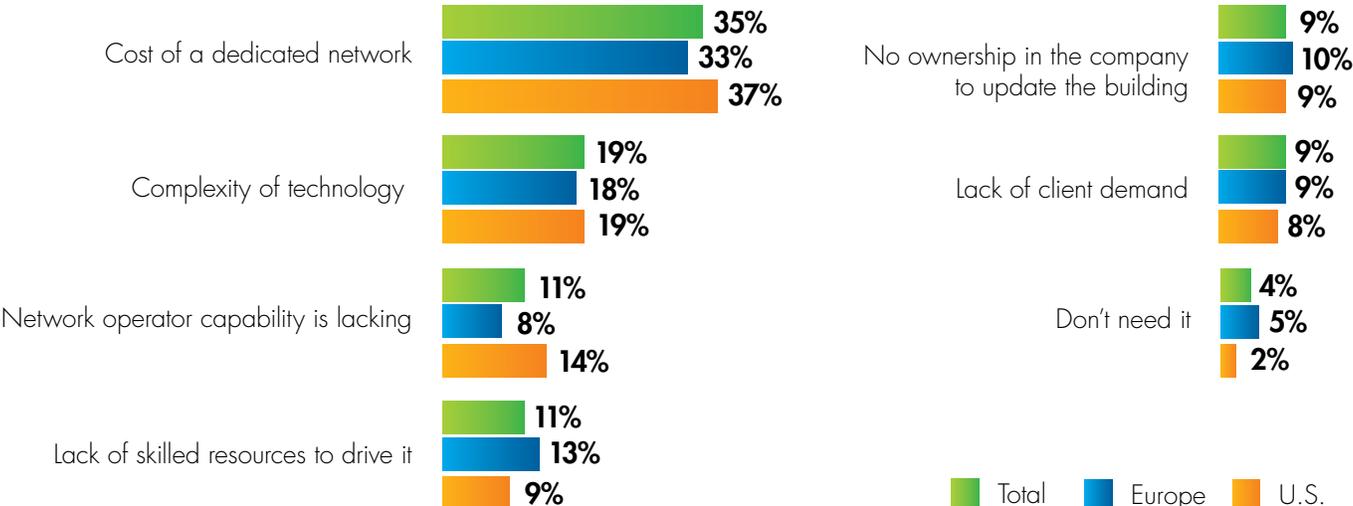
The issue of cost is, of course, always a consideration. Determining the return on every investment is critical, and when it comes to the provision of indoor cellular networks, there are multiple stakeholders in play.

These stakeholders – notably the mobile operators, building owners, architects and IT departments – all need to engage each other at different stages to ensure a seamless and pain-free installation of such a network. The issue is, as we have discussed, not all these groups always consider the cellular connectivity as something for which they are responsible.

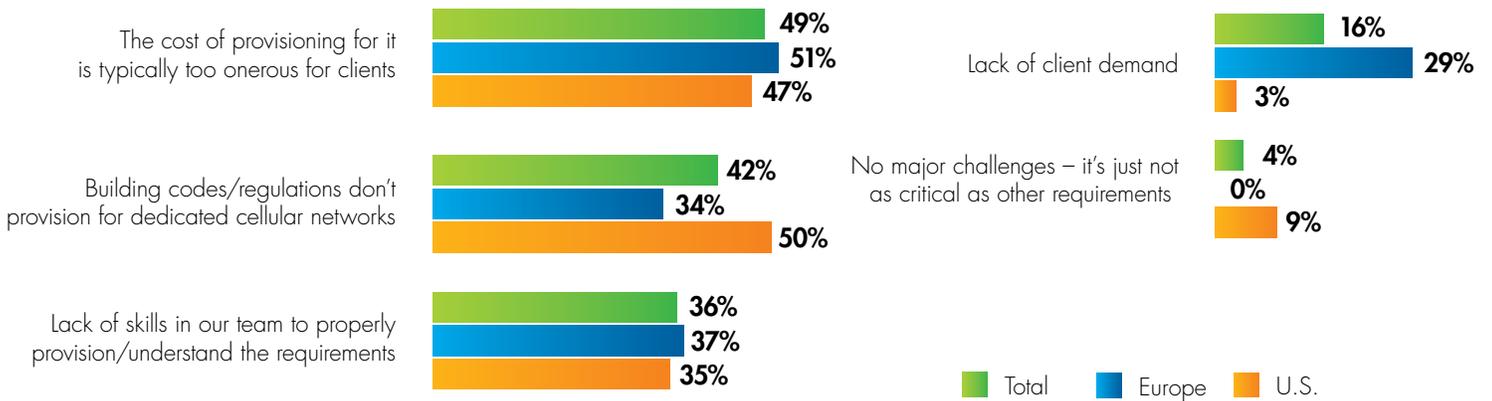
Biggest future challenges for provision of cellular coverage in buildings:



If we told you that it's our belief that 98% of buildings still don't have a dedicated in-building cellular network, what do you think is a key factor contributing towards that?



