

# EXTREME PERSONALIZATION

The desire to personalize our environment for aspects such as comfort, efficiency, accessibility and safety is a part of human nature. Historically, achieving this was relatively labor intensive and limited to physical features. However, technology developments, are making the reconfiguration of both physical and virtual environments easier, faster, more extensive, and less costly. Some degree of customizability is now an expected norm in many aspects of our daily lives.

One consequence of the proliferation of consumer centric technology is that each individual user will probably interact with several customizable devices, each of which must be configured and managed separately. "shared economy" models will add further complications as objects need to be re-configured to suit each different user's preferences. The seamless and efficient orchestration and customization of a wide variety of devices, while remaining ethical in the way that individual's data is managed and used, will be a major challenge.

## Extreme personalization in action

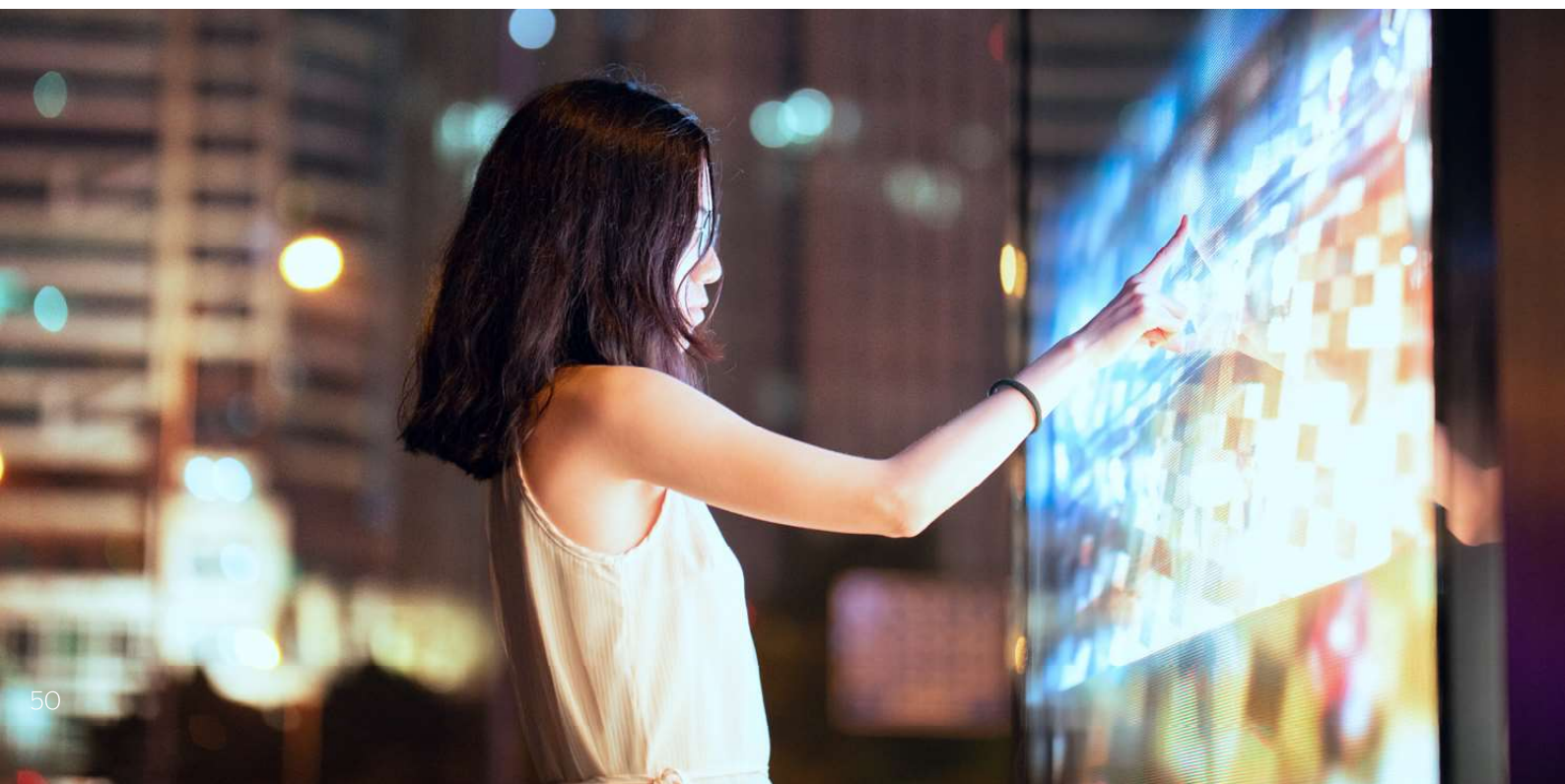
Environments that adapt to an individual's needs has been a goal of accessibility and assistive information technology for many years. The vision is of a device agnostic roaming profile that automatically configures user interfaces to meet personal requirements.

This might be in terms of the way information is presented (e.g. font-size and contrast, audio output, and haptics) or input (e.g. keyboard configuration, voice control, and physical gestures). Advances in "smart devices", sensors and network connectivity allow this goal to be extended to a wider range of physical objects.

