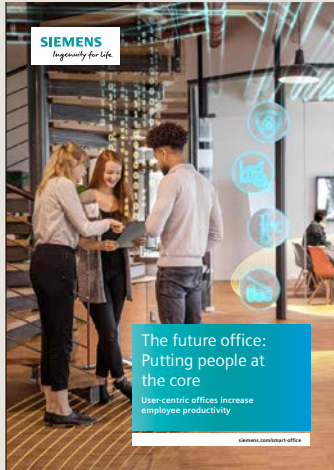**SIEMENS**

Ingenuity for life

The office future lies in flexibility

Smart offices enable flexible adaptation to rapidly changing requirements and needs

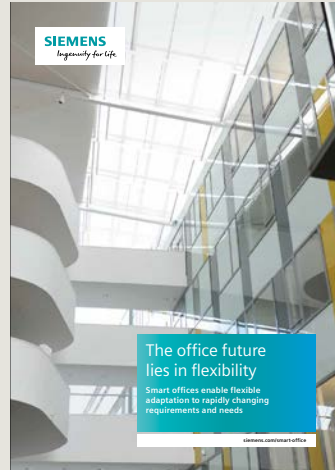siemens.com/smart-office

White paper series on the journey towards a smart office

User centricity

Flexibility

Sustainability

Flexibility
The office future lies in flexibility

The market for office real estate is changing, with customers demanding more short-time lease contracts, office-as-a-service models, and the new normal of remote work leading to overcapacities in office space. Real estate players need to adjust to this and embrace flexibility by enhancing their service portfolio and maximizing asset and real estate efficiency. Implementing space optimization services, creating new rent models outside of monthly contracts, and upgrading building technology infrastructure are some of the critical steps.

Foreword

This white paper is part of a series of papers discussing the future of the office – the smart office. There are three dimensions to this: user centricity, flexibility and sustainability. This paper discusses flexibility. To inform the white paper production, industry and expert interviews were conducted in June and July 2020. For more information, please refer to the other two white papers.

Content

The office future lies in flexibility

The office stakeholder community faces significant challenges, including overcapacity, health requirements and changing office user demands

Whether commercial or corporate real estate player, facility manager or office user, the office stakeholder community is currently facing three tremendous challenges. Coping with them will require new office concepts and business models over the coming years.

First, the type of space demanded by clients is changing. Increasingly, traditional long-term lease contracts for unfurnished spaces are being replaced by more short-term, ready-to-use offices that provide full-service experiences to their clients. Co-working spaces have paved the way here, and it is expected that by 2030, a full 30% of office space will be consumed in ready-to-use fashion.[1]

