Roland Berger

AN OFFICE BUILT AROUND PEOPLE

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Building user-centric offices boosts productivity

The office building has long been a staple of modern business life. Working from home or "telecommuting" were exotic options available as benefits only for the few. Covid-19 has changed all that, upending much of our day-to-day life and forcing millions to work from home or radically change their work patterns. Many companies and real-estate managers were unprepared to handle those sudden changes.

The current wave of digitization, automation and decentralized ways of working in advanced economies looks set to continue. Although the pressing need to work from home caused by the pandemic may be gradually receding in some places, Covid-19 has changed our relationship with the office. Compounding these effects, Generation Z have begun in earnest to enter the job market, bringing with them new expectations of the office environment. The "smart office" is the culmination of these factors: It redefines how intelligently designed spaces can improve employee productivity, happiness and flexibility.

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Our changing relationship with offices

Millennials, the generation born between 1981 and 1996, entered the workforce hoping to be drivers of change. Generation Z, born between 1997 and 2012, demand different work conditions. As they enter the global labor force, their priority is to achieve a work-life balance that allows for flexibility in their working hours and working location, plus a lifestyle that combines work-related and personal elements. Research shows that this is more important to them even than salary considerations.[1] And despite their technology-centric lifestyle, the younger generation wants to interact physically with their colleagues in communal office spaces. They see collaboration with others as allowing them to achieve their full potential – even if it means working long hours.[2]

Technology empowers both employers and employees to customize their physical environments in line with their individual needs. Modern IoT (Internet of Things) sensor technology, 5G data streams, self-learning algorithms and powerful handheld devices are driving the convergence of information technology and operational technology. This allows complex physical spaces to be monitored in real time and adapted flexibly to the needs of their occupants, regardless of their age, infrastructure requirements or technological savviness.

The new circumstances brought about by Covid-19 have also forced companies to reconsider the way we view our office spaces. Offices should contribute to the health and safety of their occupants, and at the same time be resilient in times of crisis. The idea is that by responding to threats intelligently and flexibly, offices can become a key element of business continuity management. That makes future offices a critical success factor for improving the capabilities of the teams working collaboratively in them.

From asset efficiency to productivity efficiency

To harness these trends and opportunities, companies should change their mindset, putting the needs of the office user at the heart of their planning.

Corporate real estate departments have long determined efficiency by looking solely at the asset, that is, the office itself. While asset efficiency and KPIs such as utilization, costs per square meter and power usage are important, decision-makers should now also consider what employees actually use these spaces for. Personnel represent by far the largest cost center for any office space, costing the average company around USD 3,000 per m^2 a year. That should make employee productivity a top priority for employers.
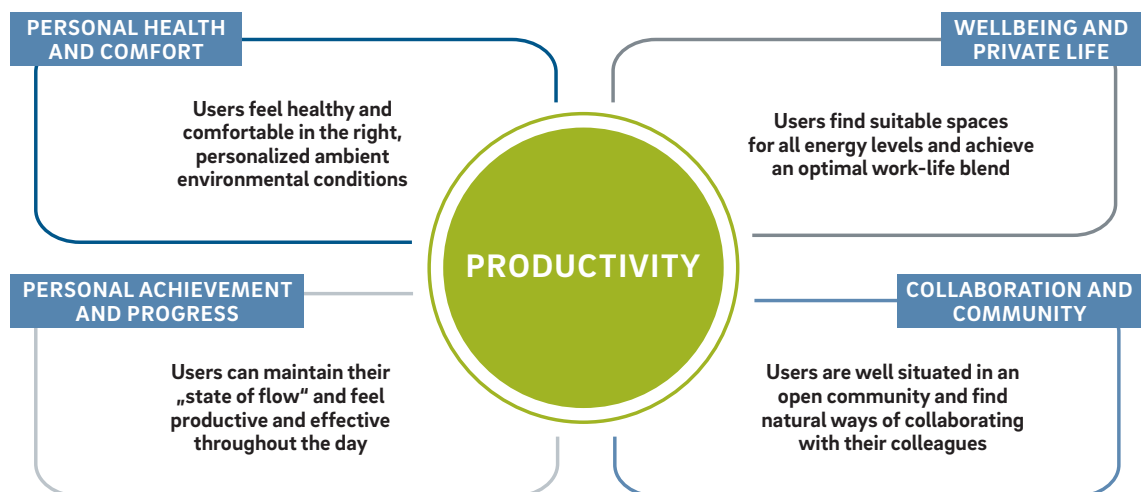
As global office utilization rates decline and work-from-home alternatives abound, offices and their uses should be redefined to reflect what employees are actually looking for in office spaces. One way to do this is by introducing user-centric KPIs, such as employee satisfaction with the building's infrastructure or the flexibility of team rooms, alongside equipment usage levels. In this way corporate real estate portfolios can respond to the need for rekindling office communities and collaborative workspaces, both of which drive not just asset efficiency but productivity, too.