Architects on the challenges that exist when considering the installation of an IBW network:



When designing and developing a building, there is often little or no pressure from enterprises for ensuring mobile connectivity for its users. And without this pressure, a building owner or manager is unlikely to sacrifice their profit margins to make it happen. It is typically after the tenant has moved into the property that they discover connectivity is an issue. By this point, if the architect and building owner haven't made provisions for the additional cabling and antennas, installation of an IBW network can be complex and costly.

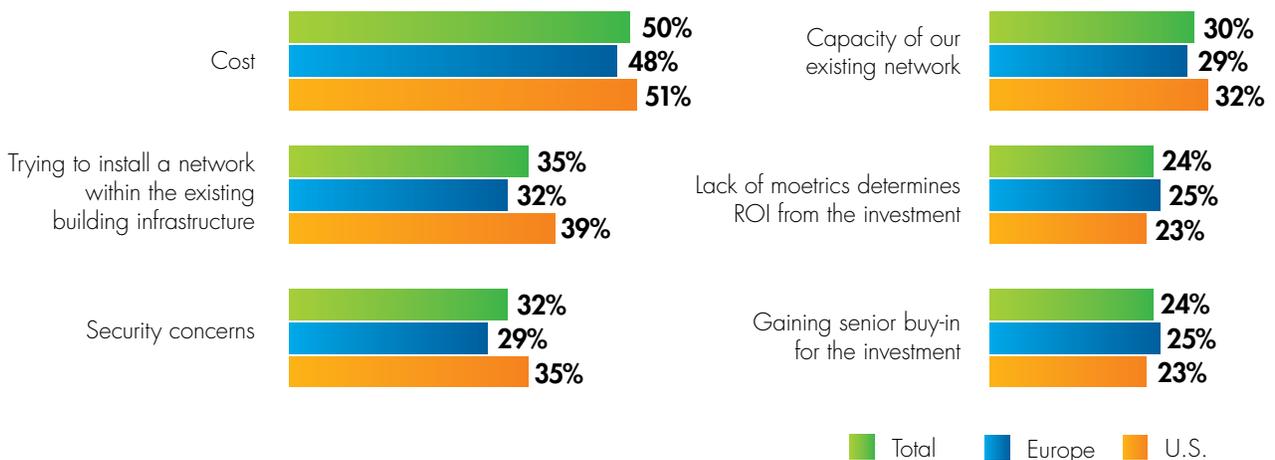
While there are conversations being held by various public sector authorities across the globe, our research suggests there are seemingly few regulatory codes to standardize and control the provision of cellular coverage within a building.

Concerns also exist around the complexity of IBW technology, with respondents anxious that they do not have the expertise to install and manage this type of network. IBW technologies are

evolving to address this concern with a goal of making these systems comparable to enterprise Wi-Fi deployments. IBW systems are being developed with simplicity in mind to ensure that enterprises or facilities managers aren't forced into procuring additional expertise at an increased expense.

Ultimately, the most effective way to keep costs down and ensure simplicity for all is for enterprises and building managers to avoid the 'build it now, fix it later' approach, and address this issue from the outset. Whether the ROI is determined by leasing the network to wireless operators or from increasing the cost of leasing the property to tenants, those responsible for buildings must overcome these challenges. With the reliance on mobile devices only on the up, and competitors increasingly savvy to this situation, the question for owners shouldn't be, "How much will this cost?" They should really be thinking "Can I really afford not to invest?"

Building professionals on the top challenges that exist when considering the installation of an IBW network:



Chapter four: The value of future planning

We have already addressed the sheer volume of wireless traffic that occurs indoors using mobile devices – and this trend shows no sign of stopping.

However, we haven't discussed the important role that cellular coverage will continue to play in ensuring our connections are secure, speedy and seamless.

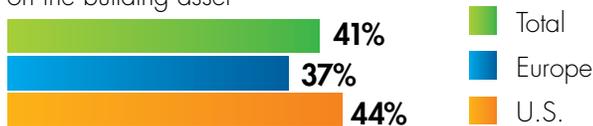
While people are likely to initially point to Wi-Fi as the network to undertake this change, what many may not be aware of is that cellular coverage is generally more secure than most Wi-Fi connections. In the case of 4G LTE, it also typically provides a better quality of service as well, with many people anecdotally preferring LTE.

