

Designer data

How product engineering approaches for electronics can serve insights for the entire organization

The value of data

For much of the history of electronics products, data has been valuable but not central to the design process. Data has offered validation, been an output of usage or input into products. But now, data capture is a vital design consideration that exists alongside mechanical, electrical, electronic and software engineering. Thinking machines will leverage data across a machine's lifecycle to help deliver more relevant and educated interactions. Captured data will help answer questions across the organization. As design becomes more data-centric, the potential for new opportunities and new businesses will cause data to be viewed more like intellectual property.

Differentiated value, delivered from data

Today, products are being infused with electronics potential. Technologies like the Internet of Things (IoT) and artificial intelligence (AI) drive differentiation. Although the sensors that are added to a product may not necessarily be sophisticated individually, the way the data they collect is shaped and transformed can offer nearly limitless potential. In fact, the IBM Institute for Business Value, in cooperation with Oxford Economics, surveyed 6,050 executives and validated the rising importance of big data and cloud to the design process, with 45 percent of product development participants noting that big data will have a significant impact on their business over the next three years. Additionally, 41 percent of the product development executives surveyed identified that the IoT generates most data within their organization.²

Organizations that harness data to drive intelligence and use it to reshape how they do business will be separated from those who only use the input from sensors to change user experiences. Owned and accessible data of all types can be brought together to create exceptional interactions. For example, in the next few years, increased adoption of facial recognition in mobile device authentication is predicted.³ If a car and a mobile device can both recognize the driver, could they collaboratively enable smarter, safer hands-free communications? Similarly, if a factory's manufacturing line could respond to ambient conditions for the devices it produces, it could recommend a longer paint curing time to obtain optimal wear, based on accumulated intelligence from service centers and device trade-ins. These new ways of combining data go beyond how data has been used before.

Fifty-five percent of product development executives surveyed said they expected improvements in innovation and idea generation, and 51 percent noted the potential for improvement in lifecycle management.

“Always design a thing by considering it in its next larger context.”

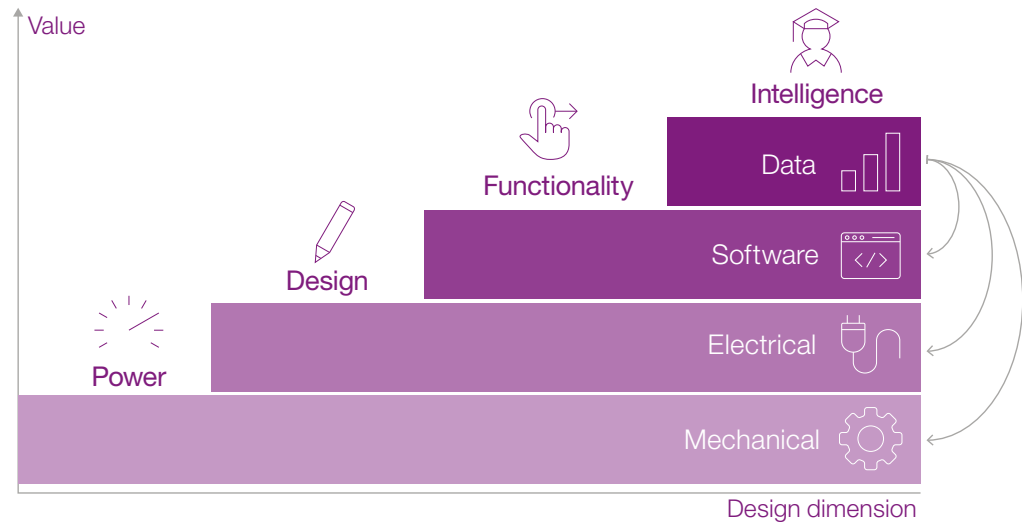
E. Saarinen, Finnish American architect and industrial designer

Making the most of this data requires using innovative new tools, as well as innovative new thinking about the business challenges. Our survey revealed that the ability to leverage this data through tools like artificial intelligence and cognitive computing will be fundamental.

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Figure 1

The emerging state of electronics systems design



The transition from data to intellectual property (IP)

Data goes beyond product design and development. With data, you can solve problems in one area and recombine it to solve problems in another. Data has an extremely low cost of usage but a high potential value. We often consider data's operational or day to day value to the business. However, as data now streams into our systems it has greater strategic and innovation value to the business. What if data were valued similarly to intellectual property? In electronics, patent portfolios, trademarks and trade secrets are valued highly and protected forcefully. Patents offer commercial value, and in many cases, extreme value in licensing and access opportunities. Designating these deeper insights as trade secrets moves electronics companies beyond differentiation to innovative ways of working.

