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The Cost of "Smart" Cities Include Cybersecurity, E-Waste, Environment and Pollution

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A new meta-integrative qualitative research paper published in the journal Buildings presents the multi-level problems that could arise from the implementation of smart building structures, especially with 5G and IoT devices. Researchers found cybersecurity threats and radiation effects, "especially from 5G cells that can directly affect the individual, biologically and mentally." The paper also focuses on e-waste and energy consumption.

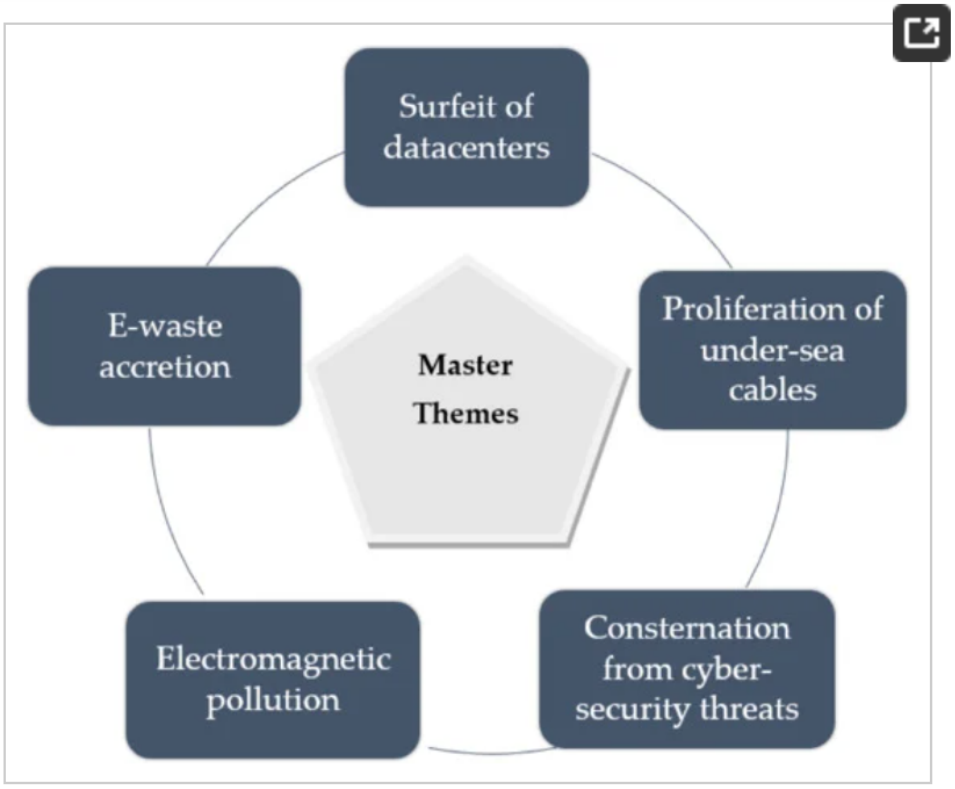

Figure 1. Five master themes generated from meta-integration process.

The authors challenge the rhetoric that 5G is energy saving. The paper documents that because so many additional cell towers and antennas are required for 5G "*the generic*

notion that wireless data transfer is energy-conserving or can act as a CO_2 eliminator can be challenged." The authors recommend a thorough analysis of the carbon emissions and environmental impacts of massive data centers and undersea optic cabling.

Read the full paper here.

> "This new paper should be a call to action for our city planners and elected leaders worldwide. A cradle to grave analysis of so called "smart" cities should be a pre-requisite before we leap into 5G. As this paper outlines, the true cost of 5G and the internet of things includes cyber-security threats, electromagnetic pollution, E-waste, and environmental impacts from data centers and the proliferation of undersea cables. The word "smart" is being used to describe a tsunami of infrastructure and technology that is harming our environment and threatens human health," stated Theodora Scarato, Executive Director of Environmental Health Trust co-author to the paper "Building Science and Radiofrequency Radiation: What Makes Smart and Healthy Buildings" which documents why and how to reduce/eliminate radio frequency (wireless) electromagnetic radiation in buildings. "We must ensure safe and sustainable technology to protect our children's healthy future."

Abstract

Smart buildings deploying 5G and the Internet of Things (IoT) are viewed as the next sustainable solution that can be seamlessly integrated in all sectors of the built environment. The benefits are well advertised and range from inducing wellness and monitoring health, amplifying productivity, to energy savings. Comparatively, potential negative risks are less known and mostly relate to cyber-security threats and radiation effects. This meta-integrative qualitative synthesis research sought to determine the possible underlying demerits from developing smart buildings, and whether they outweigh the possible benefits. The study identified five master themes as threats of smart buildings: a surfeit of data centers, the proliferation of undersea cables, the consternation of cyber-security threats, electromagnetic pollution, and E-waste accumulation. Further, the paper discusses the rebound impacts on humans and the environment as smart buildings' actualization becomes a reality. The study reveals that, although some aspects of smart buildings do have their tangible benefits, the potential repercussions from these not-so-discussed threats could undermine the former when all perspectives and interactions are analyzed collectively rather than in isolation.

