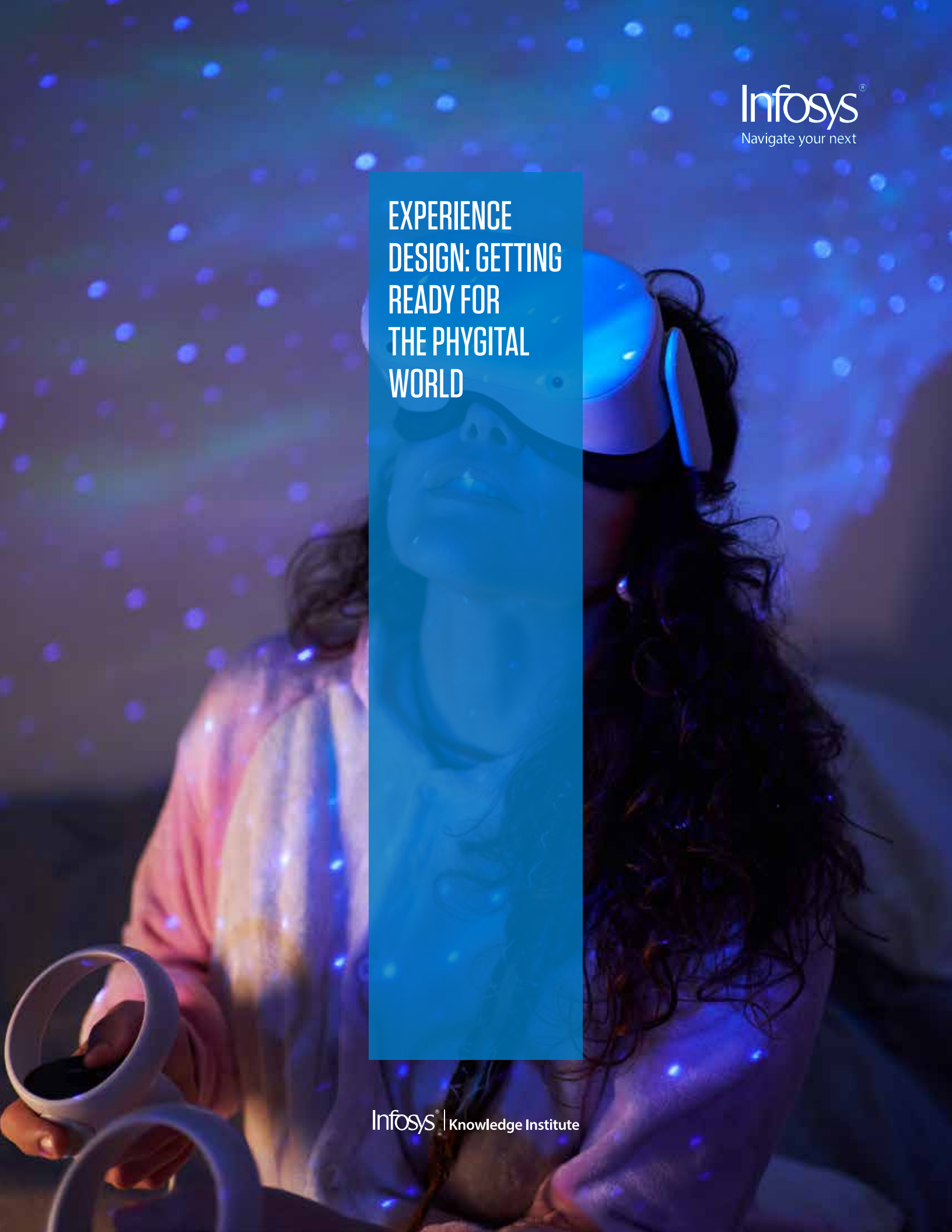

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# EXPERIENCE DESIGN: GETTING READY FOR THE PHYGITAL WORLD

Infosys® | Knowledge Institute


# Contents

**Users want intelligent, immersive, and meaningful experiences. Organizations should fulfill the latest asks for hyperpersonalization and touchless interactions. That too with security and transparency. Experience design can help deliver such effectual experiences by combining physical, digital, social, and environmental elements. Developments across artificial intelligence (AI), edge computing, and extended reality (XR) have much to offer.**

Today's consumers are tech-savvy and want utmost personalization in every interaction. "Hyperpersonalization," "touchless interactions," and "neumorphism" have become buzzwords. Organizations must closely understand users' unique needs and preferences and make them as organic and human as possible. Consumers also want transparency and control of what type of information is collected and for how long. Enterprises should build such solutions to provide memorable experiences. Trust and transparency are the differentiators here.

User-centric technologies have gained much prominence since the pandemic. Experience design has evolved from delivering data entry-based to persona-based to today's personalized, meaningful, and intelligent experiences.

A productive yet secure environment is a necessity amid ongoing developments and emphasis on remote-work tools. Enterprises should ensure that communication and collaboration among stakeholders are not compromised. Every workflow at the workplace should entail an "in person" feel to reduce the burden of remote work and ensure expected productivity. That said, the future of work is human-centric and "phygital" (physical + digital).

Enterprises must gear up for the next digitization wave by understanding the human psyche and customer experience journey. This digitization path will utilize the latest trends, take an empathy- and inclusivity-based approach, unlock human insights, and judiciously employ user experience (UX) technologies, AI, analytics, and XR. Design teams must partner with businesses to create smarter, interconnected, and more efficient touchpoints to deliver more significant value-added UX. In turn, businesses must understand how to utilize technologies to improve users' lives, become a companion, and support user needs at scale. Companies must ensure a skilled workforce, encourage innovative thinking and creativity, and actively participate in this whole new transformation. That is when the progress from knowing tools to delivering impact will happen.

## The road to natural, progressive, immersive, and adaptive interfaces

The present-day consumer is tech-savvy and relies on various devices. A 2019 Zenith study[1] revealed that a third of Americans are online almost always. Users expect a seamless experience across all devices, which sets the stage for hyperpersonalized, ambient, and adaptive UX design. The virtual world is becoming an extension of the real world. This means users should be able to access the virtual world as effortlessly as possible.

The concept of human centricity has gained momentum in recent times. However, companies such as Xerox, Apple, and Microsoft opted for a human-centric approach long before, where function rules over form and design experience is human-centric. As technologies evolved, design experience also ventured into modern paradigms such as design

thinking. Businesses must understand how to utilize technologies to improve users' lives, become a companion, and support user requirements.