What impact does wireless connectivity have on the desirability of a building?

Make the building more desirable to lease/own

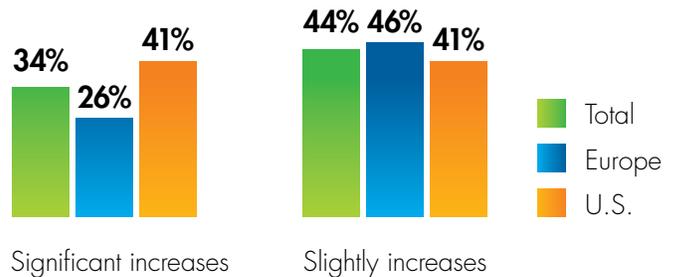


Create a greater return on the building asset



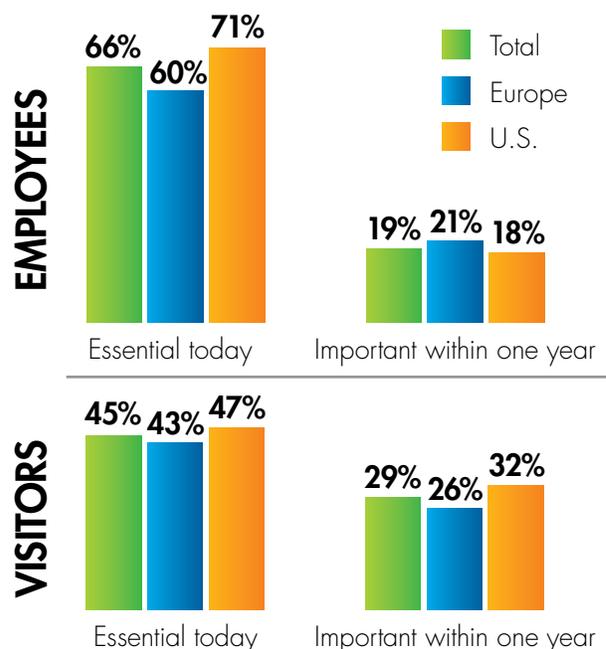
Ultimately, a building manager's role is to provide the best possible user experience for his or her tenants. Traditionally, managing the property by providing adequate and reliable gas, electricity, water and – recently – Wi-Fi has been the role of the building owner, but we believe this is changing, and the provision of fast and reliable indoor cellular coverage has reached this level of importance as well.

Compared to other utilities, how much do you think in-building cellular coverage affects the financial value of buildings and real estate in terms of employee/staff productivity?

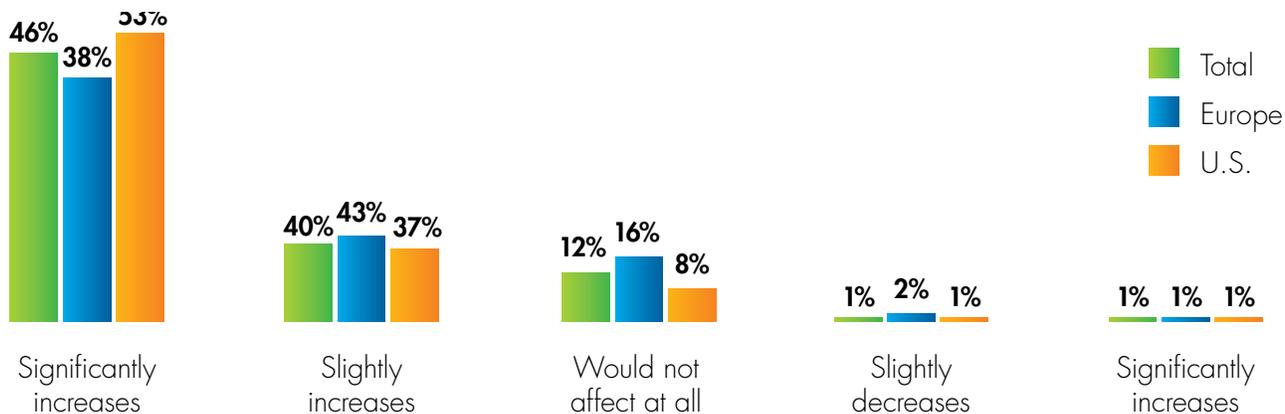


Our research suggests those managing buildings are of the same mindset, with two-thirds of respondents acknowledging that indoor mobile coverage is essential today for employees, and a further one in five believing it will be important within a year.

How important is the provision of cellular coverage for your tenants and their visitors?



Effect of in-building cellular coverage on market value:



Those that design and manage buildings are also seemingly aware that there is some form of potential ROI from implementing dedicated IBW technology, with nearly half believing that the value of a property will significantly increase after doing so.