Second, office business models based on high seat density are suffering immensely and will continue to suffer in the future. This is not just because of health considerations and the physical distancing requirements brought by the pandemic. Rather, offices must become user-centric work spaces focused on workers' productivity and experience – this requires new types of office infrastructure going beyond simple desk-to-space ratios.
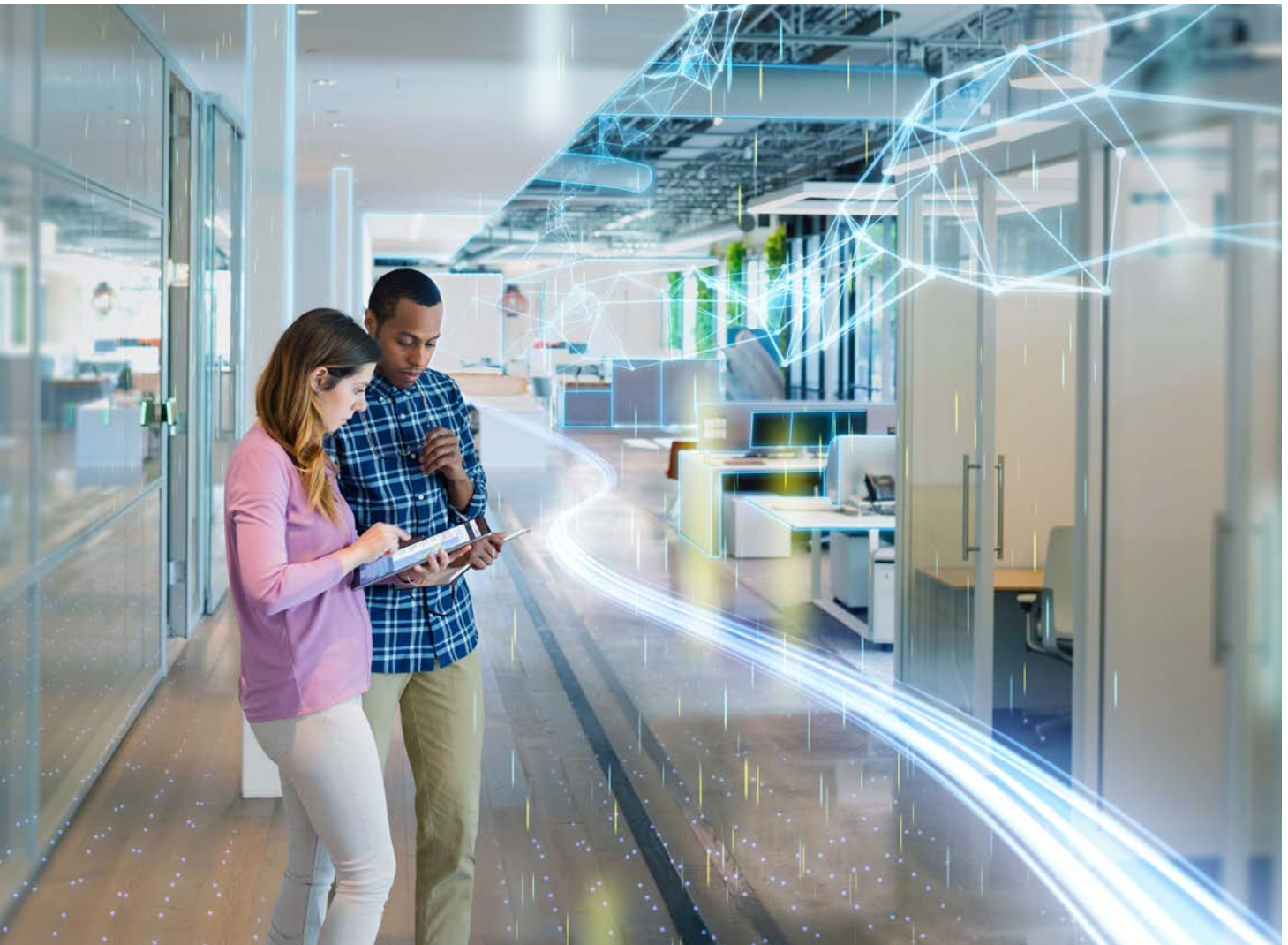
Third, the new normal has proven to many businesses that company-wide remote working is feasible. Employees demand seamless integration of remote work and office work,[2] and companies have reacted. Firms like Facebook, Twitter and Siemens have pushed ahead with bold policies and will even allow their people to work from home as much as they want.[3] As a result, office spaces face overcapacities of between 50% and 60% globally, assuming employees work remotely one or two days a week.[4]

What does this mean for offices? With the market shrinking and the competitive landscape consolidating, office providers will face fierce competition, and only the best offers will survive. The office of the future must be both highly attractive and cost efficient. How do real estate players achieve this?

54%
U.S. adults want to primarily work remotely[2]