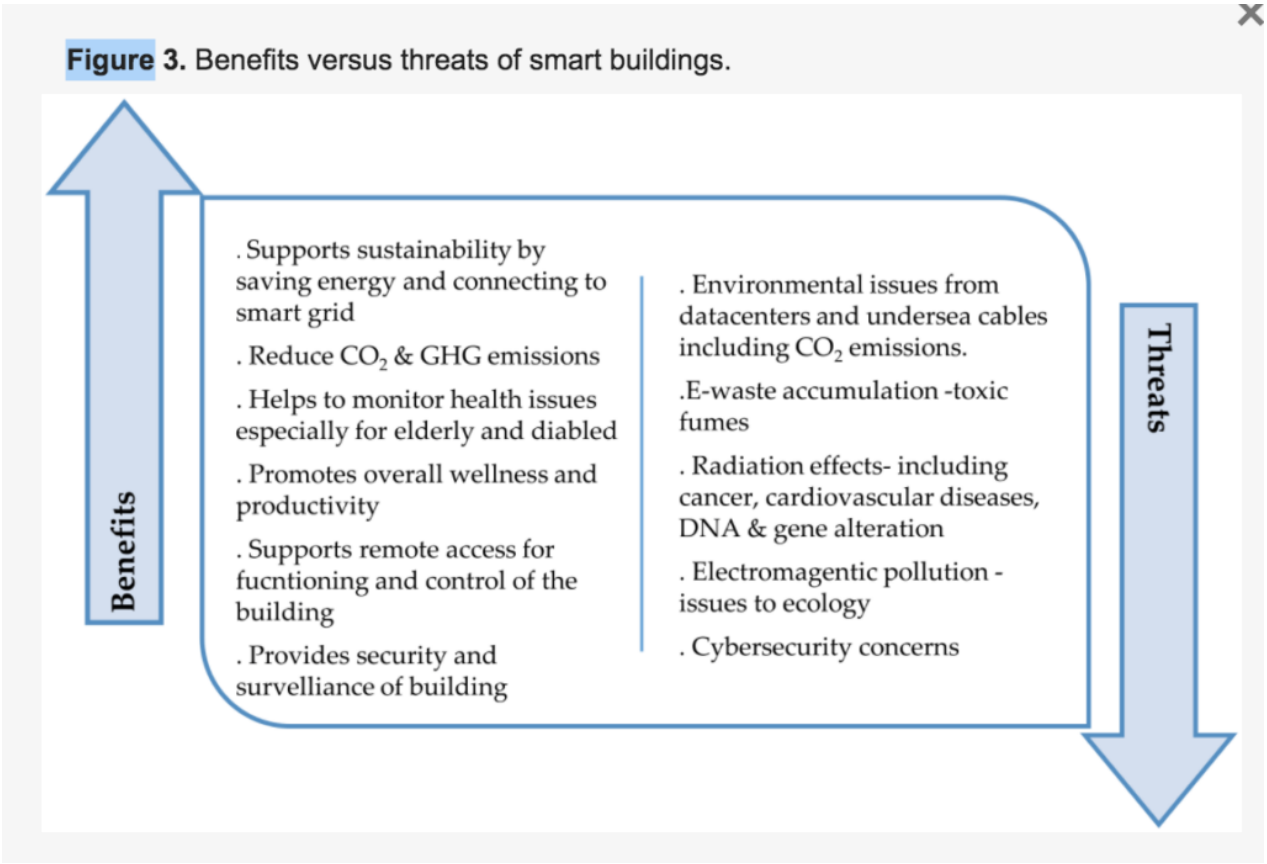

Figure 3. Benefits versus threats of smart buildings.

Conclusions

Smart buildings are seen as the futuristic change in the built environment. Along with smart vehicles, they are deemed to reduce carbon and GHGs emissions by incorporating smart appliances that can communicate with each other and generate live information for data analytics to prescribe the solution to problems ranging from energy efficiency to health are. While technological companies advertise the benefits of smart buildings and smart cities, there is an equal need to understand the demerits behind developing these smart cities/smart buildings.

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This meta-integrative qualitative research paper tried to understand and correlate the multilevel problems that could arise from the implementation of these structures, especially with 5G and IoT devices. Apart from cybersecurity threats to radiation effects, especially from 5G cells that can directly affect the individual, biologically and mentally, a thorough analysis of the indirect effects such as the carbon emissions from massive data centers and undersea optic cabling is highly recommended to counteract the carbon emission reduction that these buildings claim to make through efficient appliances. The study also considered the potential electromagnetic radiation pollution that could arise from electronics waste disposal and its potential negative contribution to the environment.

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Finally, this study cautions that more research is needed to quantify both benefits and threats on a comparative scale to verify whether there is any chance that threats could be more detrimental than the benefits. The underlying objective is that impacts on human health, environment, and climate change must be regarded as a top priority prior to the deployment of such a technology on a global scale.

Generally, there is a belief that wireless connections decrease CO_2 emissions. However, the wireless transfer of data can take place only for a short distance (distance being dependent

on the frequency of operation of the smart devices), for example, for 4G, the wireless data transmission is around 1000 miles, while, for 5G, it is only 10 miles. As a result, additional relay cell towers and antennas are required for the operation of 5G devices [95]. As a result, the generic notion that wireless data transfer is energy-conserving or can act as a CO_2 eliminator can be challenged. Therefore, the data from any sensor device would have to take a wired path for almost 99% of its travel time to reach back to the user's mobile phone [96]. Thus, smart buildings that function with multiple smart devices that are connected to a network culminate with the installation of more undersea cables.

Read the full report here:

Raveendran R, Tabet Aoul KA. A Meta-Integrative Qualitative Study on the Hidden Threats of Smart Buildings/Cities and Their Associated Impacts on Humans and the Environment. Buildings. 2021; 11(6):251. https://doi.org/10.3390/buildings11060251

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