Based on data, products can dynamically change behavior or reactions. These change possibilities must be designed into the product early and the insights monitored for future use. Some of these options can be patented, while some may remain trade secrets. When you gather, use and protect insight data, you can create and optimize product, contract, subscription or repair pricing. You also can correlate usage, perceived benefit and satisfaction data to prioritize features and development for future devices. Incorporating actual customer data can improve end-of-life recommendations. Additionally, you can share usage statistics and behaviors with partners or affiliated organizations. For timely service delivery, you can share the logistics of repair and spare parts networks.

Our survey also showed that 53 percent of supply chain professionals expected this data, coupled with AI and cloud computing, to drive dramatic improvements in servicing and returns management.⁵

Next generation data monetization

Electronics companies can harness data in multiple ways. Here are real examples from around the globe:

- User insights from medical devices and sensors help the elderly with robotics and avatars including reminders, support, companionship and emergency alerts.
- MRI usage data supports new business model definition, which can move hospitals from capital expenditure to operational expenditure models.
- Building management companies pay providers for efficiency of people-moving machinery, power, lighting and mechanical systems based on effective data management.
- Sensor data from paint rooms in factories allows adjustments that improve drying time and humidity control.
- Hotel smart mirrors use a consumer's profile attributes to change lighting, show favorite sports scores or share nearby dinner specials.
- A factory's manufacturing line adjusts machine parameters for the quality of incoming parts using actual component supplier test data, as opposed to prior specifications.

Create a strategic plan

To pursue a “data as IP” leadership position, electronics executives need a strategic plan that details how data will be used throughout the company. This plan should include how the data will be used and how it will be created, acquired, maintained, owned and understood, or turned into actionable insights. Consider, for example, the following uses of data in an electronics company:

- *Product development.* Data from products in the field will inform product development decisions. Feature-level usage data will direct the use of development resources. The ability to use AI to effectively query massive databases of patent and technical publication information can help improve the company’s IP rights position.
- *Manufacturing.* Data collected during the lifecycle of the product can range from component suppliers to the company’s own manufacturing line to after-sales service. This data can help improve both manufacturing yield and outgoing product quality.
- *Sales and marketing.* Data collected from customer touch points may include detailed product usage data. This information will enable the sales and marketing organizations to personalize their messaging.
- *After-sales service.* Combining data from connected devices with manufacturing data and the service data of a particular device will allow service organizations to provide personalized service while likely lowering costs.
- *Partnering.* Many data sources can be valuable even if the company doesn’t hold exclusive ownership. For example, companies might want to access patent, weather or social media data that they don’t need to own. Conversely, some data the company owns may be valuable to selected partners. For example, machine usage data is valuable to companies that sell consumable products for those machines.

In the electronics industry over the past decade, much of the physical hardware has been commoditized. In coming years, software will become commoditized as well, but data can provide continued competitive differentiation. When aggregated and used intelligently, data can be exponentially valuable. Each incremental piece of data potentially adds value and can increase the value of the existing company data as a whole. Electronics executives that don’t already have a strategic plan for using data consistently throughout their company should start creating one today.

The steps to cognitive design

As data ownership and control of IP becomes paramount to corporate strategy, behavioral and community data can inform and drive the development process. Data can offer insights into usage, collaboration, actions, transactions and communication among business partners.

To realize the value of data and cognitive design in manufacturing, organizations need a sustainable roadmap. Take these steps to transform product design and development with data:

- Treat data and the insights garnered from that data as mission-critical corporate assets that can grow in value and utility.
- Determine which insights translate into IP that is protected for competitive advantage; protect it in the same fashion as patents or trade secrets.
- Use data as a key foundational aspect of design, from creation through behavior observation and future prediction.
- Employ the insights from data to build a continuous loop across the organization. Challenge every team to find five new insights each quarter. Then, determine which insights have the most value and go from there.
- Engage with partners and suppliers that are essential to strategic direction, but remain diligent in protecting data.
- Refine data protection activities based on technological changes and market conditions.

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Notes and sources

- 1 IBM Institute for Business Value Global Cognitive Survey. 2017. (unpublished data) <https://www.ibm.com/services/us/gbs/thoughtleadership/accelentreinvent/>
- 2 Ibid.
- 3 "Facial Recognition Devices and Licenses Will Reach 122 Million Annually by 2024." Tractica. 2015. <https://www.tractica.com/newsroom/press-releases/facial-recognition-devices-and-licenses-will-reach-122-million-annually-by-2024/>
- 4 IBM Institute for Business Value Global Cognitive Survey. 2017. (unpublished data) <https://www.ibm.com/services/us/gbs/thoughtleadership/accelentreinvent/>
- 5 Ibid.