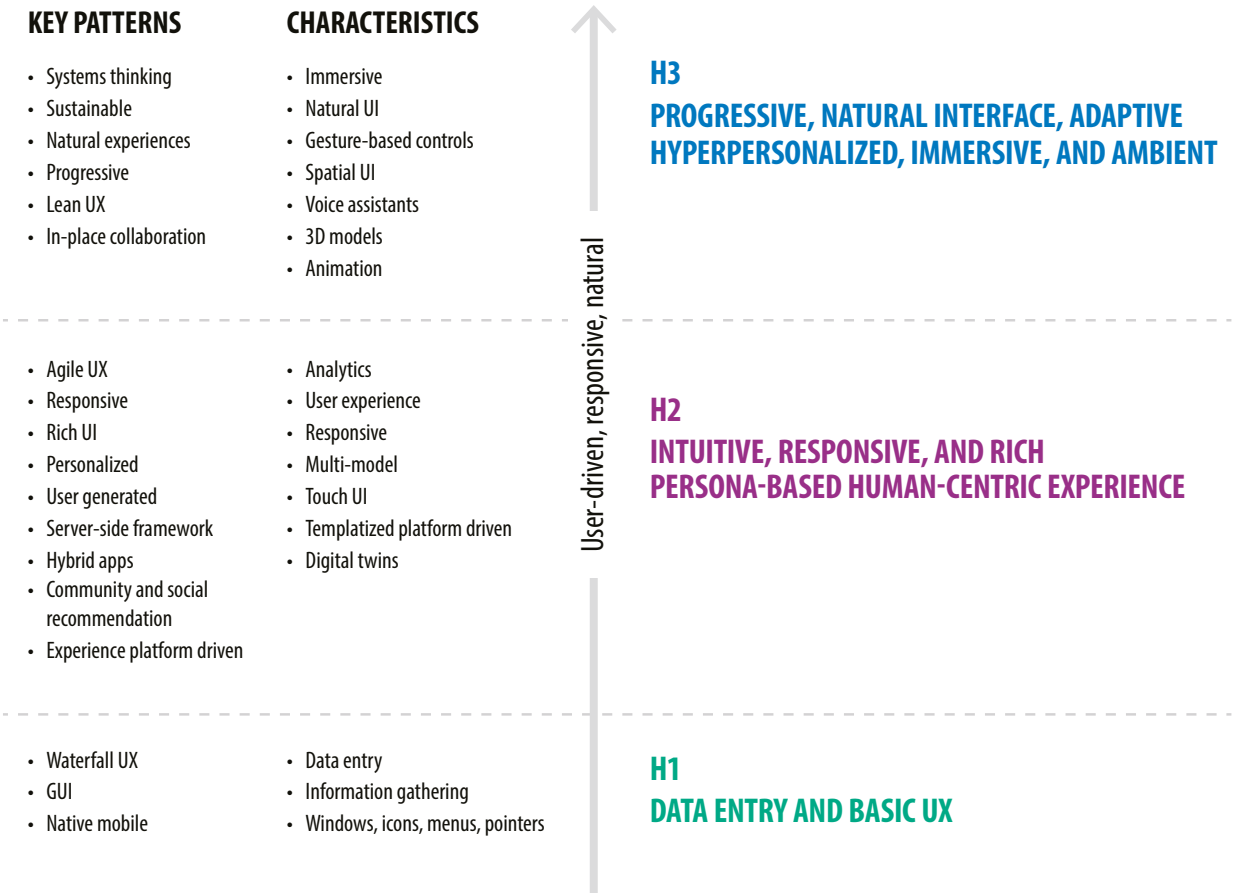
Infosys relies on diverse resources such as the center of excellence, the design and partner community, and R&D to anticipate the changes in experience design trends. The continuous study of this space allows us to proactively respond to environmental changes and provide great UX.

Our analysis shows the evolution of experience design across three horizons — from a data entry-based (H1, elementary) to a persona-based (H2, intuitive, responsive, and rich) to today's hyperpersonalized, immersive, and ambient (H3, progressive and adaptive) experience. H1 characteristics have almost faded, H2 features remain dominant, and H3 characteristics slowly gain traction.

To transition to H3, enterprises will have to navigate through the following 10 subdomains:

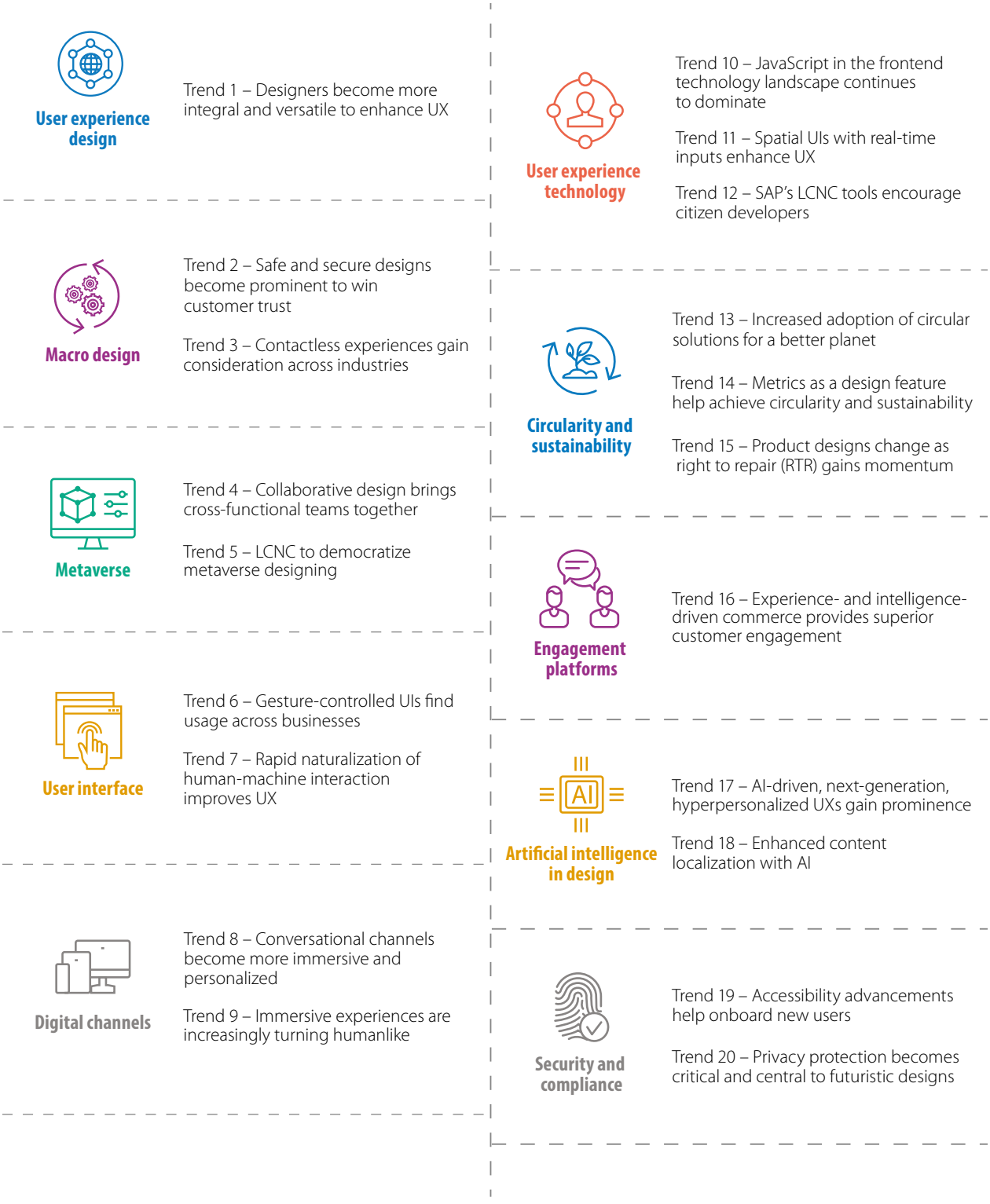
**User experience design**
**Macro design**
**Metaverse**
**User interface**
**Digital channels**
**User experience technology**
**Circularity and sustainability**
**Engagement platforms**
**Artificial intelligence in design**
**Security and compliance**

## Figure 1. Entering H3: hyperpersonalized, immersive, and ambient




Source: Infosys

## Figure 2. Key trends across experience design subdomains




Source: Infosys

# USER EXPERIENCE DESIGN

Systems thinking moves beyond the bottom-up approach of design thinking to a top-down view of user journeys and data flows of an organization's value chain. It boosts efficiency and creates comprehensive awareness by harnessing various technologies. Systems thinking seeks to create the conditions necessary for an innovative and frictionless environment. It allows designers not only to contextualize problems and solutions within the greater framework they inhabit, but to understand how targeted and effective design can bring that needed change.