1 JLL. 2020. "The impact of COVID 19 on flexible space." *JLL*, July 14, 2020. https://www.us.jll.com/en/trends-and-insights/research/the-impact-of-covid19-on-flexible-space
2 IBM. 2020. "IBM Study: COVID-19 Is Significantly Altering U.S. Consumer Behavior and Plans Post-Crisis." *IBM*, May 1st 2020. https://newsroom.ibm.com/2020-05-01-IBM-Study-COVID-19-Is-Significantly-Altering-U-S-Consumer-Behavior-and-Plans-Post-Crisis
3 Conger, Kate. 2020. "Facebook Starts Planning for Permanent Remote Workers." *The New York Times*, accessed August 4th 2020. https://www.nytimes.com/2020/05/21/ technology/facebook-remote-work-coronavirus.html
Höpner, Axel and Christof Kerkmann. 2020. "Wie Konzerne Abstand wahren: Siemens rollt weltweit seine Büro-App aus." *Handelsblatt*, accessed August 4th 2020. https://www.handelsblatt.com/technik/it-internet/kampf-gegen-corona-wie-konzerne-abstand-wahren-siemens-rollt-weltweit-seine-buero-app-aus/26013902.html
4 Wiebe, Frank. 2020. "Investoren fürchten leer stehende Büros." *Handelsblatt*, June 6th 2020. https://www.handelsblatt.com/finanzen/anlagestrategie/trends/immobilien-investoren-fuerchten-leer-stehende-bueros/25939530.html

"Office real estate players must embrace flexibility to tackle the challenges they are facing."

Dominique Vanhoutte, Global Solutions Manager, Siemens Smart Infrastructure

The flexible office
provides solutions to these challenges

Embracing the concept of flexibility can provide the solution: In the flexible office, the office stakeholders are closely linked, even more than before. Frequent and open collaboration becomes natural, with the result that changing needs can be addressed instantly, powered by office infrastructure capable of swift adaptation. Real estate players and facility managers can quickly adapt to the expectations of office users, while also implementing operational efficiencies that drive down costs. There are three key dimensions to the flexible office concept.

First, time-based lease contracts are replaced by pay-per-use business models. Why should office users pay for desks, spaces and meeting rooms they do not use? The continued prevalence of remote working illustrates how often this can be the case. This business model could be realized by measuring aspects such as frequency of door use, room and desk bookings or elevator rides to quantify how intensively

Up to
60%
of office space unused in the new normal[4]

"Remodeling spaces as quickly as we did in response to the pandemic was only possible with digital planning."

Head of Technology, Real Estate Developer

the office is being used. The technical realization of this is already achievable with the use of IoT sensors and a central data platform. This approach lays out clear incentives for both office users and real estate players. Tenants pay only for what they use, and operators focus their attention on what is in use.
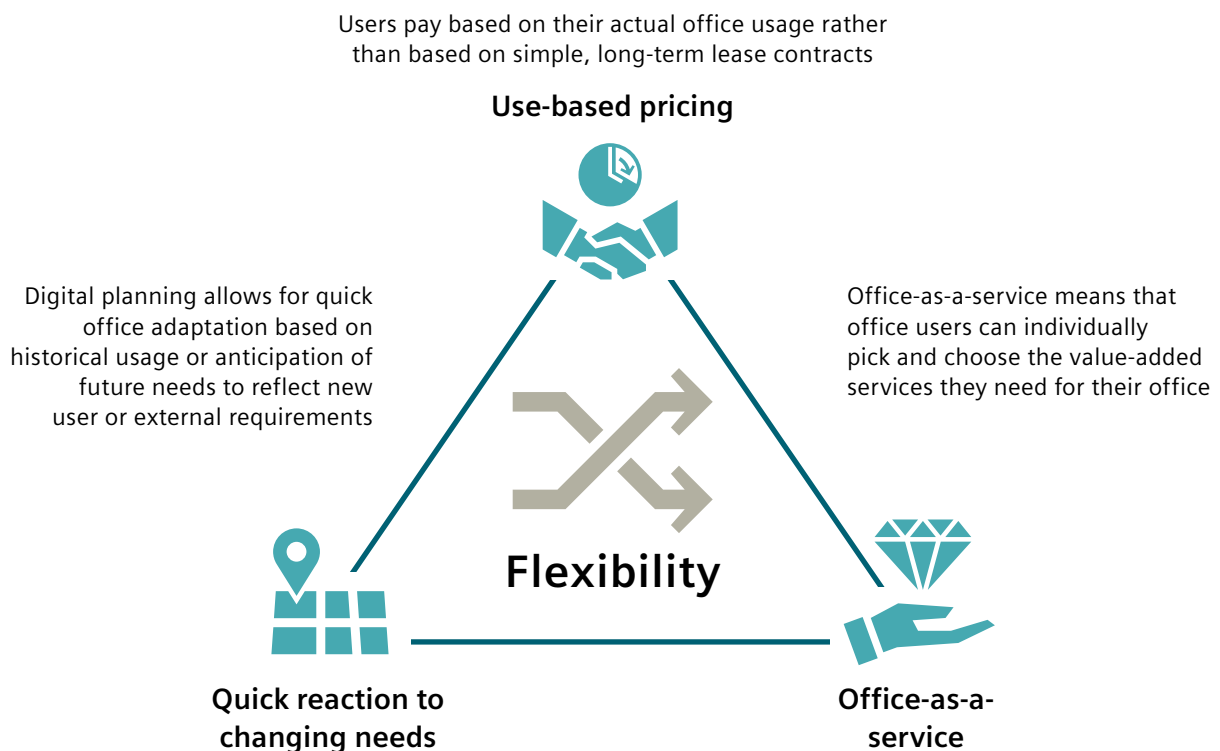
Second, the office-as-a-service concept provides the potential for additional revenue streams for real estate players, while allowing tenants to customize the office package to their own needs. Office users can choose between service packages they need, ranging from furniture or serviced drinks, snacks and food offerings to digital packages like keyless access management, guest management or EV charging capacities.