When asked to select how much value an in-building cellular coverage system brings to a property, nearly half of the respondents (46%) chose 'significantly increases.' Asked then to estimate the value increase, a mean average of 28% was cited. While this figure may be debated - and inevitably vary on a property-by-property basis - it is important to note that those designing and managing buildings believe some form of relationship exists between high quality cellular coverage and the increased value of a property.

By what percentage do respondents believe the market value would increase slightly/significantly?

	Total	Europe	US
Percent change:			
0 to 10	34%	39%	29%
11 to 20	24%	24%	23%
21 to 30	13%	14%	13%
31 to 40	6%	5%	7%
More than 40	23%	18%	27%
Mean	28%	24%	31%

These results are of course encouraging, but our experience points to the fact that there is a great deal of education required to address this issue entirely. All stakeholders - enterprises, architects and building owners - must know their roles in order to make this happen. Enterprises need to take responsibility for connectivity in their buildings, engaging with the building owner at the earliest opportunity and starting conversations with operators.

Simply understanding the importance of a theoretical issue on its own often isn't enough to result in practical business change. Real data and return on investment models are needed. We hope this research report contributes in this regard.

According to our research, building managers understand the growing importance of connectivity, but in our experience they won't act unless they are called upon. Until now, for a building owner to invest in a dedicated in-building wireless solution, they would have to be presented with the prospect of losing lucrative tenants because of inadequate coverage, or a situation that will secure them guaranteed ROI.

Ultimately, without enterprises taking the lead to put forward the business case for connectivity, nobody else will. The onus is on them to ensure their staff have access to 'enterprise-grade' wireless connectivity.

With increasing numbers of connected devices on the cusp of the workplace, now is the time for building owners to start considering how investing in mobile connectivity will lead to increased ROI for their prospective tenants. This is an opportunity for them to differentiate themselves from their competitors ahead of the curve.

Conclusions and recommendations:

It is clear from this research that there is no 'one size fits all' solution to provide indoor cellular coverage within large and complex buildings.

With key stakeholders varying from the building owners and managers, architects and facilities managers, to the tenant enterprises and the mobile operators themselves, it is clear that this is an issue that requires real consideration, engagement and leadership from all parties.

Therefore in summary, there are five key recommendations from this research for the wider building, residential, business and operator community:

1. Building owners must address the current and future requirements of their tenants

With the proliferation of connected devices set to infiltrate residences and businesses and the knowledge economy, building owners simply cannot ignore the requirement to connect their tenants. While of course these devices are likely to be compatible with existing Wi-Fi networks, these are unlikely to be able to cope with the increased demand, forcing tenants to turn elsewhere. Without fast and reliable 3G and LTE network connectivity, the use-potential of these devices - alongside regulars such as smartphones and tablets - is severely weakened.

2. Architects and building owners must lead with a vision for tomorrow

Architects and building owners must not fall victim to the 'build it now, fix it later' approach by considering how and where mobility solutions could be installed. It is no longer acceptable when designing new buildings to simply ignore the growing requirements for connectivity. Even if it is just informing the client of the IBVV network's potential, engaging with them to consider whether this could be of interest at an early stage could result in significant cost savings.

3. Avoid the paralysis of inactivity

Those in charge of managing buildings often consider the need for an IBVV or mobility solution but fear the technology is too costly or complex – and do not act on it. They may be halted by the perception of requiring complex engineering – or worrying that they do not possess a clear understanding of radios and the cabling technology associated with this type of network. Concerned by the prospect of 'yet another rip and replace' job, they do nothing, letting the building fall further out of date and less attractive to potential tenants.

Taking responsibility and engaging with the experts will likely set building managers' minds at ease. Outsourcing the complications makes life easier, and they will often find out the solutions aren't as complex as they might have first thought.

4. Consult with the industry experts

The provision of indoor connectivity is likely to improve the desirability of a building, as well as its potential value, and enable more productive personnel for enterprise tenants. Yet, the cost of doing so is clearly a large barrier for all involved. However, as we have discussed, there are methods to offset and even share the burden of this investment. Placing wireless connectivity at the heart of any renovation strategy will ensure today's buildings are fit for tomorrow's workforce.

5. Cellular coverage is the next utility

Building owners clearly understand the importance of providing adequate and reliable utilities such as gas, electricity, water and even Wi-Fi to tenants. Only by considering cellular connectivity a basic utility will we quickly move towards fast, reliable and seamless connectivity for all. In today's digital environment, building owners must provide mobile coverage to their tenants, or they may find their tenant relationships at risk sooner rather than later.

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