Deloitte.

In association with **Cisco**

DESIGNING WITH DATA IN MIND:
REIMAGINING ARCHITECTURE DESIGN FOR DATA-INFORMED USE CASES

Architects, designers, and engineers have traditionally designed spaces to elicit a desired experience for the user. But now with more access to building data and insights, the design process needs to be transformed. Design professionals can use these insights to create innovative workplaces and provide lasting benefits to building occupants and real estate leaders. Doing this requires earlier decisions in the design process and moving beyond just form and function as requirements of the space. For instance, if the capital project aims to create the best user experience to attract new employees, how will the space and its systems capture and report on this? This is particularly important when considering how work, collaboration, and space will continuously evolve throughout the project's lifecycle.

There is a tendency for architects and designers to focus on creating visually compelling spaces that prioritize the aesthetics of a building over the occupant's experience. When it comes to office building and workplace design, architects and designers typically develop a building program, which pragmatically catalogs the requirements of a new facility—such as the number of offices, common areas, collaboration spaces, and amenities—while also designing for bold, statement locations that capture the eye and introduce experiential moments.

While these elements are undoubtedly important to creating interest, they often overshadow the aspects of design that contribute to the long-term value and functionality of the capital investment. "Location, location, location" is no longer the only determinant of strategic advantage where organizations operate; firms increasingly realize that "data, data, data" holds an equal importance in creating a competitive edge[1]. As the great 19th century American architect Louis Sullivan said, "form follows function."

As buildings evolve over time and real estate leaders learn from the way their buildings live, defining the program beyond 'day 1' is critical to accommodating 'day 2' requirements.

One of the most significant challenges in this context is the insufficient integration of data in the early stages of the design process. Traditionally, the programming phase has relied on interviews, previous projects, and generalized assumptions, probably due to a lack of specific data. This data scarcity tends to limit the architects' and designers' ability to fully anticipate and plan for the technological, operational, and functional shifts that facilities must adapt to over their lifecycles.

There is a compelling business case for architect and design firms to begin the design phase with a data-driven approach that can better serve and support their clients. By incorporating data and the technology that generates it in the initial design phases, architects can create designs that are not only aesthetically pleasing but also adaptable, sustainable, and future-proof. Establishing certain requirements early on and communicating them to design partners such as mechanical, electrical, and plumbing (MEP), lighting, and audio/video (AV) firms is crucial. This approach can enhance the long-term functionality of the building and aligns with the evolving expectations of clients who seek modern, intelligent, flexible, and technologically integrated facilities.

The importance of data in architecture

During the programming phase, decisions on data and technology often remain an afterthought, rather than a central component of the Corporate Real Estate (CRE) design strategy. By integrating data early in the design process, architects and designers can make more informed decisions that lead to better investment outcomes and enhanced design quality.

Modern buildings are complex entities, typically comprised of more than 20 subsystems, each generating vast amounts of data. This data from building management systems (BMS), IoT sensors, and other devices, if introduced early, can provide invaluable insights in key areas, including space optimization, simulations and modeling, budget forecasting, resource management, risk mitigation, sustainability, and technology integration.

Historically, architects have tended to focus on the immediate delivery of a project. Given today's trends and user expectations, there needs to be a shift toward how these systems can interact and provide ongoing value through a unified "single pane of glass" platform for operational and day-to-day management. This shift will likely lead to more inputs and data analytics that can help architects and designers plan and provide valuable insights for the construction phases. Without addressing these data and interoperability requirements early in the design process, organizations may spend considerably more money on the back end trying to integrate data and systems. Making decisions early in the design process stands to help reduce the cost to build.

Understanding the stakeholders and their data needs

Involving end users often and early allows architects to understand both the needs of their clients and the future occupants of the spaces. For example, including a member from the customer's IT team as a stakeholder early in the project allows for efficient identification of:

- Requirements around the use of IT and AV infrastructure
- Valuable institutional insights into how the IT and AV stack will be deployed
- Plans for how this infrastructure will be leveraged.