Finally, digital planning of the office space enables quick reaction to changing needs. The office layout can be con-

tinuously optimized based on usage, and scenario analysis enables the simulation of minor layout changes or drastic adaptations. As demonstrated in the pandemic, firms all over the world had to redesign office layouts to accommodate physical distancing requirements, implement health & safety procedures and install new technologies to be able to return to the office and maintain essential business functions. However, it's not only external shocks but also changing internal needs that can trigger a desire to reconfigure the office – team sizes and work foci change, and more project and innovation spaces than usual may be required. **graphic A**

These three dimensions define the flexible office. Building it requires a building twin as the technological foundation. How does the building twin work?

A Flexibility concept in the smart office

Users pay based on their actual office usage rather than based on simple, long-term lease contracts

Use-based pricing

Digital planning allows for quick office adaptation based on historical usage or anticipation of future needs to reflect new user or external requirements

Office-as-a-service means that office users can individually pick and choose the value-added services they need for their office

Flexibility

Quick reaction to changing needs

Office-as-a-service

"The building twin is the glue that holds hardware and software together. It is the basis on which we turn data into insight and into action."

Marjut Rautavaara, Head Digital Building, Siemens Smart Infrastructure

The foundation of the flexible office is the building twin

The prerequisite for realizing the flexible office-as-a-service model is real-time, precise and actionable information on the office building, the surroundings and space usage: The flexible office is a data-driven smart office. Intelligent sensors and controls monitor all relevant office parameters, such as the operational state of building systems, including air conditioning and ventilation, equipment-related data on the functioning of computers, projectors or conferencing systems, environmental parameters like humidity levels, light and temperature, and space usage and occupancy details at all levels of data aggregation: from single desks or rooms to areas, floors and whole buildings.

With the help of a building twin, data is turned into insight and action. This digital twin serves as a virtual building model in which the collected data points can be related to the physical layout of the office and the installed IT, OT and IoT infrastructure. The model serves as the foundation of the data ecosystem that the smart office relies on: a central, common platform that brings together data streams from sensors and existing legacy building information systems in office buildings. It is capable of third party data stream integration and offers the necessary APIs to develop new applications. Holistic integration ensures reliable data quality and enables automatic quality checks. Further down the road, even the need for a common platform will be eliminated. Computing at the edge will allow devices to talk directly to one another and trigger the necessary adjustments – the building manages itself.

The building twin is the technological foundation to realize the flexible office. How do they work together in concrete terms to make offices more attractive and cost efficient?

