Automation in Real Estate

Automation, Healthy Buildings and the Future of Work

CENTER FOR REAL ESTATE

The Real Estate Innovation Lab

AN EDUCATIONAL WEBINAR FOR EY

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Automation continues to be one of the biggest buzzwords in the real estate industry with much discussion about the benefits and best practices for implementation. Organizations are now beginning to see the benefits of automation as well as how they can automate their processes to ensure their businesses are ready to thrive and compete in a disrupted world.

To help organizations think about what automation means, EY and MIT's Real Estate Innovation Lab have been producing a series of webinars that focus on the future of automation in real estate. In essence, cutting through the hype and exploring what's happening now to understand what will come next.

Irrespective of our geographical individualities, the concepts of how and where we work are facing a new reality in the wake of an unprecedented pandemic that has stopped the world in its tracks. While we all hope to return to what we once knew, a building's operations, design and functions have changed drastically, as we all try to maintain safe distancing to help reduce the spread of a virus. However, this preparation is not wasted on just COVID-19. The world we return to will need to respond to global challenges more efficiently.

In this third edition of our series, we worked with Selina Short, EY Partner and Global Real Estate Innovation Leader, to discuss the rising challenges of health in the workplace and how automation could help augment and assist with some of those challenges. The third webinar also featured Mike Norton, Global Haed of Property Management, and Erik Umlauf, Managing Director, at JP Morgan Global Real Estate and Elizabeth Brink, Principal, at Gensler. Their combined experience gave great insights into the basic design and technology interventions that we can enlist to help people have healthy and productive work environments. Combined, their insights teach us that not only can we work to have sustainable and healthy workplaces, but we also have many of the tools ready to be organized to achieve that goal, today.

"ETHICAL AUTOMATION AND DATA SCIENCE CAN HELP US LEARN, ORGANIZE AND DESIGN FOR HEALTH."

DR ANDREA CHEGUT
MIT REAL ESTATE INNOVATION LAB

"AI AND AUTOMATION NOT ONLY MANAGES ROSTERS AND MAINTAINS SOCIAL DISTANCING REQUIREMENTS, BUT ALSO UNEARTHS NEW OPPORTUNITIES TO HELP PEOPLE CONNECT AND COLLABORATE."

SELINA SHORT
EY OCEANIA REAL ESTATE, HOSPITALITY AND CONSTRUCTION MANAGING PARTNER

LESSONS FROM HISTORY

DESIGN

Early 20th century architects saw design as a panacea to the sick, overcrowded cities. The Sanitary Movement impacted bathroom and building materials - a shift from mainly wood facades to tile to mimic the cleanliness of hospitals.

TECHNOLOGY

In a world without social media and the internet, it was newspapers and the popularization of telephones that urged people to avoid gathering in crowds.

ECONOMY

During the Spanish Flu Pandemic between 1918 and 1920, flu-related deaths in 43 countries led to a 6% reduction in GDP.

GOVERNANCE

Government-led social distance is key to pandemic response and needs to be implemented early to be successful. Public parks were first a refuge to restore health to overcrowded, industrial towns.

Over the course of history, the world has endured a number of pandemics that have shook the world. Looking back, we have found that cities and people tend to evolve in four key areas - The economy, design, technology and governance. These four key areas generally evolve to enhance public health, minimize the loss of life, minimize the loss of economic productivity and lead to an increase in technological invention that improves the human condition. As a result, new systems of organization are put in place to create a safer society.

Throughout history, the world has suffered more than 20 pandemics which collectively have been responsible for millions of deaths and will are likely to happen again in the future. Tracking design, technological, economic and governance responses and in cities in buildings is a part of humanity's way of developing survival mechanisms.

BACK TO BASICS

We find that the recommended responses towards COVID-19 are not unfamiliar to the ones given over the last one hundred years.