1) PWC. 2011. "Millenials at work: Reshaping the workplace." pwc, accessed August 4, 2020. https://www.pwc.de/de/prozessoptimierung/assets/millennials-at-work-2011.pdf

2) Gensler. 2020. "U.S. Work from Home Survey 2020." Gensler, May 26, 2020. https://www.gensler.com/uploads/document/695/file/Gensler-US-Work-From-Home-Survey-2020-Briefing-1.pdf

"The data-driven smart office is not only invaluable to facility managers, it is essential for understanding how employees operate best. This people-first approach unleashes the power of collaborative talent and stakeholder-ship to create both better offices and better teams."

The four dimensions of productivity

PERSONAL HEALTH AND COMFORT

Users feel healthy and comfortable in the right, personalized ambient environmental conditions

WELLBEING AND PRIVATE LIFE

Users find suitable spaces for all energy levels and achieve an optimal work-life blend

PRODUCTIVITY

PERSONAL ACHIEVEMENT AND PROGRESS

Users can maintain their „state of flow" and feel productive and effective throughout the day

COLLABORATION AND COMMUNITY

Users are well situated in an open community and find natural ways of collaborating with their colleagues

Source Roland Berger

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3) Dolak, Franziska and Daniel Schröder. 2018. "Das Gebäude als Interface zwischen Mensch und Raum" Wirtschaftsinformatik & Management 2018, No. 4. https://www.springerprofessional.de/ das-gebaeude-als-interface-zwischen-mensch-und-raum/16029110

The user-centric office requires companies to consider what makes employees happy, motivated and well-adjusted, and therefore productive. We identify four overarching dimensions of productivity that can guide companies as they reimagine their office space:[3]

1 *Personal health and comfort:*
By putting physical health at the forefront of office design and planning, employers can help office users feel safe returning to the office. The right environmental conditions make a significant difference to office users' comfort levels and their ability to focus throughout the day.

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2 *Wellbeing and mental health:*
Offices need to cater to users' fluctuating energy levels over the course of the day, ensuring their wellbeing and mental health.

3 *Collaboration and community:*
With the right design and processes in place, offices can once again become centers of interaction and collaboration. Having a variety of spaces and an open office design can help employees engage in both scheduled and natural interactions.

4 *Personal achievement and progress:*
Employees who experience limited distractions or annoyances during their workday feel a greater sense of accomplishment. By limiting such disruptions, offices can enable users to be more productive and efficient.

Productivity and the war for talent

The post-COVID office space requires a rethinking of what it means to go into the office. A focus on health and safety, as well as on collaboration and dynamic teams, is key to setting up an office that employees may not visit every day. Employees should work to reduce distractions to encourage productivity and wellbeing. By simplifying and automating mundane processes, such as room bookings, scheduling and arranging guest passes, employers can allow staff to focus on their main duties. These productivity improvements save on personnel costs and improve employee satisfaction, increasing employee retention.

The quality of a company's office space also has an impact on the company's resilience. This resilience takes two forms: team resilience and building (or asset) resilience. In the spring of 2020, many companies were overwhelmed by the series of lockdowns and the uncertainty of the pandemic. Companies with flexible working arrangements and a smart ecosystem of offices and digital working solutions helped their employees react to the changing circumstances swiftly, creating a cohesive transition towards the new normal. With the help of smart solutions, buildings can also be designed to be more resilient through decentralized power generation and energy "prosumership". The ability to generate one's own power through renewable energy sources, such as roof-installed solar panels, allows for a more stable power supply and minimizes the effects of grid outages.