The flexible office in action: Increasing attractiveness through space efficiency and future-proofing

Increasing the attractiveness of office spaces means working efficiently with the space provided and offering a future-proof business model to support it.
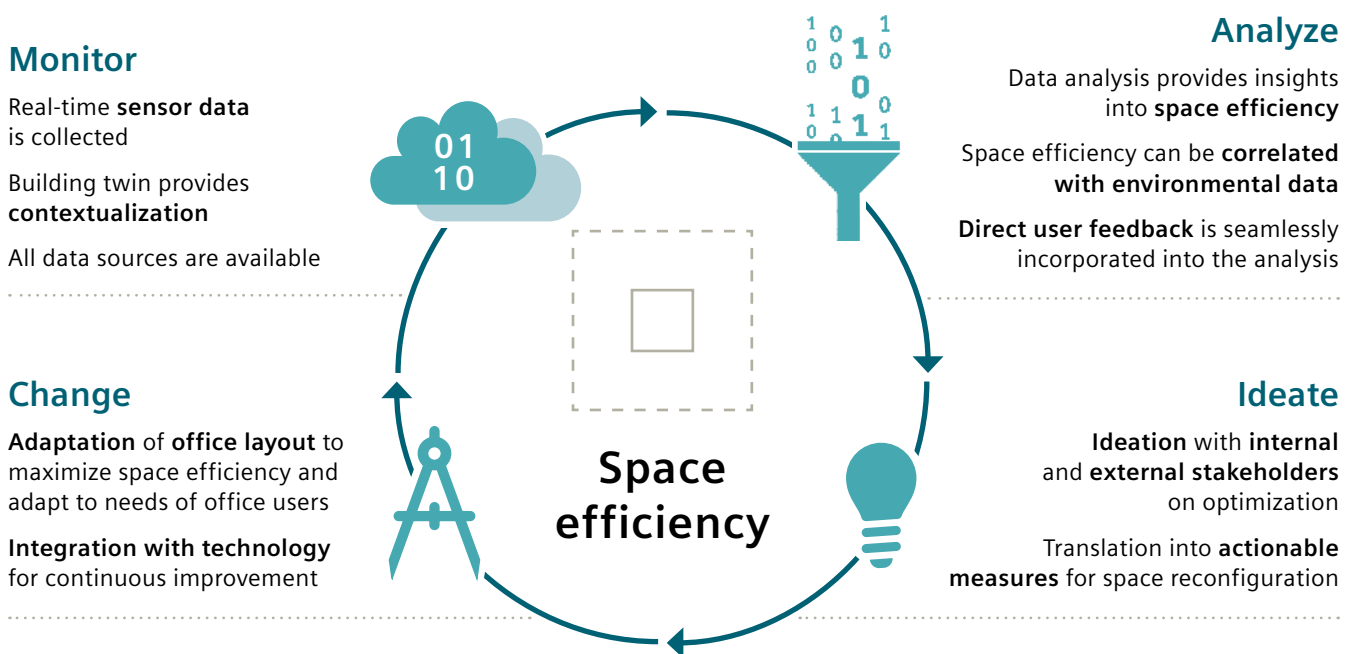
To increase space efficiency, the smart office relies on the insights generated from the building twin. The smart office constantly monitors and analyzes sensor-generated data on room occupancy, movement patterns, desk bookings and more. Are there spaces nobody ever uses? Are more quiet working spaces needed because existing ones are always full? What are the routes most people take to get to the kitchen? Where do people have the most interactions?

From the data collected, stakeholders can jointly derive improvement measures. Adding more phone booths, converting unused meeting rooms into much-needed collaboration spaces or rearranging desk layouts to better fit project team setups becomes an easy endeavor. Office users and real estate operators can discuss and implement these measures, enabling continuous, informed adaptation of the physical office space as the backbone of an agile and adaptive business. Of course, users and operators can also discuss anticipated future demands, like new regulatory requirements, team structures or work modes. Using digital office models, they can ideate around new designs, test them in scenarios and bring the plans to life. With movable walls and reconfigurable design in the flexible office, such layout changes are easily realized. **graphic B**

"It's one thing to allow for flexible space usage with shared and co-working spaces. It's another thing to provide flexible infrastructure – when you can create new rooms on demand, you truly add value."