FILTER AIR

Filtration of recirculated air reduces transmission of airborne, infectious diseases

HUMIDIFY

Viruses survive in low-humidity environments

CLEAN

Adjusting cleaning protocols to meet the demands of the current situation

EDUCATE

Recommend washing hands often with soap and water for at least 20 seconds

VENTILATE

Ventilating with outdoor air is vital to diluting airborne contaminants and reducing disease transmission rates

"THERE IS NO SINGLE INITIATIVE TO TAKE THIS VIRUS DOWN - A LAYER OF DEFENSES IS CRITICAL FOR A HEALTHIER BUILDING."

MIKE NORTON
JP MORGAN CHASE

AUTOMATION HELPS WELLNESS

13% INCREASE IN AUTONOMOUS FLOOR CARE ROBOTS DOING 8,000 HOURS OF DAILY WORK THAT WOULD OTHERWISE HAVE TO BE DONE BY HUMAN EMPLOYEES AT RISK.

SOURCE: NEW YORK TIMES (2020)

IOT AIR QUALITY AND CO2 LEVEL MANAGEMENT CAN HELP REDUCE WORKER ABSENCES, WHICH COST APPROXIMATELY $226 BILLION IN THE UNITED STATES.

SOURCE: SENSEWARE 2020

"A NEURAL NETWORK CAN HELP SPOT COVID-19 IN CHEST X-RAYS."

SOURCE: MIT TECHNOLOGY REVIEW (2020)

Data and analytics are going to lead the way in helping us understand the risk factors of returning to work with numerous automation technologies available to help fight COVID-19:

- Neural networks are capable of understanding systematic patterns that are not apparent from more simplistic data models. At MIT, researchers and data scientists used numerous historical data sources in order to help predict the steep rise of COVID-19.

- Shantenu Jha, a computational scientist at Rutgers University and Brookhaven National Laboratory, is screening billions of existing drugs for their interactions with, and ability to, disrupt or bind to SARS-CoV-2 proteins. Using machine learning techniques has greatly advanced the development of over 125 vaccines for COVID-19.

- Data scientists are also using various tracking and tracing techniques, whether via surveys such as 'Covid Near You,' or with other track and trace apps being developed by government agencies and large technology companies such as Google or Apple.

There has also been a significant advancement in robotics and sensors, with a 13% increase in the use of robotics to aid in sanitation and cleaning. Air and humidity sensors to identify poor air filtration are also showing a strong increase in demand.

WHAT IS A HEALTHY BUILDING?

The idea of a healthy building is not a new concept, having been in existence for centuries. The Romans, for example, made links between causes of disease and methods of prevention, leading to the construction of sewers, aqueducts, public toilets and large public baths.

In modern times, however, the average American spends up to 90% of their time indoors, be it in an office, a school or a home. It is during this time indoors that they are exposed to the largest amount of pollutants.