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"Covid-19 clearly demonstrated the case for smart offices: Companies with flexible working arrangements and smart technology were much better prepared for changing circumstances because they could adapt easily."

Another area where reimagined office space can play an important role is in the war for talent. If employers fail to invest in developing attractive offices for their employees, they risk losing out on both improved productivity and greater employer satisfaction. They also risk falling behind their competitors, leading to a potential loss of talent. As demographic changes sweep across many advanced economies, the ability to curate a working environment that places employees' health, wellbeing and professional goals at the forefront will be a key step in attracting, keeping and developing talent. Generation Z have grown up in a world of collaboration and connectivity, and they expect the same of their office environments. By catering to these digital natives' expectations, companies can intelligently design spaces that ultimately lure and retain talent across all age groups and demographics.

Productivity barriers in traditional office spaces

Today's offices have mostly departed from the characterless cubicle towers of times past. But even modern, comfortable, open-space environments face barriers to productivity. The constant search for free meeting rooms and team-appropriate spaces can drain office users' time and energy. Glaring lights and uncomfortable temperatures can result in unhappiness and fatigue. This decreases productivity, resulting in unhappy employees and damage to the company's bottom line.

Traditional, non-smart office spaces typically display the following symptoms:

1 *Fatigue and discomfort:*
Factors such as uncomfortable temperatures, humidity and lack of airflow contribute to higher levels of exhaustion and are damaging to employees' physical health. This can bring both direct healthcare costs and indirect performance costs. Additionally, unsuitable conditions such as improper lighting and noise decrease overall office comfort for both employees and visitors.

2 *Lack of community:*
Separate offices and assigned workspaces minimize spontaneous collaboration and a sense of community, limiting them to break times. Even some open office concepts do not truly encourage cooperation and spark conversations in the way they are intended to, due to their sense of emptiness and disregard for privacy.

3 *Demotivation:*
With assigned desks and a limited choice of workspaces, office workers are not able to choose an environment that matches their needs. Quiet areas for work that requires high concentration become a privilege reserved for the few, while creative spaces are only available if booked in advance. With little opportunity to adjust to their fluctuating energy levels during the day, users experience a decrease in wellbeing.

Distractedness from core mission: Lines for the elevator, slow guest check-in processes, searching for free rooms and tracking down colleagues can take valuable time away from employees' real work and reduce their sense of personal achievement and progress.

A recent survey of 6,000 office workers by the Fraunhofer Institute of Industrial Engineering confirms these symptoms of non-ideal office spaces. The office users surveyed emphasized the importance of high-quality surroundings, including good acoustics and the ability to move between relaxed spaces for collaboration and quiet spaces for concentration. Additionally, factors such as fresh air and spontaneous conversations contribute significantly to high levels of productivity.

Smart offices connect people, spaces and infrastructure

The growth of remote working, combined with the new focus on collaboration, real-life interactions and location-irrelevant productivity, mean that the office building is no longer the bulwark of what it means to work. As we head back into the office, realigning our relationship with teams, the physical set-up of the office and the underlying infrastructures within the office is vital.

Enter the smart office: A data-centric space that enables employees to stay healthy, productive and able to be as flexible and comfortable as they want. The smart office actively optimizes itself to be an enabler of users' creativity and collaboration through the deployment of sensors, machine learning and process automation. The building infrastructure and physical spaces serve as a toolkit to achieve employees' goals, putting the user first.

The smart office relies on relevant, accurate, timely data. It is therefore equipped with intelligent sensors and controls that monitor the infrastructure of the building in real time. Building infrastructure data is collected along three dimensions. First, system-based sensors gather data on the underlying systems themselves, such as the heating and air conditioning, water and plumbing, and security systems. Second, spatial data, centered around the user, considers lighting, noise levels, temperature, air quality, movements, interactions and occupancy levels. Third, exterior or peripheral data, such as data on deliveries, traffic and weather, gathered through Internet connectivity or smart city applications, provide a clearer picture of the user's journey to, from and around the office, creating a truly intelligent ecosystem.