The programming phase of a project often focuses on how real estate will be used to achieve specific enterprise goals, involving all stakeholders for that location. Data requirements and the interconnectivity of data needed by stakeholders will vary,

providing different insights critical to daily use and decision-making. Therefore, architects and designers need to be aware of these variations to design the space with the right data sets in mind.
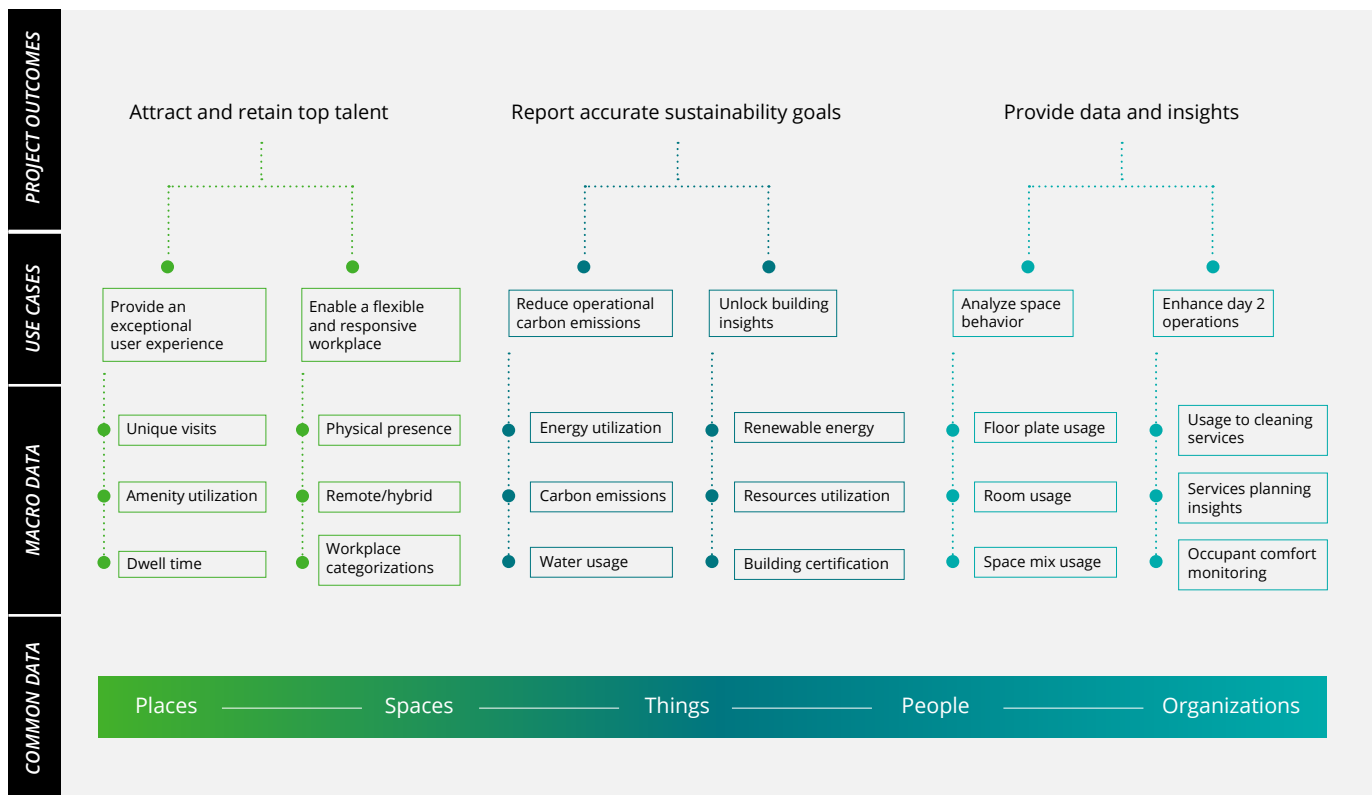
Even more impactful is when data sources can communicate with one another. Combining information technology, operations, and customer data can support decision-making at the highest levels. As the design process progresses through schematic design, design development, and construction documents, it is essential that the architecture and design teams clearly delineate the required data sets at each stage to ensure seamless project execution. This approach can help ensure a more holistic, end-to-end leveraging of available data insights, from earlier schematics and design development to the creation of construction documents.

The intersection of data and architecture via use cases

Historically, programming documents laid the structured framework for building projects by detailing every aspect of operational and client requirements. These documents helped ensure that the architectural vision aligned with different constraints. However, the evolution toward designing projects with specific data and technology use cases in mind marks a significant shift toward combining long-term adaptability with user-centric design. This includes capturing new data requirements for facilities being designed. Picture a scenario where a customer's key goal is to attract and retain top talent. What use cases and associated data points should be considered to measure and achieve this goal?