## Trend 1 — Designers become more integral and versatile to enhance UX

As next-generation technologies integrate more with services, processes, and experiences, the role of designers becomes integral and versatile. Designers reinvent the business value of design by enhancing physical, digital, and social usage, while ensuring environmental sustainability. A 2020 survey by the NRF and IBM found 57% of customers are willing to change their buying habits in favor of sustainable products.[2] With customer preferences leaning toward sustainable designs, businesses are using it as the primary tool for value delivery. The unique perspective of the modern designer uncovers new challenges and orchestrates effective solutions, as they challenge conventions and champion systemic transformation.

Modern design requires this systemic mindset, where simply learning design tools will not suffice. The approach here is that the design should highlight problems and drive human-centric solutions, identifying improvement areas and bringing results-oriented changes.

Design researchers have become more collaborative to accommodate the larger systems they affect. The researcher should coach and coax human-centric insights from their collaborators, incorporating those into the overarching strategy. Further, partnering with data scientists, technologists, and/or other experts fosters a greater understanding of the space in which

designers are working, allowing deep and professional insights. Development teams should effectively work with designers, influencing designs with their contributions. The designer ensures the team's human-centric focus throughout the phases of a project. Incorporating and realizing multiple views allow the designer a unique, comprehensive perspective of the design space, challenges, and potential solutions.

The inclusive designer can understand the challenges of the end user, incorporate the insights of the experts, and address the priorities of stakeholders to drive transformation by recognizing the needs and perspectives of everyone in the system.

For a global airline, Infosys brought the concept of "design as a disruptor." The airline's design teams were encouraged to rethink all aspects of operations and offerings and reimagine the entire flight experience. The team worked with agents and flight crew, airport personnel, and technicians, ensuring each new solution contributed to an ideal air journey.

# MACRO DESIGN

The pandemic has brought the virtual and physical worlds much closer together. This has increased the demand for customer-focused hyperpersonalization to boost conversion rates, engagement, and loyalty. However, it is critical to balance delight with trust while ensuring the digital well-being of users.

Experiences are moving from intuitiveness and richness to being progressive, adaptive, and ambient. For example, there is a shift toward products that offer a dark mode setting. It reduces the luminance emitted by device screens while still meeting minimum color contrast ratios. It improves visual ergonomics by reducing eye strain, adjusting brightness to current lighting conditions, and facilitating screen use in dark environments — all while conserving battery power. Further, the past year has seen pushback from super-flat and minimal UIs to a more textured and 3D feel — a switch from lifeless representation to midway realism. The trend refers to making the interface more familiar to users by associating it with real-life and recognizable objects. As more brands adopt and experiment with this style, accessibility will automatically be enhanced.

## Trend 2 — Safe and secure designs become prominent to win customer trust

Digital data drives businesses, but the major differentiator is the safety and security of that data. Now, organizations are focusing on collecting only essential data and avoiding the risk exposure of securing and storing large data pools. Beyond data provenance, governance, and compliance, products must win over consumers by demonstrating how exactly consumers' data is being used.

Explainable and trustworthy AI has become an important part of this experience.

An ecosystem that fosters trust by design encourages greater and more active participation among stakeholders. Gig economy platforms are the best examples of this. Here, the platform orchestrators shape participants' behavior toward cooperation by expanding from trust between participants to trust in the ecosystem.

With AI being applied to high-stakes applications, explainability becomes important. Businesses will have to make it explainable, i.e., AI programmed to describe its decisions and data usage to all stakeholders.

Transparency and impartiality in AI are essential to building trust. This way, users can understand the context behind the data and design algorithms that support human values. It needs a well-designed reputation system and a right level of disclosure that remove biases and set precise expectations among participants.

A large U.S. health insurer partnered with Infosys to adopt a "privacy by design" approach. The company wanted to protect its member and provider data while developing services and products. The company extensively leveraged Infosys Enterprise Data Privacy Suite for data de-identification, masking, and on-demand services.

## Trend 3 — Contactless experiences gain consideration across industries

Business-to-business (B2B) and business-to-consumer (B2C) interactions are increasingly becoming contactless — meetings, transactions, purchases, credit cards, consultations, curbside pickup, etc. The reason is convenience and heightened awareness of health and safety. Technologies such as AI, 5G, and cloud platforms enhance contactless experiences.

AI capabilities and a range of sensory experiences offer glimpses of what the future holds. AI-powered biometrics data from sensor-tracked eye and finger movements to predict numerals and letters without touching the screen are becoming a reality. This takes us closer to a world of gesture recognition, where a wave, a smile, or a frown allows customers to access and interact with screens, products, and objects.

And then there is digital olfactory (smell) technology knocking at the door. It allows the transmission of a variety of aromas, smells, and taste sensations. Your smartphone could be a way to sample sights, smells, and flavors.

However, as experiences become touchless, people will miss the "human touch" in their interactions. A buildup of "experience debt" and resulting alienation will have to be compensated by computing to detect users' physical states, infer their needs, and respond contextually and emotionally. Further, with 5G and cloud-native application rollouts, businesses are set to harness the opportunities arising from contactless experiences.

A large utility company wanted to extract information and display details about field equipment to field engineers for better equipment maintenance. Infosys helped the client by visualizing relevant data via augmented reality (AR)/virtual reality (VR). This solution provided an interactive experience to the real-world environment by leveraging perceptual information. The solution augmented sensor information about the field equipment in real time and aided in routine maintenance activities via predictive maintenance capabilities.

# METAVERSE


Metaverse is ushering user experiences into a new world, where boundaries between physical and digital worlds will gradually disappear. It is changing the way people socialize, connect, get business done, and transact. Technologies such as AR/VR/XR, AI, blockchain, 3D modeling, edge computing, and 5G are evolving to suit the requirements of the metaverse. Collectively, these will be the building blocks for metaverse adoption. Industries such as retail, manufacturing, healthcare, gaming, and many others are expected to undergo a fundamental shift in how they interact with their customers and other stakeholders.

To keep up with this revolution, design will have to transform as well. Traditional UX designs focus on intuitiveness, ease of use, and look and feel, whereas designs for metaverse will have to be immersive and engaging. The metaverse experience is not just about accomplishing a task, it is more about an entirely new, enjoyable user experience, where mundane tasks become effortless.

## Trend 4 – Collaborative design brings cross-functional teams together

Metaverse is altering how people perceive their jobs, social interactions, ecommerce dealings, etc. To enable this transformation, collaborative design is gaining momentum globally. Large tech companies such as Adobe, Microsoft, and Figma are developing collaborative designing platforms to build metaverse assets. These platforms allow developers from various organizations to collaborate and develop metaverse assets. Tech major Nvidia has also forayed into the enterprise metaverse space with its Omniverse platform. This technology allows users to create, design, and engineer complex workflows.

Collaborative design enables cross-functional teams to work together and deliver business outcomes faster. According to Infosys Agile Radar, collaborative cross-functional teams can increase a business' chance of growth by as much as 7% compared to competitors.