By synthesizing relevant data at the individual, local and peripheral levels, the smart office is able to contextualize information and relate it to the space and individual for which it was generated. Simple data readings, such as temperature, and complex trend analyses, such as energy usage, occupancy fluctuations and room preferences, can be

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"Aggregating data in the cloud is easy. Building open data models that work across systems, manufacturers and the lifecycle remains a key challenge, especially for existing infrastructure."

combined and addressed accordingly, enabling employers to further optimize the physical space or permitting automatic optimization. Smart offices intrinsically understand where problems, annoyances and inconveniences may arise and can minimize these disturbances by adjusting ventilation, elevator movement, lighting or window shutters as necessary.

Of particular importance to employees is health-related data, such as airflow patterns and people density. Through statistical analysis and airflow tracking, the smart office can correlate the activities of office users to their effect on airflow and particle distribution, adjusting ventilation and filtration accordingly. While these actions do not address the causes of airborne particulate matter and smog, sensors can identify patterns and recommend potential courses of action. Such insights and recommendations can also be used to alert property management, when problems arise that require maintenance or improvements.

## 3 Layers of the Smart Office: Connecting People, Spaces, and Infrastructure

PEOPLE
are at the core of the Smart Office – maximizing their productivity is the goal

SPACES
are the physical structure of the Smart Office – they flexibly and seamlessly adapt to users' needs

INFRASTRUCTURE
makes the office smart – it knows & learns what users want and provides the data for adaptation
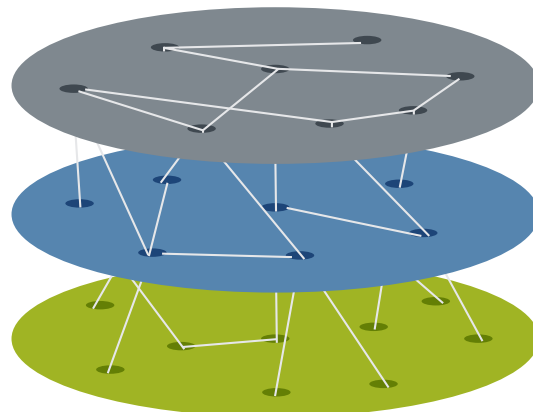
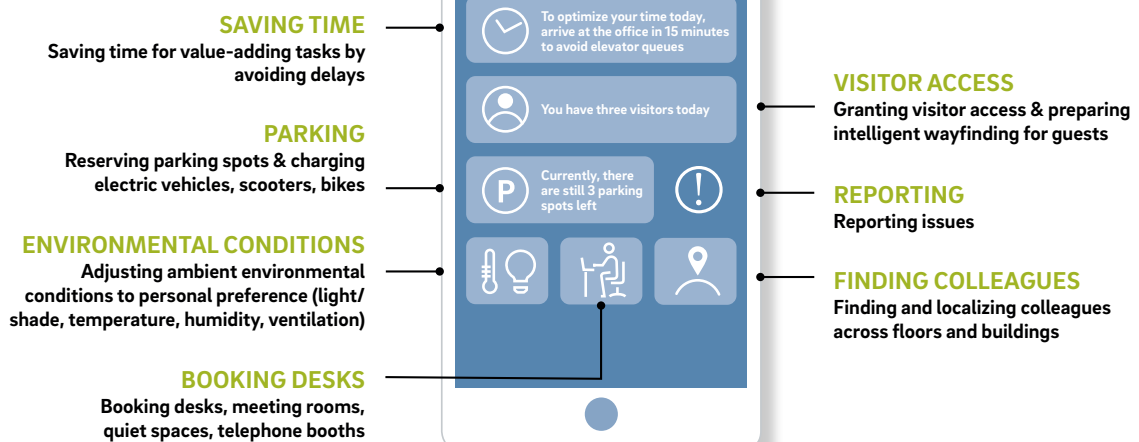**Source** Roland Berger

Roland Berger

In a smart-office system, machine-learning algorithms can be used to interpret the data and present it in the form of comprehensive dashboards. These dashboards can provide actionable insights into both human-focused parameters, such as occupancy, interaction, noise and satisfaction, and infrastructure-focused parameters, such as building status, environmental factors and resource efficiency.