Commercial Real Estate Expert

B Space efficiency in the flexible smart office

Monitor

Real-time **sensor data** is collected

Building twin provides **contextualization**

All data sources are available

Change

Adaptation of **office layout** to maximize space efficiency and adapt to needs of office users

Integration with technology for continuous improvement

Analyze

Data analysis provides insights into **space efficiency**

Space efficiency can be **correlated with environmental data**

Direct user feedback is seamlessly incorporated into the analysis

Ideate

Ideation with **internal** and **external stakeholders** on optimization

Translation into **actionable measures** for space reconfiguration

Space efficiency

To fully future-proof business models for office users, real estate players need to further develop the office-as-a-service concept. With the office-as-a-service model, users purchase the services they need to customize the office experience to their needs and working modes. There are many services available that real estate players can integrate into their portfolio, and they may use the building twin to integrate third party services, like food and beverage providers. Crucially, the office user can decide which services they truly need before booking and paying for them and, especially useful for large corporates, they may even bring their own office user applications to be integrated with the building twin. **graphic C**

Enabling flexibility and frequent adaptation to changing needs is associated with higher costs, so how does the

flexible office remain affordable regardless? The answer lies in extreme cost efficiency.

The flexible office in action: Minimizing costs through asset and energy efficiency

Increasing the cost efficiency of office spaces means increasing asset efficiency and energy efficiency. With high asset efficiency, real estate players maximize the availability of their office building by minimizing disruptions from maintenance operations and thereby generate minimal

C Flexible office-as-a-service offering for office users

*The **space efficiency** package ensures we have enough and the right spaces*

*It's great to see that we are using the **resource optimization** services*

*The **EV charger** service makes it so easy to use electric vehicles for commuting*

*We should really invest in opt-in **location sharing tools** for all colleagues*

*Moving in will be so much easier when we book the office with **furniture***

*Planning visits is so easy with the **smart guest management** service*

operational costs. With high energy efficiency, the office building consumes the minimum amount of energy for building operations by intelligently managing controls. This ensures that unnecessary costs are avoided, the flexible office remains affordable and real estate players and office users can fully exploit the benefits derived from higher flexibility.

To increase asset efficiency, the office needs to have high availability, low operational costs and a long lifetime. While incidents that cause prolonged office downtime are rare and office workers are now more equipped to work from home than ever, office unavailability and maintenance operations do generate costs. For one, maintenance distracts, annoys and slows down employees, thereby decreasing productivity. Second, if the office does in fact become unavailable at short notice, office workers need to spend time rearranging their work plans and setting up meetings, which would otherwise not have been needed. The flexible smart office tackles this by using equipment-generated automatic notifications to allow facility management to begin repairs immediately instead of going through manual reporting systems. Before any breakdown even