A global engineering firm was experiencing cost overruns due to design errors. With the help of Infosys, it developed a VR-based review system that allowed stakeholders to collaboratively design and review building structures and identify errors in a virtual environment. It creates a digital twin of the design to monitor progress and identify any possible issues. Here, a constant feed of sensor data from development site was matched with digital twin to identify and correct deviations.

## Trend 5 – LCNC to democratize metaverse designing

LCNC designs require minimal to no coding knowledge. They even allow end users to participate in the development process. With the participation from these citizen coders, the collective imagination and creativity pool is much wider. This helps in building robust software pipelines, democratizes tech-focused innovation, and, in turn, builds business' IP. It boosts innovation and resilience and makes the entire process data driven. Gartner estimates 65% of application development to become LCNC-driven by 2024.[3]

LCNC is usually simple point-and-click or pull-down menus. Here, business users develop systems based on their requirements in just some hours. Tableau is a classic example here. Another leading example is Microsoft's Power Platform that runs as a web app and allows users to create data visualizations, workflow automation, and analytics metrics. Robotic process automation (RPA) with LCNC technologies can further strengthen workflows across multiple systems. Also, special connectors, application programming interfaces (APIs), and databases with the right AI tools can boost innovation.

Infosys' XR Platform enables businesses to design immersive 360-degree experiences for their users, customers, and other stakeholders. The platform requires no coding and basic UI training. Retailers can use this platform to design store experience for users looking for merchandise tryout and purchase options. A real estate firm can use the platform to design virtual tours for its customers. An engineering company can use it to resolve workforce troubleshoot issues and get expert guidance through AR/VR systems remotely.

# USER INTERFACE


Good UI is vital for the success of a product. Today's customer uses multiple devices each moment, ranging from remote controls and smartphones to laptops, smart speakers, and wearables. Here, the user's ask is a natural interface with the least complexities.

UI technologies such as touch screens and voice commands have advanced exponentially. Today's device-centric technology compels businesses to adapt faster to the latest interfaces. For instance, banks recognized the popularity of smart speakers, and many of them now provide account balance and other basic services through Alexa, Siri, and Google Assistant.

## Trend 6 — Gesture-controlled UIs find usage across businesses

The next generation of UI is about touch-free control, which enables communication through speech, gestures, and facial expressions. Touch-free controls are especially relevant in today's health-conscious world and promise a whole new level of engagement.

Gesture recognition is a complex area that involves sensors and cameras to capture hand movements as inputs. Current advances make this recognition more context sensitive so that devices can accurately anticipate a user's asks. While gestures are hugely popular in the gaming industry with the use of VR, AR, and mixed reality (MR), they are set to grow in the business world too. Enterprise UI experts must study different types of gestures employed, including generational differences in the way devices are used, to provide an easy-to-use and intuitive design.

> Infosys Tennis Platform offers an MR HoloLens experience that provides a view of a futuristic tennis retail store and a VR-based tennis experience. Spectators get the experience of a near-to-live environment. The application enables users to interact through gesture commands such as air tapping, gazing, head rotation, and voice commands.

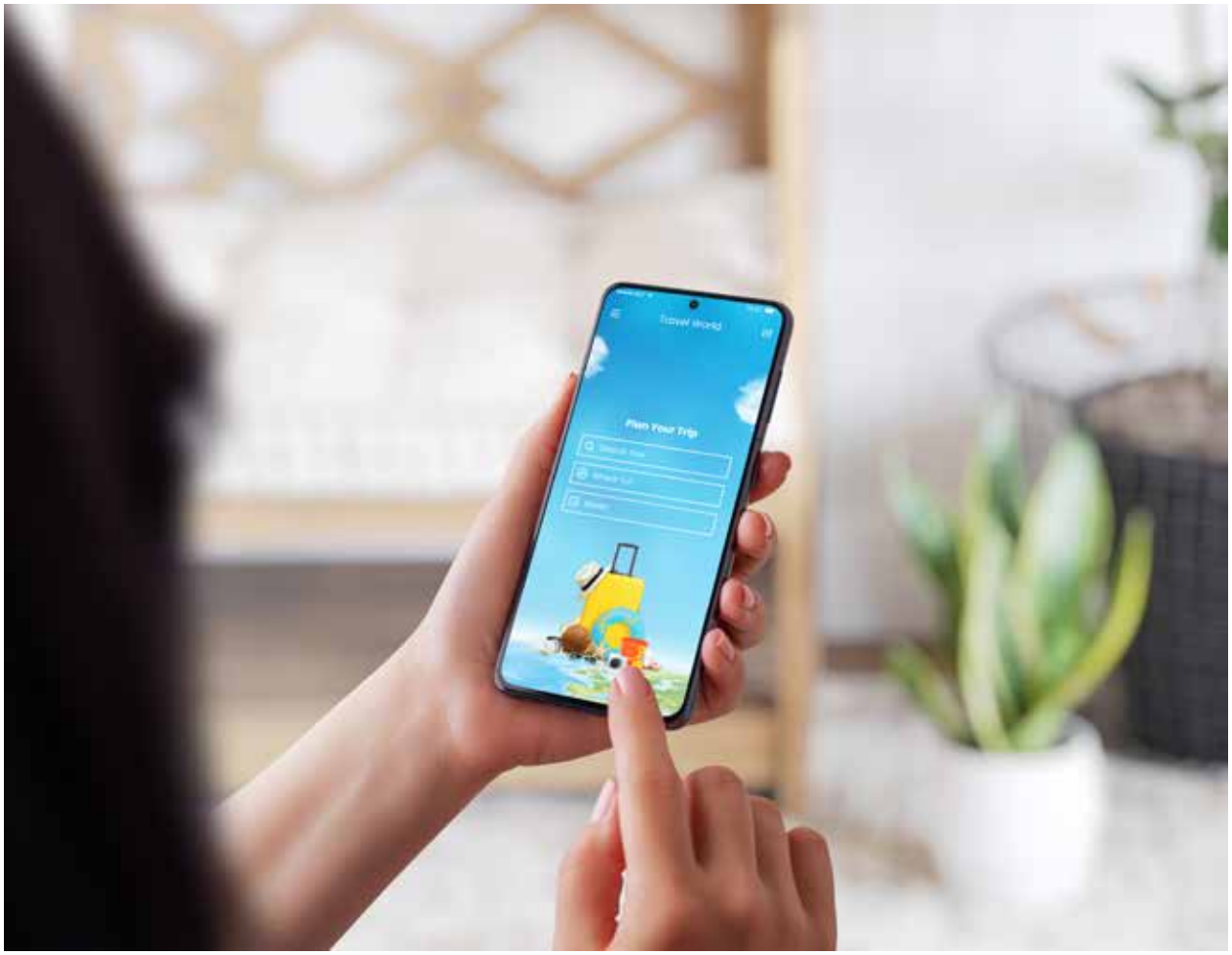
## Trend 7 — Rapid naturalization of human-machine interaction improves UX

Natural UIs represent simplified human-machine interactions. These smarter interfaces arose with the advent of social channels and progressed as social media became the primary source of engagement for both business and leisure. As users moved from simple phones and desktops to smartphones and tablets, these interfaces also kept pace to make it as seamless as possible.

Touch UIs were early breakthroughs leading up to conversational AI, which has created a significant shift in the way we communicate with machines. In conversational AI, the device enables the user to give voice or text commands in natural language and eliminates the need for special commands or buttons. Chatbots and smart speakers are commonly used today to facilitate frictionless experiences with a device.