The user-centric smart office

The smart office is not just four walls fitted with sensors: It is the center of an ecosystem that relates the physical building to its users and managers. It also extends the office experience into the home and the commute, through seamless integration of the work-from-home setup and the office.

Put the Smart Office in the user's pocket

SAVING TIME
Saving time for value-adding tasks by avoiding delays

PARKING
Reserving parking spots & charging electric vehicles, scooters, bikes

ENVIRONMENTAL CONDITIONS
Adjusting ambient environmental conditions to personal preference (light/shade, temperature, humidity, ventilation)

BOOKING DESKS
Booking desks, meeting rooms, quiet spaces, telephone booths

VISITOR ACCESS
Granting visitor access & preparing intelligent wayfinding for guests

REPORTING
Reporting issues

FINDING COLLEAGUES
Finding and localizing colleagues across floors and buildings

Hi there!
Here's your daily overview

To optimize your time today, arrive at the office in 15 minutes to avoid elevator queues

You have three visitors today

Currently, there are still 3 parking spots left

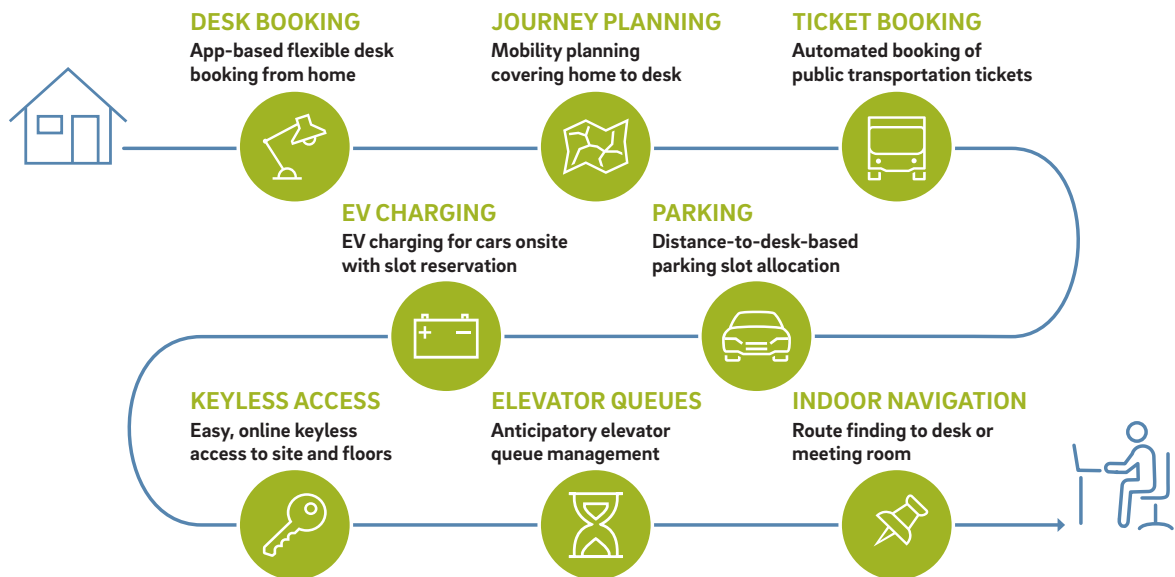**Source** Roland Berger

Roland Berger

At the core of the smart-office experience is the smart office application. Users can adjust ambient environmental conditions manually or automatically in line with their personal preferences via the app, before they arrive at work or during the course of the day. Combined with state-of-the-art building technology, this enables them to feel comfortable and safe in their office space. Depending on the team and utilization of the space, office colleagues can be systematically placed together on certain floors to help build a stronger sense of community. If not in the immediate vicinity or in a specific teamworking room, the smart office can direct colleagues to their counterparts through smart navigation.