PROJECT OUTCOMES	**Attract and retain top talent**	**Report accurate sustainability goals**	**Provide data and insights**

USE CASES

| Provide an exceptional user experience | Enable a flexible and responsive workplace | Reduce operational carbon emissions | Unlock building insights | Analyze space behavior | Enhance day 2 operations |

MACRO DATA

Unique visits	Physical presence	Energy utilization	Renewable energy	Floor plate usage	Usage to cleaning services
Amenity utilization	Remote/hybrid	Carbon emissions	Resources utilization	Room usage	Services planning insights
Dwell time	Workplace categorizations	Water usage	Building certification	Space mix usage	Occupant comfort monitoring

COMMON DATA

Places ——— Spaces ——— Things ——— People ——— Organizations

A forward-looking approach not only addresses traditional requirements but also integrates advanced technology solutions and data-centric needs right from the planning stages. The advantages of this strategy can include design efficiencies, improved user experience, and significant cost savings. A key consideration when transitioning from the planning stage into design and specification is to ensure that the technologies providing the data are contemplated within the scope of the project. An example would be ensuring that some of the operational technologies required to enable a connected workplace are captured in Division 25 of the specifications.

This technology-first workplace strategy provides a better way to design and construct—reducing capital expenditures and operating expenses (CapEx and OpEx) while providing a better user experience and business outcomes[2]. In a recent case study, Cisco was able to realize an 8 percent savings in materials and labor during construction and has realized up to 36 percent reduction annually in energy consumption.

The responsibilities, needs, and enabling technology solutions available to stakeholders across a CRE organization

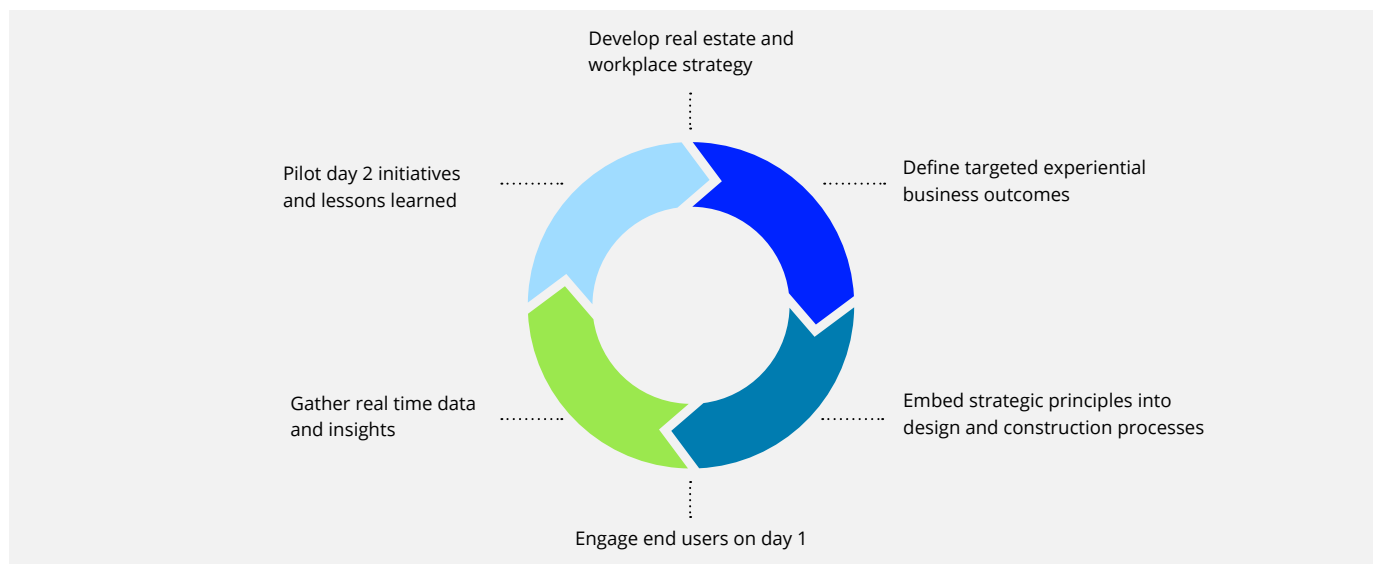| STAKEHOLDER	DATA INSIGHTS DESIRED	USE CASE	ENABLING TECHNOLOGY
SVP of Global Real Estate	Data for finance and facilities planning	Strategic decision-making of portfolio optimization, resource allocation, and operational efficiency	Cisco Spaces: Provides real-time consolidated information on real estate assets, space utilization, and trends. Leaders can use these portfolio, vendor, and space usage insights to better align strategic decisions and cost-saving initiatives with the corporate strategy.
SVP of Facilities and Operations	Data for facilities operations	Monitor building performance, resource allocation, energy consumption, preventive maintenance, safety and security measures, service request management, and asset lifecycle management	Webex Navigator and Sensors: Monitors indoor ambient conditions on air quality, temperature, humidity, and CO_2 to help maintain safe conditions for employees. Cisco Spaces and Wi-Fi Access Points: Counts and tracks people's physical location throughout properties to understand the behavior and locations.
Workplace Experience Lead	Data for human capital leaders	Using workplace and work-space data to enhance the employee experience and how it aligns with employee preferences and use	Cisco Cameras and Room Devices: Space management analytics, such as collaboration analysis and meeting area usage, provide insights into employee preferences and needs, so leaders can improve the employee experience.