occurs, predictive maintenance allows for foresight-based facility management of building technology, preempting failure and shifting maintenance to times of low-frequency building use. Even more so, predictive maintenance allows facility management to prolong the asset lifetime with strategically timed repairs that prevent critical failures.
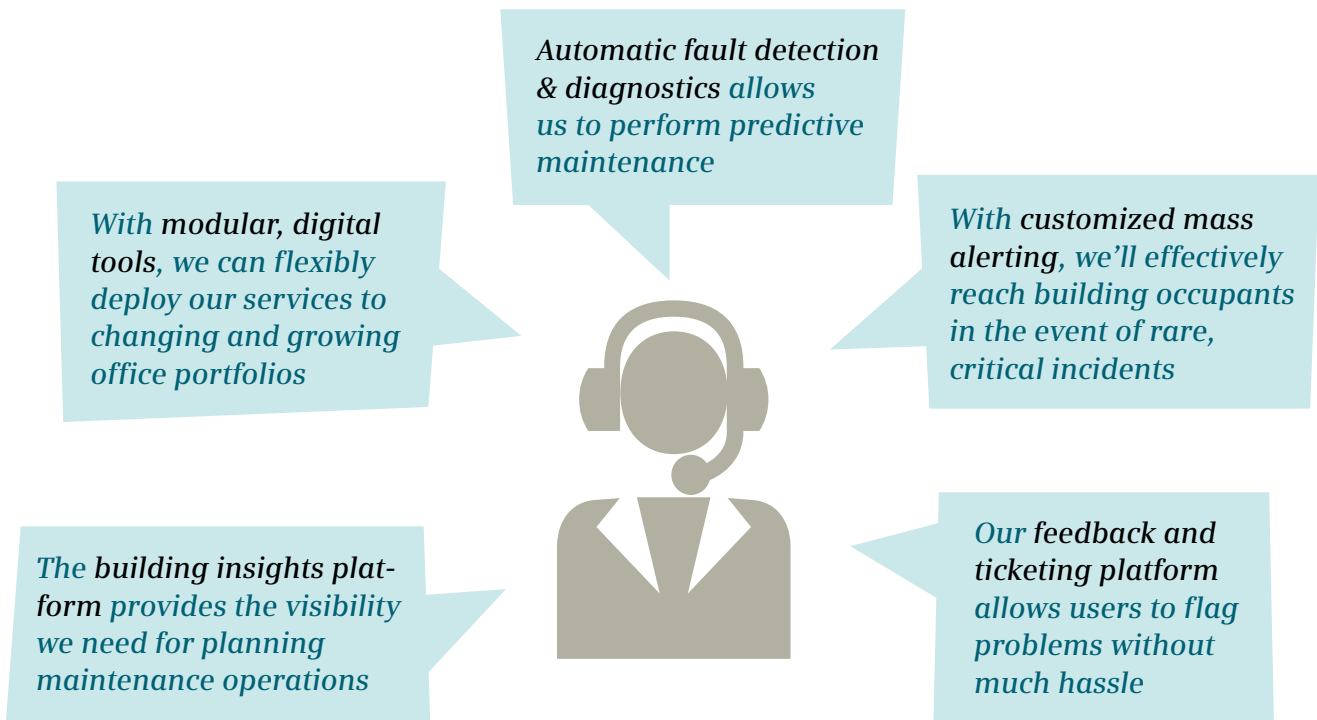
To increase energy efficiency, the flexible smart office intelligently adjusts lighting, heating and ventilation in unused spaces to reduce energy consumption. Using sensor data on building occupancy and typical usage patterns, it quickly adjusts to actual and planned building usage and thereby increases energy efficiency by up to 30%[5] compared to a traditional office.   **graphic D**

With high asset efficiency and high energy efficiency, the flexible smart office becomes as cost efficient as possible. In turn, this means that real estate players can focus their investments on their service offering and office users can spend the bulk of the funds they reserved for rent on paying for the flexibility and quick adaptation they desire for their office space.[6]

5 Expert interviews.
6 While the flexibility use cases relating to space efficiency, a future-proof business model, asset efficiency and space efficiency are emphasized in this paper, you can find an overview of all flexibility-related use cases considered in the production of this white paper in the annex to this text.

D Flexible office-as-a-service offering for facility managers

Automatic fault detection & diagnostics allows us to perform predictive maintenance

With modular, digital tools, we can flexibly deploy our services to changing and growing office portfolios

With customized mass alerting, we'll effectively reach building occupants in the event of rare, critical incidents

The building insights platform provides the visibility we need for planning maintenance operations

Our feedback and ticketing platform allows users to flag problems without much hassle

The next step towards embracing flexibility

Market trends clearly show that offices need to be attractive to office users to remain competitive, and cost efficient to remain affordable. With considerable office overcapacity prevalent in times of widespread remote working arrangements, a shrinking office market puts the revenue streams of commercial real estate players and facility managers at substantial risk right when office users demand highest-quality offers. For corporate real estate players, the challenge lies in maintaining the relevance of their offices.

Flexibility is the tool that helps office real estate players respond effectively to these threats. To adjust to over-capacity in the new normal and to protect valuable assets, real estate players need to proactively embrace flexibility: Use-based pricing models, office-as-a-service and quick reaction to changing needs are required in order to provide attractive and cost-efficient offers. Flexibility is enabled by a data-driven building model, in which real-time data is collected and turned into insights.

The next steps for decision makers must involve a review of their office real estate portfolio and the integration of all

"Flexible, smart and user-centric offices become destinations that offer features homes simply cannot offer."