A U.S. bank, in collaboration with Infosys, developed an app to enable on-the-go expense reporting with a conversational interface full of real-time updates and insights. The app fully supported natural language-based interactions.

For an investment bank, Infosys developed a wearable stock trading app that used a combination of haptic feedback and force touch to enable interactions with the app. The app supported natural language-based conversations to interact without depending on visual cues.



# DIGITAL CHANNELS

Digital channels began as purposeful interactions on a desktop or web browser among B2B and B2C companies. Following awkward interfaces that were far from intuitive, the next generation of digital channels came with a smarter interface, primarily driven by smartphones and social media channels. When the focus shifted to peer-to-peer interactions, personalization, usability, and natural communication became a priority. We already see home appliances connecting to Wi-Fi and exchanging data with a monitoring system that produces insights. Flexible displays, robots, smart products, and XR devices have followed the league. With all this, enterprises are pivoting their businesses to become more tech enabled and deliver more relevant offerings.

## Trend 8 — Conversational channels become more immersive and personalized

A large part of the world has already experienced chatbot interactions and voice AI such as Amazon's Alexa. These communication platforms blend natural language processing (NLP) and AI to create humanlike interactions. But they respond to every user the same way and lack personalization. Nevertheless, these technologies are already undergoing a makeover to become more immersive and personalized — expect tailor-made, humanlike conversations.

Another challenge is that biases make their way into these systems because humans train them across geographies. So, organizations with a global audience are investing in solutions that treat all interactions the same way. Some governments have also mandated neutrality. These significant trends will aid in large-scale adoption of conversational channel technology and facilitate better customer service and experiences.

> An American telecommunications company wanted to improve its customer experience and engagement by reducing the dropout rate. It also wanted to minimize customer service operating expenses. The company collaborated with Infosys to develop an in-app chatbot with 1,000+ intents on Google Dialogflow (an AI/NLP engine).

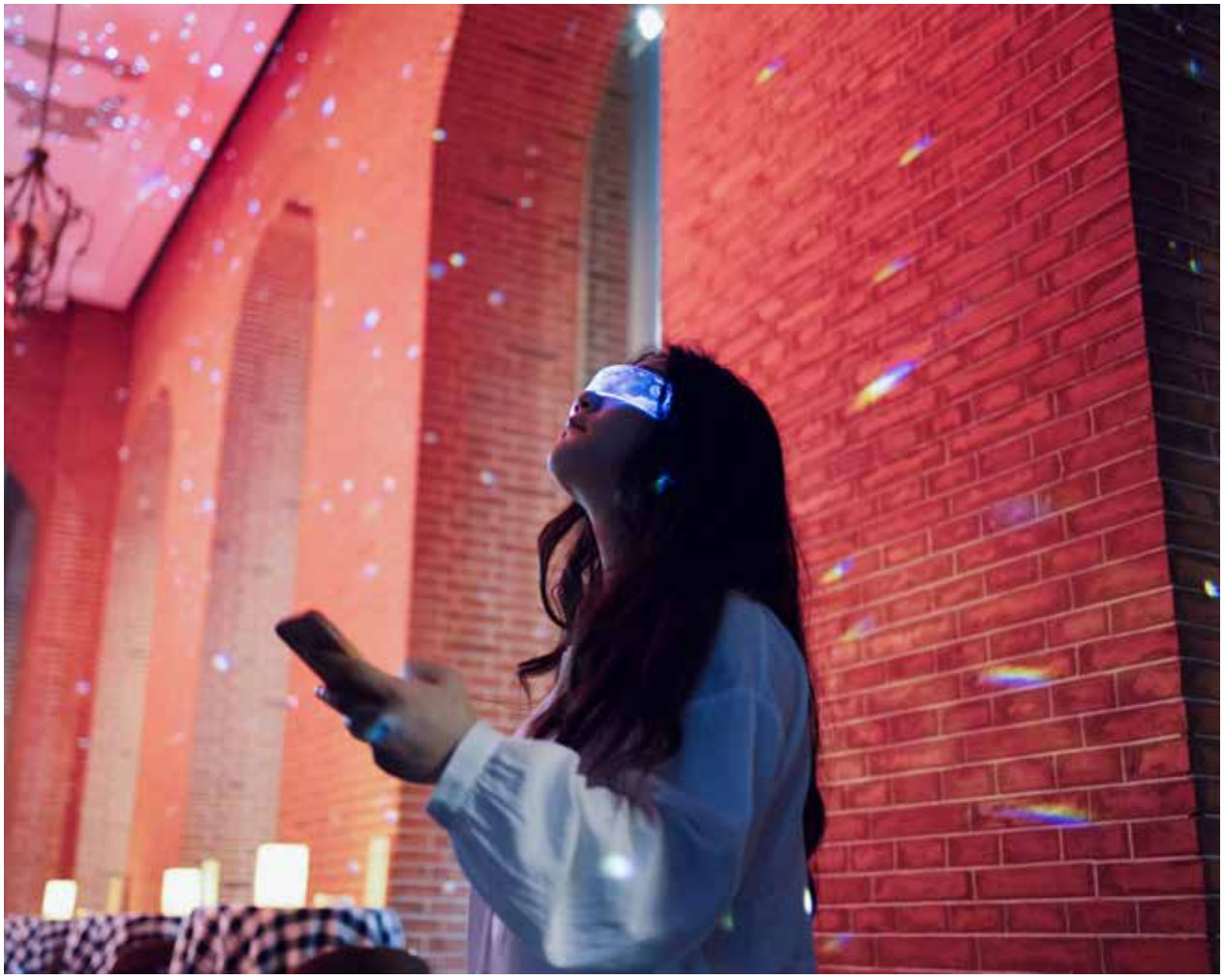
## Trend 9 — Immersive experiences are increasingly turning humanlike

Immersive experiences are a step closer to near-humanlike interactions, as they help bridge the gap between the physical and digital worlds and present a multidimensional, multimodal experience. But this technology is expensive and only now gaining a foothold in the business world.