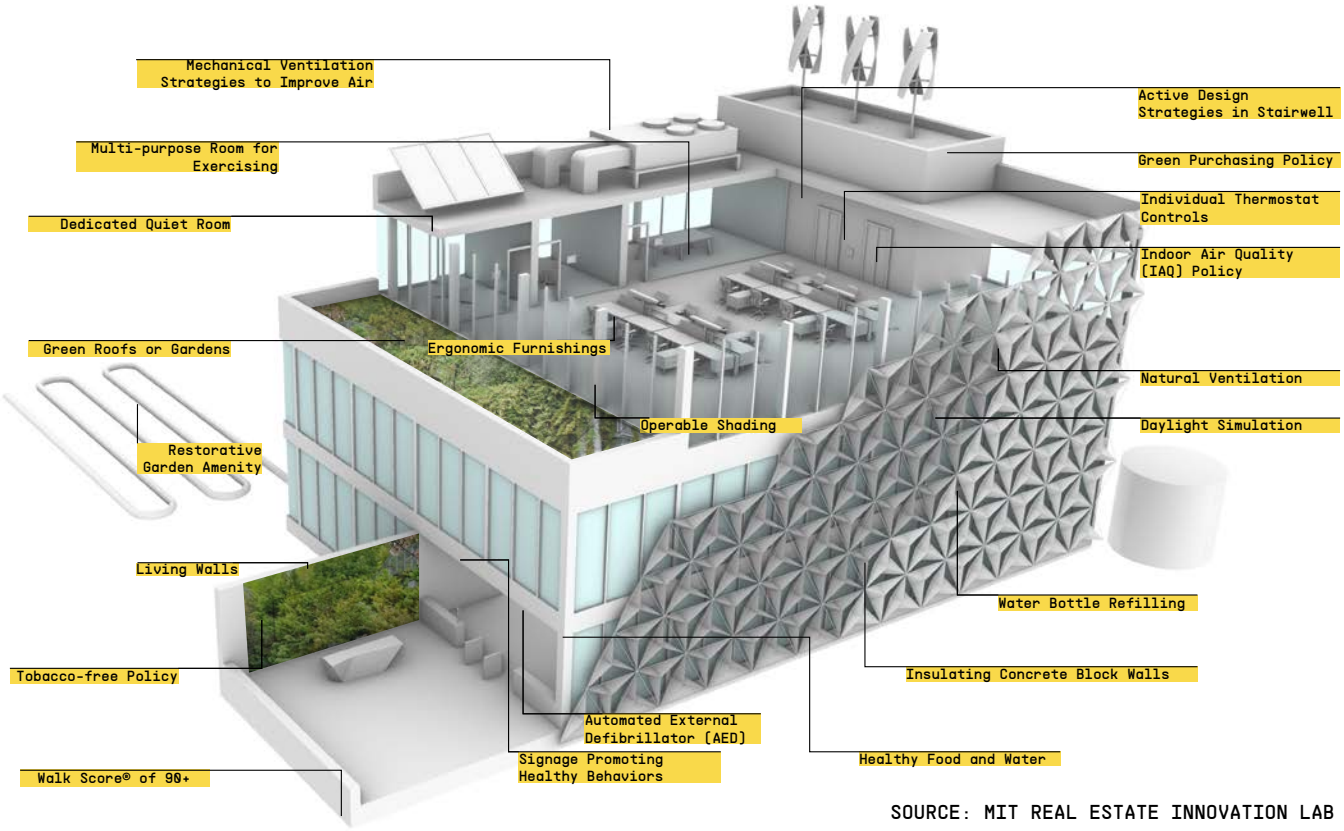
In the U.S. alone, the savings and productivity gains from improved indoor environments are estimated anywhere between $25 and $150 billion per year. It is also projected that by 2030 there will be 52 million deaths from chronic diseases caused by poor lifestyle. There is also a direct correlation between poor ventilation rates and higher instances of short-term sick leave, asthma, and respiratory infection among building occupants. Given this, incorporating design features that contribute to a healthier office building can have a significant impact on our wellbeing.

Currently, the WHO defines a healthy building as a space that supports the physical, psychological, social health and well-being of people. While this definition is broad in terms of scope, the current pandemic clearly illustrates that many buildings still fail to meet these guidelines.

"THIS PANDEMIC HAS OPENED OUR EYES AND PUSHED US FORWARD TO THINK MORE INNOVATIVELY, BE MORE COURAGEOUS, AND DELIVER ON THE ESSENCE OF OUR CLIENT NEEDS."

ERIK UMLAUF
JP MORGAN CHASE

TECHNOLOGY AND DESIGN FEATURES OF A HEALTHY BUILDING



SOURCE: MIT REAL ESTATE INNOVATION LAB

The features of a Healthy Building can be seen as an extension to the features of a GREEN Building, additionally taking a more cohesive approach towards the design of the building to encourage more occupancy activity.