Real Estate Portfolio Manager, Asian StartUp Village

promising office venues in a smart office program. A strong partner with unifying capabilities can help holistically analyze the existing office portfolio and provide expertise in all suitable technologies.

While the office market is becoming more flexible and service driven, office performance is increasingly measured by productivity KPIs and sustainability goals. How office players can make their office user centric and how office buildings can become sustainable for the benefit of all stakeholders is what we discuss in the other white papers in this series: user centricity and sustainability.

Annex

Overview of potential use cases in the flexible smart office

No.	Title	Description

1	**Intelligent amenities**	• For the purpose of this use case, amenities are food, drinks and recreational activities
		• Use case consists of intelligent delivery of food or drinks to the office and/or proposal of recreational activities based on individual consumption and behavior
		  › Office analyzes office user consumption and intelligently derives the most attractive food options, which it can automatically select and order, while also choosing new food options to suit user tastes
		  › Office analyzes office user behavior and schedule and suggests suitable recreational activities in the vicinity
		• Data privacy concerns and work/life blend must be taken into account – Service should be set up as opt-in rather than opt-out

2	**Intelligent information delivery**	• Use case consists of new ways of delivering advertisements/information sharing/learning in the office building
		• Additional (digital) spaces are used to share and promote information to employees/visitors, for example through screens and sound in the lobby, elevator, waiting areas, etc.
		  › Information sharing could be used as an avenue for decision making, education, advertisement, networking, announcements, etc.
		  › Companies could take advantage of "product journeys" as part of the "meet & greet" in the entrance area of an office building, which could be used to promote company brand, vision and mission

3	**Voice-enabled smart office**	• Use case consists of people accessing building services by using their voice • Compatible building services could include heating, ventilation, air conditioning and lighting but also room booking, locating colleagues, etc. • Voice commands could integrate with access control if voice recognition is advanced enough
4	**Digital monitoring**	• Use case consists of monitoring of building functions on a digital dashboard • Performance of automatic systems, availability of space, usage of (limited) resources (e.g. projectors), stock of food/drinks/paper/ink, etc., location of people/resources, access control, routing of emergency services, predictive maintenance and cleanliness could all be measured by available sensors • Digital dashboard may include hyper-automation feature, allowing the application of artificial intelligence and/or machine learning algorithms to process data (i.e., discover, analyze, design, automate, measure, monitor, reassess) and automatically adjust building controls or replenish supplies
5	**Digital building modeling**	• Use case consists of digitally modeling the office building and spaces in the design phase to be more flexible, agile and open • Technology enables unrestricted planning of all aspects of the office • When required, digital building modeling can also be used to remodel the layout of an existing office to better suit a new tenant or purpose

No.	Title	Description
6	**Buildings as energy centers**	• Use case consists of self-sufficient buildings that automatically and autonomously generate, use and trade energy • Building as an energy center may also integrate plants for temperature control and water filtration (which would then have to be automatically monitored/ watered/cut back, etc.) in order to additionally save resources and increase efficiency • Use case goes hand in hand with predictive maintenance for generating technology (e.g. solar panels, small wind turbines, etc.)
7	**Buildings as communicators**	• Use case consists of buildings that are connected to other buildings via a network and communicate relevant information on occupants, status, etc. automatically • Network of buildings becomes automatically aware of occupancy levels and individual preferences for managing emergencies (in case of fire, surrounding buildings also go into lockdown), for sharing and trading energy, for managing maintenance (there may be a shared pool of replacement parts and predictive maintenance allows for effective sharing of resources), etc.
8	**Heat mapping**	• Use case consists of determining space utilization through heat mapping • Utilization of sensors for data generation and intelligent analytics to determine who uses which space when and under what circumstances • Heat mapping allows further optimization of space usage (if no one sits on a specific couch because it is too close to a heater, it can be moved; if no one uses a specific desk, it may be because there is no plug, etc.)

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We work together with customers and partners to create an ecosystem that intuitively responds to the needs of people and helps customers to better use resources.

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Creating environments that care.
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