Taking the next step

As architects and designers navigate this evolving design landscape, the integration of data and technology has become essential to creating functional, impactful, and user-centric spaces. Insights from data can facilitate a smarter, more sustainable, and adaptable building design that meets modern usage and operational efficiency needs.

In new projects, architects have the unique opportunity to embed advanced technologies from the ground up and design with a future-forward mindset. For existing structures, the challenge lies in incorporating current technologies without disrupting a building's use and avoiding costly retrofits.

Architects and designers don't always consider how they might leverage the inevitable IT and operational technology stack that will be specified, deployed, and managed in the space. Working with the right service provider is key. They should have deep experience helping CRE leaders plan and implement data modernization strategies—like Deloitte—and give your teams direct access to the leading technology providers whose tools have the scalable capabilities to unlock new insights—like Cisco.

With the right teams, tools, and strategies in place, architects can focus on bringing data and use cases into the beginning stages of their design process. This proactive approach should also include all aspects of design specifications and early collaboration with lighting designers, mechanical, electrical, and plumbing experts, and other future stakeholders whose data-driven requirements can be seamlessly integrated in the design ecosystem.

The effective use of data extends beyond the initial design and construction phases. Managing occupancy, add-moves-changes, and ongoing maintenance through the use of data is crucial for the day-to-day operation and long-term sustainability of buildings. By leveraging data analytics, building managers can optimize space utilization, streamline maintenance schedules, and adapt to changing occupancy needs efficiently. This continuous data-driven management helps ensure that the building remains functional, efficient, and responsive to the needs of its users over time.

Develop real estate and workplace strategy

Pilot day 2 initiatives and lessons learned

Define targeted experiential business outcomes

Gather real time data and insights

Embed strategic principles into design and construction processes

Engage end users on day 1

Consider the workplace as a continuous learning loop where data is constantly collected, analyzed, and applied to improve performance and user experience. This iterative process allows for ongoing enhancements and adjustments, allowing the building to evolve alongside technological advancements and its occupants' desires. The most important aspect of the continuous learning loop is leveraging lessons learned from the data and insights gathered through a connected workplace to regularly inform the evolution of an organization's real estate and workplace strategy.

By shifting our mindset to more fully and functionally consider data, technology, and use cases in the earliest stages of program definition, architects can take their rightful place at the forefront of this transformation and play a pivotal role in weaving data and technology into the future spaces we'll all occupy and experience.

Let's talk

If you're ready to design with data in mind, Deloitte and Cisco are here to help. Reach out to us to discuss how to kickstart your journey.

Michael Gordon
Managing Director
Deloitte Consulting LLP
michgordon@deloitte.com

Ignacio Chavarria
Manager
Deloitte Consulting LLP
ichavarria@deloitte.com

Bob Cicero
Principal, Future Proofed Workplace Practice
Cisco
rcicero@cisco.com

Brian McCourt
Consultant, Future Proofed Workplace Practice
Cisco
brmccourt@cisco.com

References

1. Deloitte, "RE-generative AI: How technology can transform commercial real estate" December, 05 2023
2. Deloitte and Cisco, "What's magnetic, digital and green all over?" 2023.