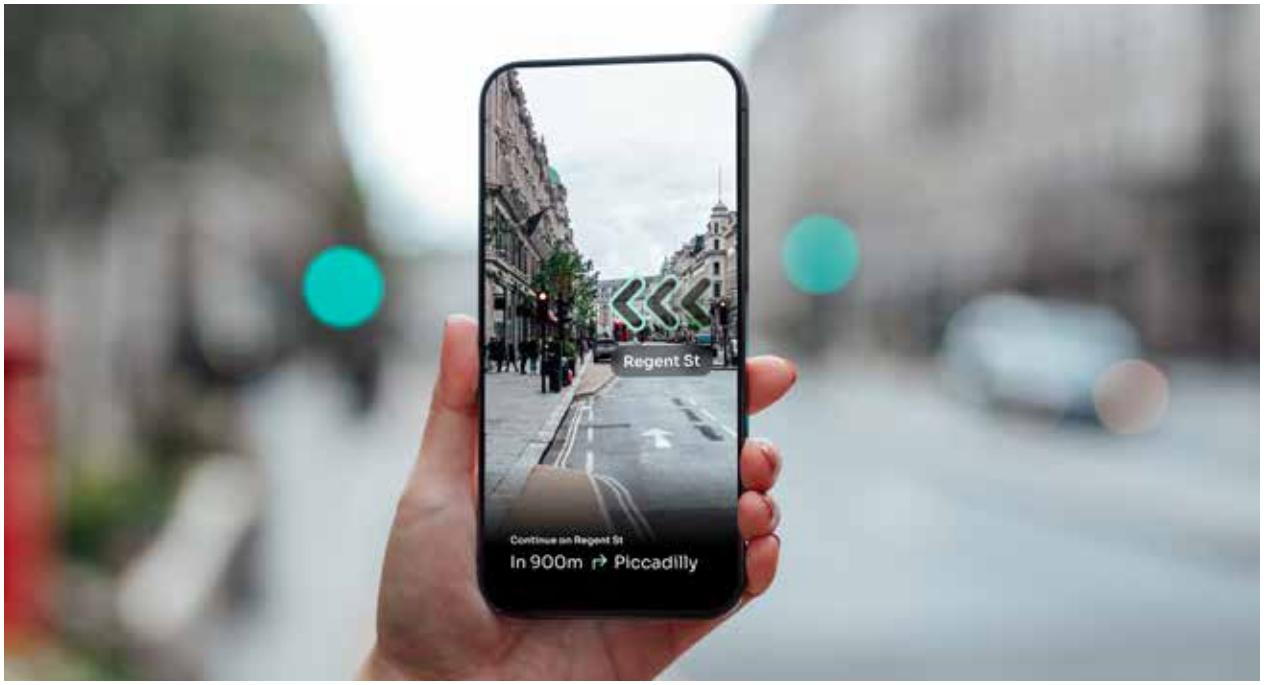
There are several areas where immersive experiences can help. It becomes easier to repair a complex machine because the maintenance person can receive real-time instructions from experts anywhere. They can facilitate interaction-rich experiences such as hosting clients on a virtual 360-degree tour of an office or running a high-tech design meeting.

Design teams, along with business stakeholders and innovation teams, must examine how to make this paradigm shift more acceptable to users and anticipate the barriers they must overcome.

> Infosys conducted its flagship sales leadership event, Connect 2020, virtually on its EPOC Platform. EPOC is a state-of-the-art collaboration platform that helps conduct online events and supports immersive experiences. It uses WebVR and XR technologies. Connect 2020 was powered by 3D booths, a 360-degree immersive tour of Living Labs with 20+ showcases, and an immersive navigation console.



# USER EXPERIENCE TECHNOLOGY




Functional UIs have developed into more responsive, intuitive interfaces that attempt to mimic human actions. In the past, such interactions were triggered by a console-based command line; a static, data-driven web; or a thick client interface. Today's powerful technologies allow gesture-enabled and AI-powered UX with learnable interfaces that can be deployed on different device types. Applications can be built to directly utilize technology to drive the UX irrespective of the user's location.

## Trend 10 — JavaScript in the frontend technology landscape continues to dominate

JavaScript has been popular as a programming language. Its capabilities such as native support on browsers and the ability to run on many devices make it a compelling choice for developers to reach a wide audience.

Innovations such as client-side state management libraries (Redux, NgRx, VueX), progressive web applications (inbuilt support by browsers and popular libraries), and micro frontends (webpack module federation) help handle complex applications and utilize opportunities provided by the application programming interface (API) economy. A vibrant open source community continuously supports all these innovations. While JavaScript is a language interpreted at runtime, TypeScript enables developers to have compile-time type checking. Webpack, "rollup," "npm," etc., are examples of maturing tools that support the JavaScript ecosystem and developer productivity in creating optimized web applications.

Web assembly is a possible future technology that may complement or provide the ability for other languages to increase popularity on the web. Innovations are also underway to automate the creation of frontends. Low-code, no-code (LCNC) platforms such as UiZard can convert sketch to code. Similarly, Microsoft's ink to code can convert a wireframe to code.

For a global supermarket chain, the ask was to deliver a single-page experience covering multiple modules. Infosys adopted a micro frontend-based approach, aiding teams to independently work on various modules and eventually deliver a single-page experience to end users. This approach simplified the overall development process and reduced the application complexity.

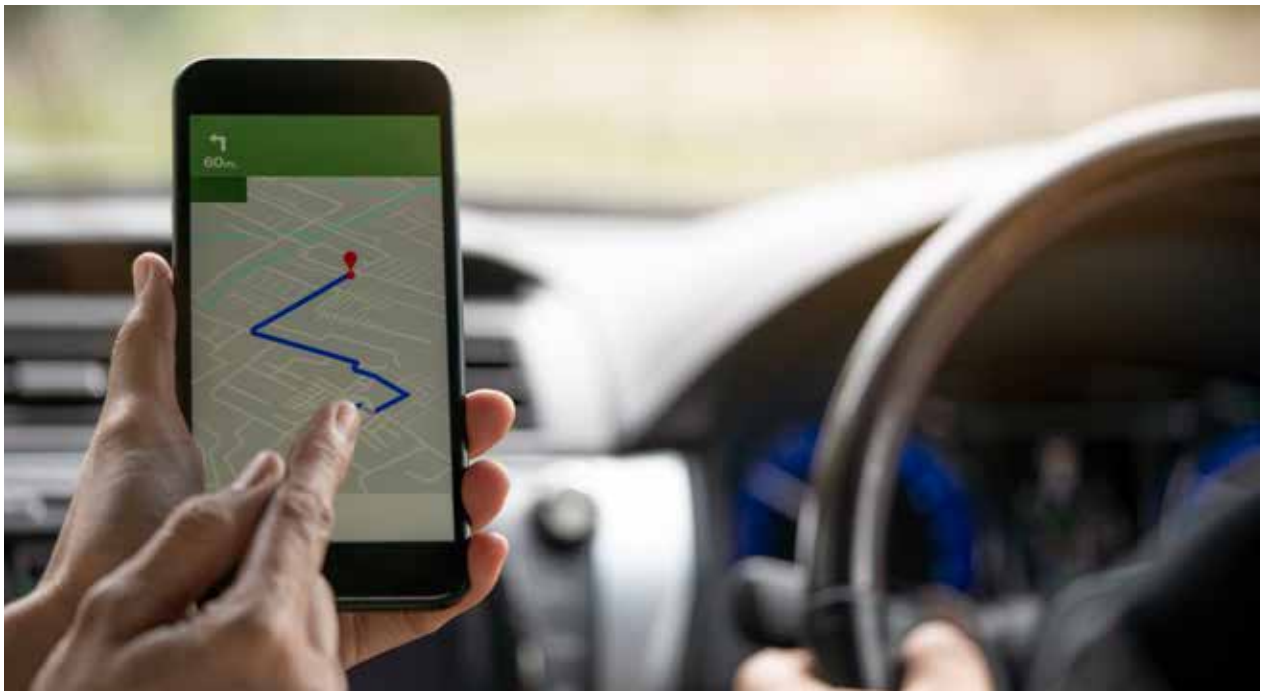
## Trend 11 — Spatial UIs with real-time inputs enhance UX

AI, VR, and MR UXs rely on real-time inputs from the physical world to deliver outputs. These are a blend of real-world data and programmed elements that make them suitable for this phygital environment.

The launch of XR-enabled UXs has been delayed due to the high costs and lack of device support. Today, XR-enabled technology is available even in mobile handsets, with market leaders Google's ARCore and Apple's ARKit becoming mainstream. Once Apple launched its ARKit as part of iOS 11, it was able to add thousands of AR apps to the App Store. Microsoft also released its MR toolkit with Unity as open source, which helps developers learn techniques and best practices to develop applications on the Microsoft HoloLens and Open VT platforms.