Across the leading certification agencies, we have found a number of common features that are considered best practices in guiding the built environment towards healthy building standards: ergonomic furnishings, natural daylight, operable shading, natural views, green purchasing policies, zero asbestos, fitness rooms, indoor air quality (IAQ), and a no smoking policy.

ADJUSTING TO A NEW REALITY

As offices around the world begin to open up, and restrictions are loosened to allow people to return to work, businesses need a plan to adapt to the increasing personal concerns of their employees. 80% of staff (EY Return to Work Survey 2020) want to return to work, but expect that changes will be implemented.

The workplace has to respond to the increased demand for healthier workplaces while still retaining irreplaceable key elements that employees crave for: collaboration and interacting with co-workers (Gensler Work from Home Survey 2020).

In response to this new landscape, EY examines three key interlinked aspects:

Workforce
We expect an enduring impact that demands new ways of working and an opportunity to reshape the capability of our workforce.

Workplace
Where and how we work has been redefined and our focus on workplace must be on creating connected places where people can do their best work safely.

Worksmart
We went into this crisis in a low growth, low productivity environment. The old methods won't work. We need to find new ways to reinvent business models, processes and ways of working to deliver growth, enhance productivity and engagement while rethinking costs. It's clear that resilient working means bringing together people and place, enabled by technology, to reach new levels of productivity.

20% OF STAFF WANT TO CONTINUE TO WORK FROM HOME INDEFINITELY. THE REST ARE HAPPY TO RETURN TO WORK, BUT EXPECT CHANGES.

SOURCE: EY RETURN TO WORK SURVEY 2020

PRIOR TO THE COVID-19 PANDEMIC ONLY 7% OF CIVILIAN WORKERS IN THE UNITED STATES HAD ACCESS TO A "FLEXIBLE WORKPLACE" BENEFIT.

SOURCE: PEW RESEARCH CENTER

74% OF PARTICIPANTS SAY THEY MISS PEOPLE THE MOST IN WORKING FROM HOME; 55% HAVE A HARD TIME COLLABORATING.

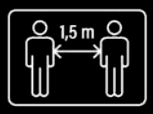
SOURCE: GENSLER WORK FROM HOME SURVEY 2020

IMPACTS TO DESIGN MOVING FORWARD

In addition, COVID-19 will create a different set of intentions for design and curation of spaces moving forward.

DESIGNING WITH DENSITY

Deliberately set aside a percentage of square footage to be experimental and prepared for learning what a new behavior needs to be.



TOUCHLESS WORKPLACE

Design interventions focused on viral transmission risk, including smart materials, pinch points, and voice activation.

LOBBIES ARE PRE-CLEAN ROOMS

Sensors and other scanning technologies can also help reacclimate people to public gathering spaces.

OFF-SITE CONSTRUCTION

Fabricating and assembling building components offsite could prove to be a healthier alternative to traditional construction.

MIXED USE REAL ESTATE TO SUPPORT ORGANIC DENSITY

Self-sustaining districts and connected communities will experience a resurgence.

ACCESSIBLE OUTSIDE AIR FLOW

Fresh, clean air helps maintain healthier environments & dilutes the human-to-human passage of airborne elements.

Source: Gensler & Princeton University (Lewis and Nordenson)

“DESIGN DECISIONS REINFORCE CULTURE, AND BEHAVIOR. IT SIGNALS TO EMPLOYEES WHAT IS IMPORTANT TO AN ORGANIZATION. IN THAT WAY, DESIGN NEEDS TO BE ALIGNED TO ORGANIZATIONAL GOALS AND VALUES.”

ELIZABETH BRINK
PRINCIPAL, GENSLER

AUTOMATION TECHNOLOGY JUST GOT A JOB!