Office spaces can be just as versatile as the needs of their users. Meeting or team-working rooms, quiet spaces for concentration or a phone booth for Vico calls can all be booked via the app, for instant use. The app can be used for scheduling and keyless access. Issues such as conflicting room requests are quickly optimized through algorithmic booking systems that ensure both higher productivity and less confusion. Additional optimizations can encourage workers to pay attention to their wellbeing, such as by taking regular breaks and drinking enough water. Office events can be highlighted and notifications given of any planned occurrences, such as fire alarm

The new user journey in the Smart Office

DESK BOOKING
App-based flexible desk booking from home

JOURNEY PLANNING
Mobility planning covering home to desk

TICKET BOOKING
Automated booking of public transportation tickets

EV CHARGING
EV charging for cars onsite with slot reservation

PARKING
Distance-to-desk-based parking slot allocation

KEYLESS ACCESS
Easy, online keyless access to site and floors

ELEVATOR QUEUES
Anticipatory elevator queue management

INDOOR NAVIGATION
Route finding to desk or meeting room

Source Roland Berger

Roland Berger

checks. By encouraging staggered arrival times and optimizing elevator use, lines for the elevator can be avoided. Physical guest passes become a thing of the past, as the app checks visitors in and guides them to their destination. With these time-consuming tasks removed from the daily workflow, office workers can spend their time on productive, value-adding tasks, focused on their mission.

Smart offices do not begin and end at the front doors of the building, either: The smart office journey begins well before users start working and continues into the evening. Thus, smart office ecosystems can identify optimal commutes, book public transportation tickets and guide users to their parking spots or electric vehicle charger. During lunch breaks, ecosystems can suggest restaurants in the vicinity. During the day, they can manage the user's time intelligently to allow for leisure activities, such as workouts or yoga classes. Depending on the amount of input users volunteer to the application, the smart office can manage personal appointments and coordinate time slots by blending

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"The smart office forms the center of an ecosystem that extends beyond the confines of pure work – lunch breaks, commutes and socializing are all part of the smart office experience."

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work and life in a way that feels both non-intrusive and meaningful. This intelligent integration of work and life allows for well-deserved breaks and a more balanced schedule, reducing employees' stress and increasing both job satisfaction and motivation.

Office as an ecosystem

Arranging errands like dry cleaning or shoe repairs

Suggesting lunch places based on preferences or occupancy

Managing appointments based on schedule and occupancy rate

Coordinating with amenities around the office, e.g. physical exercise

Synchronizing deliveries

Keeping track of events around the office, pre-booking and notifying of changes

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First steps towards a smart office

Underutilized corporate real estate and the rise of alternative work models has led to corporate executives carefully reexamining their real estate portfolio strategies. Human Resources and individual office users should be brought into the decision-making process on how to proceed. The transition to a more mobile-friendly and productivity-focused office portfolio needs to be reviewed holistically in a way that forms a unified strategy centered around tenants and employees, instead of focused purely on building assets. In advanced economies, such as the United States or Europe, greenfield office buildings are not the norm, and thus a careful retrofitting of existing infrastructure is required to make offices smart. This approach contrasts starkly with the situation in much of Asia and the Middle East, where new office buildings can be designed with smart office integration in mind before construction begins.

Office users have started returning to the office, with new expectations of flexibility and collaboration opportunities that are not available in their current work-from-home set-up. By increasing their productivity and satisfaction, employers can enjoy lower office operating costs through efficient operations and increased talent retention rates. The newly redefined relationship with our places of work turns offices into productivity hubs that support other aspects of our personal and professional lives. From meeting colleagues to helping us get lunch quickly, offices are removing the burden of scheduling and planning to let us concentrate on the task at hand. Smart offices go one step

further, ensuring that employees' wellbeing and requirements are catered to. With the rise of Generation Z and the necessity of flexible working arrangements, smart offices will determine companies' ability to stay resilient and retain top talent in the future.

RICHARD NOWAK
Segment Head Building Automation North America, Siemens Smart Infrastructure

"The smart office is wanted, and it is wanted now. While different global regions need tailormade solutions to address local challenges, solutions for creating smart offices everywhere are readily available."

Further reading

GREEN OFFICES ARE THE FUTURE OF TODAY
➔   rb.digital/Green_offices

THE FLEXIBLE OFFICE SPACE
➔   rb.digital/FlexibleOffice

EXPERTISE-PAGE INFRASTRUCTURE
➔   rb.digital/Infrastructure

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