Infosys experts anticipate faster adoption of AR and VR technologies for gaming, retail, and navigational use cases. However, the pace of XR adoption is rather slow due to ambiguity around how technology can help enterprises solve specific problems. Companies will need to conduct focused research on specific use cases relevant to their business and analyze the ROI of each scenario to accelerate the successful adoption of XR.

A global technology company, in collaboration with Infosys, created an augmented-assistance printer repair solution with the remote assistance of Apple ARKit. The solution helps technicians recognize the equipment and provide contextual information using AR.



## Trend 12 — SAP's LCNC tools encourage citizen developers

According to Gartner, LCNC will power 70% of application development across enterprises by 2025.[4] Trends indicate steep, projected growth of 165% every two years.

SAP AG is a leader in enabling citizen developers with LCNC tools and platforms to build enterprise-grade applications. It provides streamlined UXs for any business domain. Solidifying its place in enterprise cloud development with its latest business technology platform, SAP added a premier NC app development service to its cloud service portfolio with the acquisition of AppGyver. This will be accessible as a cloud service and augment the existing Mendix platform.

These additions give SAP customers a plethora of options for rapid application development using its enterprise-grade architecture and business intelligence. This enables citizen developers to build applications, in line with SAP Fiori 3.0 design guidelines, while targeting smart devices.

Future trends indicate the integration of AR and VR with SAP's AI platform Leonardo to provide more intuitive and powerful enterprise applications.

> Infosys' Smart Warehouse Management solution, powered by SAP and the Fiori framework, helps in automating warehouse management for large businesses. A proof of concept has been completed to renew the solution with AppGyver (SAP's LCNC platform). AppGyver plays a key role in developing applications that can run on multiple devices and operating systems.

# CIRCULARITY AND SUSTAINABILITY

Sustainability is shifting from just installing solar panels or fixing leaky pipes to solving systemic and holistic design issues. The future of sustainable design requires designers to be the orchestrators of numerous intermeshed points across a product or service's life cycle. Sustainability should not be viewed as a burden or trade-off when designing but a comprehensive asset. The sustainable designer envisions new products and processes that are efficient, renewable, and healthy for humans and the environment. Designers should ideate circular life cycles where the "end of life" is as valuable as any part of the process, ready to be reused rather than tossed aside.

## Trend 13 — Increased adoption of circular solutions for a better planet

Circular designs push sustainability to the forefront, becoming an intrinsic component of the design system. Instead of simply seeking LEED certification for a single building, circular designs tackle supply chain, product life cycle management, manufacturing, and even post-consumer use scenarios, maximizing the system's efficiency. Sustainability must encompass the process in which a product is created and distributed — ensuring production, transport, and usage are as efficient and beneficial as the product itself. Understanding the potential and requirements of the system allows sustainable concepts. The goal is to optimize the entire value chain, not only for monetary gains, but also for humanity and a better Earth.

## Trend 14 — Metrics as a design feature help achieve circularity and sustainability

Businesses are increasingly embedding "metrics as a design" feature to measure the environmental costs of products. It looks at carbon footprint data and metrics such as waste data, water footprint data, and virtual water data to bring strategic insights and enhance sustainable manufacturing for a circular economy.

However, current methods of capturing and measuring these data points aren't precise. Technologies such as big data, cloud, 5G, and the internet of things are expected to help overcome these challenges. These technologies will bring more relevant and actionable information readily and accurately. Solutions backed by these technologies can help in reversing supply chain logistics to fast-track product return to manufacturers.

Infosys created a smart system that monitored the dynamic metrics for an entire building portfolio of properties focusing on the occupant comfort variables of temperature, humidity, and air quality.

For a leading financial services company, Infosys conducted a comprehensive diagnostic of energy usage to find inefficiencies and waste sources, leading to a smart building vision and roadmap.

## Trend 15 — Product designs change as right to repair (RTR) gains momentum

RTR is transforming from a consumer ask to a regulatory requirement in several countries. It allows users, consumers, and businesses to repair their devices on their own without any legal or technical restrictions. The U.K. and a few U.S. states already allow varying RTR levels. Further broadening the scope, President Biden recently ordered the Federal Trade Commission to create national RTR regulations. While this will bring down new product sales and revenue for manufacturers, it would significantly boost sustainability requirements. Further, technologies such as AR and VR will allow manufacturers to pass the required knowledge to customers with ease and fuel the RTR movement. For example, Rolls-Royce is already using VR-based software to train technicians on aircraft engine repair.

With the broadening RTR scope, manufacturers need to redesign products to empower customers to repair products on their own and outside of manufacturers' authorized networks. A modular approach to design would be the best fit, easing users to identify and fix/replace faulty parts. Another mandatory requirement will be the unbundling of hardware and software, hindering users from identifying and mending faults.

# ENGAGEMENT PLATFORMS


Digital engagement platforms, content, and commerce management systems were earlier tightly bundled, offering a limited scope of extension. Then they evolved as microservices and integration-friendly stacks by adopting standardized and effortless approaches to create an omnichannel experience. Finally, they integrated customer intelligence from customer journeys in hyperconnected ecosystems to provide holistic, personalized, and real-time experiences.

## Trend 16 — Experience- and intelligence-driven commerce provides superior customer engagement

E-commerce activity has surged in recent years to become a critical driver of platform modernization. As consumers become more selective about their purchases, brands are investing in sophisticated commerce platforms that focus on the entire customer journey to provide better experiences and derive meaningful insights.

Traditional on-premises platforms (e.g., SAP Hybris First Gen, Oracle ATG, and IBM WebSphere) evolved through a cloud-first, microservices-based, headless approach. The latest versions of SAP Commerce Cloud, Oracle Commerce Cloud, Magento 2+, Salesforce Commerce Cloud, and HCL Commerce 9+ build and deploy capabilities on the cloud with decoupled storefronts, cloud connectors, advanced search capabilities, and cloud-based platform extensions.

We expect new, cloud-born, API-first platforms such as commerce tools and Infosys Skava Commerce to bring in a broader range of microservices. They will enable an experience orchestration engine that combines omnichannel experiences and capabilities. These platforms will provide enhanced capabilities for customer understanding with more accurate predictions and faster integration of digital assets to PIMS. This will be powered by AI and high-powered Apache Solr and deliver better product visibility through elastic search. The power of headless interfaces introduces advanced possibilities with conversational commerce touchpoints in which chat and voice assistants can elevate self-service to newer levels.

Connected experiences are integrating online commerce super apps into an in-store or in-venue

ecosystem, providing a seamless, context-aware phygital dimension to customer journeys.

Integration of capabilities such as quotations, negotiations, and subscriptions, along with commerce, is a key customer experience trend. This enables a connected experience for online purchases. It already has a significant impact on B2B commerce and is likely to shape B2C commerce in the coming years. Ready-to-use reference stores, vendor marketplace components, frontend app-building studios, and AI-powered functionalities speed up implementation and rollout.

For a leading American retail chain that offers agricultural and home improvement products, Infosys created an advanced commerce frontend. The frontend integrates with commerce core services and call centers. This provides digital capabilities, including a nimble and agile UI, with enhanced search and promotions. It also offers single-click checkout and innovative features such as BOPIS (buy online, pickup in store). These features are realized over platforms such as WCS, Apache Solr, IBM Sterling OMS and Call Center, CoreMedia CMS, and BI Talend. Enhanced ML capabilities of learning to rank integrated with WCS Search enabled more relevancy in search results, pushed most moving products, aided higher revenue, and offered enhanced business features. A conversational interface powered by a chatbot (Azure Bot framework) elevates customer engagement to the next level, addressing self-service and general queries.