In a post covid reality, automation technology just got a job in real estate. Prior to February 2020, there was discussion surrounding the business case to employ automation tools such as big data, machine learning, robotics and IoT. Today, that discussion has shifted with leaders in the industry. Here, automation can help get their innovative and creative workforce back to an office environment more safely. This shift may be surprising to some, but the old rule of $3, $30, $300 matters here, where companies annually spend about $3 per square foot on operational costs, $30 per square foot on rent and approx. $300 per square foot on productivity. This means that maintaining productivity is worth marginal expenses in certain technologies to drive safety and efficient use of space.

ROBOTS

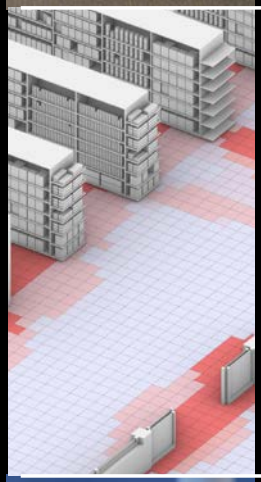
Demand has risen for robotics applications that can detect, sanitize, clean, and conduct deliveries in public spaces such as office buildings, shopping malls and medical facilities.

SOURCE: JLL, GAVIN MORGAN
SOURCE: SOFTBANK ROBOT AUTOMATES OFFICE CLEANING

IOT SENSORS

Building managers can implement IoT strategies to enhance sanitation and health-related monitoring procedures in public spaces, such as the use of sensors to perform infrared scans, pinpoint crisis locations and send alerts.

SOURCE: JLL, GAVIN MORGAN
SOURCE: CHEETAH ROBOT USED TO MONITOR VISITOR TEMPERATURES



AI ALGORITHM

In addition to enhancing detection and diagnosis of COVID-19, AI and deep learning can be used to further understand how users move through environments and iterate on more efficient layouts.

SOURCE: SPATIO METRICS
SOURCE: SPATIO METRICS USES AI LEARNING TO MPROVE SPATIAL DESIGN

WEARABLE TECHNOLOGY

Office-sponsored, wearable technologies coupled with algorithms will allow daily symptom tracking and overall body temperatures, respiratory rate, and heart rate checks. These will help to better understand early warning signs of infection.

SOURCE: REUTERS
SOURCE: OURA RING IS USED TO IDENTIFY EARLY ONSET OF COVID-19

BIG DATA

Demand for enhanced analytics to track and monitor high risk public incidents will rise. Big data also provides opportunities for performing modeling studies and guiding policymakers.

SOURCE: JLL, GAVIN MORGAN
SOURCE: ISTOCK

DIGITAL TWIN

Digital twin can show us - in real-time - how users can securely and meaningfully interact with each other and, in doing so, create secure, scalable, adaptable digital ecosystems.

SOURCE: MANUFACTURING GLOBAL, ALI NICHOLL;
SOURCE: SIRAL MODELS CITY-WIDE DIGITAL TWIN TO ACCESS REAL TIME TRACKING OF RESOURCES

Polling results from the Healthy Buildings webinar delivered some surprises from the webinar attendees, but also confirmed a lot of our suspicions. Firms are not engaging in the most fundamental contributing factor to Prodcutivity: better air quality. Most notably, there was skewness in responses due to geographical location.

Oceania-based participants were more likely to have COVID-19 interventions in place, with 43% focusing on educating building occupants and 34% in active deployment of healthy building features. This is compared to US-based participants with only 27% implementing educational practices and 22% in active deployment. This differential may be due to Oceania's head start to the pandemic.

In addition, only 13% of firms were aiming to improve air quality, which the Lab has found to be the greatest opportunity for return on cost.

GREATEST OPPORTUNITY

ONLY **13% OF FIRMS ARE AIMING TO IMPROVE AIR QUALITY** WITH VENTILATED, HUMIDIFIED, OR FILTERED AIR.

CURRENT TOOLS

35% OF RESPONDENTS ARE EDUCATING BUILDING OCCUPANTS TO ENCOURAGE PERSONAL HYGIENE AND SANITATION.