Imagine an office space that responds to the needs of an individual. Could the space be context-aware and adapt in real-time, as required by individuals, groups or changes in circumstance? Imagine a scenario where you arrive at an office and the hot desk adjusts the ambience to meet your pre-defined preferences. Or meeting rooms automatically adjust their layout to cater for meeting type and number of participants; whilst AI analyses participants' engagement levels and stress, adjusting the ambience accordingly. Such smart offices can be expected to promote productivity as the digital workplace concept evolves beyond the limitations of the "one size fits all" approach we have been constrained by to date<sup>1</sup>.

Extreme personalization will also become the norm in transportation. Vehicles will allow automatic driver specific adjustment of seat configuration, controls, mirror position, air conditioning settings, dashboard display, navigation preferences and even suspension and engine modes. While some of these features are currently available in high-end models, more mainstream adoption will become particularly important with the growth of the shared economy and the decline in personal ownership.

<sup>1</sup> Ayral et. al., Smart Desks to Promote Comfort, Health, and Productivity in Offices: A Vision for Future Workplaces. Front. Built Environ., June 2019. <https://doi.org/10.3389/fbuil.2019.00076>





## Enabling extreme personalization

To realize the potential of extreme personalization, several factors will have to be addressed such as: user identification, authorization and privacy; data standards; security; and overall user confidence.

There are several ways in which end-users can authenticate their identities, including biometrics, NFC (Near Field Communication) tags, and online user credentials. The principles of password free authentication are well addressed by the FIDO2 project<sup>2</sup>, but creating a seamless personalized experience across multiple disparate environments adds further complication.

A multi-sided “service personalization” platform is a potential solution to protect and manage the use of sensitive data across multiple configurable environments. The platform will have to support two types of objects: network-connected objects which will interface directly with the platform, and nearfield communication objects which will access it via a proxy (typically a smartphone app). Regardless of access method, the platform will generate configuration instructions specific to a user and target object. For example, a desk identified by a given NFC tag will receive a request to adjust for a specific “desk height”.

<sup>2</sup> <https://fidoalliance.org/fido2/>

The platform will use AI to interpret unknown or undefined parameters. For example, the “desk height” may not be explicitly stated but can be inferred from the user’s preferred “chair height”. The platform will learn from the user’s behavior: if it estimates the desk height incorrectly (causing the user to subsequently adjust it), then the platform will store the new “desk height” preference, and also improve its predictive algorithm.

To ensure appropriate levels of data privacy, users will need full control over how their data is shared, used and retained, and whether specific authorization is required before it can be accessed. A user might be happy that their preferred desk height is shared without explicit confirmation (to provide the most seamless experience), but they may require that other more sensitive information is only shared with their explicit consent.

While many of the technology building blocks required to move from smart devices to extreme personalization already exist, there is currently no overarching infrastructure design in place to support extensive use case realization. But the blockers are not insurmountable and by 2024 we expect extreme personalization to be the norm in many aspects of day-to-day life.

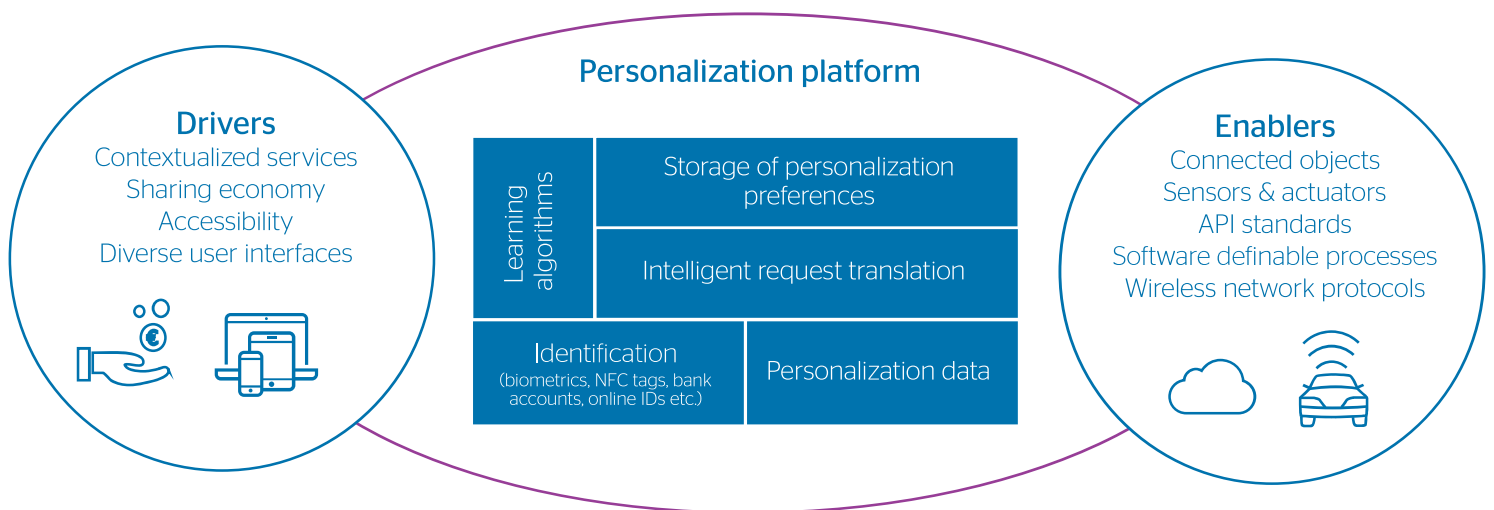


Figure 19: Drivers and enablers of extreme personalization platforms.