# ARTIFICIAL INTELLIGENCE IN DESIGN

Enterprises have moved from inflexible, rule-based systems and historical, data-based reports to real-time insights and personalization powered by big data and AI technologies. AI now plays a complementary role in digital experiences with conversational chatbots, or digital assistants, computer vision-based image recognition, and personalization based on analytics. The AI inbuilt experience is expected to drive the next era of digital experience with hyperpersonalization in the consumer and enterprise segments.

## Trend 17 — AI-driven, next-generation, hyperpersonalized UXs gain prominence

Content personalization in websites and mobile applications was mostly driven by rules defined in content management systems, experience management solutions, and analytics engines. These rules relied on frontend user interactions or a history of user patterns captured at the backend. Streaming, big data, and edge analytics offer significant insights that evolve into hyperpersonalization.

The Web 3.0 decentralized environment brings hyperpersonalization to the center with intelligent experience adaptation, user interest modeling, and user-specific semantic content handling. In addition to hyperpersonalized user-centric apps in the real world, the use of spatial inputs, digital twins, avatars, and other enabling technologies are expected to take hyperpersonalization to greater heights in the metaverse.

AI-driven hyperpersonalization entails a digital brain that offers tailored content, dynamic screens, interactive contextual interfaces switching to a conversational bot or other digital assistant based on the device or context, and optimized user interactions. The digital brain creates a unique digital experience for each user. Resultantly, hyperpersonalized apps are created for the consumer segment and live enterprise apps are created for the enterprise segment.

With its Live Enterprise Suite, Infosys has pioneered a phygital ecosystem, with sentient hyperpersonalization services powered by a digital brain. Live Enterprise was successfully deployed with customization for multiple clients and is continuously evolving. It uses an experience configuration kit to implement a computational design paradigm across various frontend platforms.

A leading logistics provider developed a digital transformation platform for employees to deploy COVID-19 safety norms with intelligent office space booking and personal assistant features. Built using Infosys Live Enterprise, the platform connects several enterprise touchpoints to provide a unified employee experience.

## Trend 18 — Enhanced content localization with AI

Large global enterprises are increasingly looking at AI-powered, real-time translators to fulfill their localization needs. Language translation technologies are enabling organizations to shift from large, distributed help desks to a centralized help desk model using AI-powered translators to respond to end users in the languages of their choice. It is also proving to be cost-effective for organizations. AI-powered language translation and localization are gaining traction.

A global retail giant worked with Infosys to develop a language translation system. This system can translate text and documents in real time to support employees and customers in their preferred languages. The system uses Infosys-customized language translation capabilities from leading hyperscalers to improve the accuracy of translation.

# SECURITY AND COMPLIANCE

With the increased use of devices and reliance on digital channels, companies must consider crucial nonfunctional factors such as security, compliance, usability, accessibility, and performance to deliver a complete experience. Security checks that use CAPTCHA or login credentials started a few years ago, but now there are intensified security checks offering multifactor authentication techniques and biometrics. This trend strives to provide foolproof security and compliance, while maintaining a simple and meaningful experience.

## Trend 19 — Accessibility advancements help onboard new users

Accessibility tools allow people with disabilities to use devices and the web smoothly. These tools have gained much prominence and are a regulatory requirement in some parts of the world. According to the World Health Organization (WHO), about 15% of the world's population has some form of disability,[5] indicating the necessity.

While still a relatively untapped market, technology leaders such as Microsoft and Apple now pay more attention to accessibility, and it could soon become a competitive advantage. UX teams must consider inclusive design principles and adhere to web content accessibility guidelines (WCAG 2.2) to deliver the best experiences to this underrepresented segment.

A U.S.-based global investment bank realized 50% savings on validation efforts by using Infosys Accessibility Testing tool.

An American publishing major also used this tool to make 80% of its client-facing pages compliant with the Americans with Disabilities Act (ADA) through automated ADA validation. The company also realized significant improvement in UX.

A U.S. semiconductor manufacturing client achieved 70% site coverage and 10% cost savings by automating ADA validation.

## Trend 20 — Privacy protection becomes critical and central to futuristic designs

Enterprises handle massive amounts of data in a highly interconnected world. The downside of having abundant data is potential breaches. Reports of data theft or data used for fraudulent purposes are on the rise, as cyberattacks become more sophisticated. Financial services sectors, hospitals, retailers, and government agencies gather a vast amount of personal information. An unscrupulous person with access to any of this data can cause privacy invasion and significant damage to a person or business. Enterprises need to take privacy seriously or they risk attracting steep fines and penalties in an increasingly vigilant regulatory environment.

Some governments have already enacted strict rules for enterprises to ensure data privacy, such as the General Data Protection Regulation (GDPR), the California Consumer Privacy Act (CCPA), and the Indian Personal Data Protection Bill. Privacy by design, a concept enforced by the GDPR, requires data protection and privacy aspects to be embedded at every level across a system and processes.

A large U.S. bank used Infosys Enterprise Data Privacy Suite (iEDPS) to build a secure data exchange data protection service. This created a boundaryless organization for its partners, employees, and customers. The bank also improved its data sanitization productivity efforts by 40% across multiple data sources and more than 1,500 applications.

An auto major in the U.S. used iEDPS for intelligent discovery reporting of sensitive data across 130+ databases and 98 applications. The company became CCPA compliant and saved up to $7,500 per data breach.

# Glossary

| Abbreviation/acronym | Full form |
|---|---|
| ADA | Americans with Disabilities Act |
| AI | Artificial intelligence |
| API | Application programming interface |
| AR | Augmented reality |
| BOPIS | Buy online, pickup in store |
| CCPA | California Consumer Privacy Act |
| GDPR | General Data Protection Regulation |
| GUI | Graphical user interface |
| IEDPS | Infosys enterprise data privacy suite |
| LC | Low-code |
| ML | Machine learning |
| MR | Mixed reality |
| NC | No-code |
| Neumorphism | New and minimal way to design |
| NLP | Natural language processing |
| NRF | National Retail Federation |
| Phygital | Physical + digital |
| PIMS | Product information management system |
| ROI | Return on investment |
| UI | User interface |
| UX | User experience |
| VR | Virtual reality |
| XR | Extended reality |

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## Advisory Council

**Mohammed Rafee Tarafdar**
SVP and Chief Technology Officer

**Prasad Joshi**
SVP, Emerging Technology Solutions

**Rajesh Varrier**
SVP, Digital Experience (DX)

**Corey Glickman**
Partner, Sustainability

**Rajesh T**
VP, Communication Design

## Contributors

**Guruprasad N V**

**Dr. Jithesh Sathyan**

**Kurt Schafer**

**Manoj Neelakanthan**

**Maximillian Vieweg**

**Sameer Singh Choudhary**

**Scott Confer**

**Shivam Deshpande**

**Siddharth Rao**

**Sidharth Malhotra**

**Varada Kumar Kadeganje**

**Venkata Lakshminarayana Indraganti**

**Venugopal Subbarao**

**Vishwa Ranjan**

## Producers

**Ramesh N**
Infosys Knowledge Institute
ramesh_n03@infosys.com

**Abhinav Shrivastava**
Infosys Knowledge Institute
abhinav.s08@infosys.com

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