FINANCIAL OPPORTUNITY

21% OF FIRMS ARE INCREASING INVESTMENTS IN HEALTHY BUILDINGS DUE TO COVID-19.

DEPLOYMENT

28% OF FIRMS ARE IN ACTIVE DEPLOYMENT OF HEALTHY BUILDING ADOPTIONS, AND 23% ARE CURRENTLY ASSESSING APPLICABILITY.

THE LAB'S TAKE

Our lab has provided some insights to questions asked during our webinar

Was there a difference in WFH preferences based on age?

A recent Work from Home survey from Gensler found that Millenial and Generation Z workers are less productive and less satisfied at home, compared to their older peers. They also feel less accomplished at the end of a typical workday and lack awareness of what's expected of them.

How can existing buildings implement IoT technologies?

There are considerable amounts of retrofit solutions on the market, and studies have shown that there are real ROI benefits to investments in IoT retrofit and smart building solutions. One study from Pressac Communications found that a retrofitted IoT system tracking CO2, temperature, and humidity data that implemented demand-led systems resulted in a 42% reduction in energy use overall.

If a vaccine emerges and ends the pandemic, should we still consider costly design changes to our office?

Conversations with our guests from JP Morgan have found that their strategy to incorporate long term health and design elements (integration of sunlight, outside air and plants, as well as sustainable material selections) into their buildings from the onset has been affirmed and found incredibly impactful during the pandemic. These design elements lead to healthier and happier employees that endorse a more productive work environment.

We are seeing return to work in the covid era as only 10-25% of the workforce, is this what others are seeing?

Based on our surveys conducted through Gensler and EY, we have found that only 12% of the workforce would like to work from home permanently. The rest of the workforce are enthusiastic about returning to the office, but expect changes from building owners to help address health concerns. Guest Speaker Mike Norton, JP Morgan Chase, has looked at bringing staff back in phases and staggering shifts.

Which traditional architectures already lean towards a similar practice of Healthy Buildings?

Historically, design has been greatly impacted by pandemics. The discovery of tuberculosis in 1882 gave rise to the Sanatorium Movement in Europe and the United States. This movement was designed to house, treat, and isolate patients using strict hygiene and large exposure to sunlight and air. Modernist architects such as Alvar Aalto and Le Corbusier who displayed influences of these practices in their work, emphasizing clinically clean design that showcased buildings full of light and air.

Healthy buildings as a space that supports the physical, psychological, and social health and well-being of people was lacking a broad mandate prior to COVID-19. Moreover, the connection between healthy buildings and automation is unclear to some.

However, the implementation of automation through an array of sensors, building management tools, touchless technologies and robotic helpers will make our buildings healthier and safer. This will become increasingly important as businesses returns to a new normal. Design will now shift its focus on touchless workplaces, increasing outside airflow, less condensed office environments, and scanning technologies that help monitor, detect, communicate and forecast the wellness of its occupants.

Ultimately, the current pandemic crisis has raised the stakes for automation technology and healthy buildings to be incorporated into our daily lives and help ensure resilient working as we move forward.

As predominantly social beings, humans seek to engage in human interaction to inspire, create, invent and produce. Although we are enabled by a suite of telecommunications and virtual spaces to help us cope and survive with living remotely during the current pandemic, there is a call to bring us back to live, work and play environments safely. More importantly, this is an opportunity to create a greater end-user experience for a building's occupants. Through thoughtful planning and design, we have the opportunity to help create spaces for a better and more resilient society.

"THE WORKPLACE WILL BE THE SOCIAL AND CULTURAL HUB WHERE PEOPLE COME TOGETHER TO COLLABORATE. A STRONG CULTURE BASE IS THE FOUNDATION OF REINFORCING THESE RELATIONSHIPS, WHICH WILL ALLOW FOR HEALTHIER, HAPPIER EMPLOYEES."

ELIZABETH BRINK
PRINCIPAL, GENSLER

The Real Estate Innovation Lab

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