THE SMART OBJECT AGE

Fig 01. Jibo, The World's First Family Robot. 
http://www.jibo.com/
Since 1968, Design Group Italia has been helping companies to design and innovate their physical products.

Like most of our clients, our history was built on the creation of manufactured products, isolated units sold off store shelves and the only communication with the end user would occur if there was a problem put to the customer service helpline.

These days, most of our clients have had to face, in some shape or form, the competitive pressure to make their products connected and become part of an ongoing conversation with their end users that creates a positive user and brand experience. These objects must now become smart and create new forms of value. Taking physical products into the digital world means the digital transformation of business.

Our experience across many consumer markets has taught us to tread wisely and to not get blown away with the glory and innovation that new technologies can potentially deliver. Adopt only the necessary technologies and do it with sense that is right for your brand.

As designers, we find ourselves helping companies path their way in building a product-service ecosystem for when physical products go digital. This white paper on the IoT aims to help the reader reflect on the human centered design challenges and opportunities the future holds. There are already more connected devices than humans on the planet, yet, even with some guided behaviour change, it is humans that must remain and feel in control.
AUTHORS

GIANANDREA GIACOMA
Design Research Director
Psychologist, expert in psychology of mediated interaction, persuasive motivational design and user needs.

LEANDRO AGRO*
Digital Design Director
Awarded IxD/UX Director, IoT Guru, patents contributor, with 15+ years of experience in design and team leadership.

CONTRIBUTORS

SIGURDUR THORSTEINSSON
Partner
An interpreter of culture and humans in general, affronting the challenges of the world with design powered innovation.

STEFANIA BERSELLI
Service Designer
An Italian service designer, specialized in human behaviors, strategic design and infographics visualization.

GABRIEL ZANGARI
Managing Director New York
Bridging the gap between New York and Milan by interpreting and harnessing European design talents to innovate with success.
LET’S KEEP THE SMART AGE FROM BECOMING STUPID

WE ARE AT A TURNING POINT IN THE AUTONOMY OF THE OBJECTS AROUND US

Human beings no longer have a monopoly on memory, perception and the elaboration of knowledge. In fact, we now find classically human cognitive capabilities in many objects that fill our homes and offices, or are even worn around our necks or on our arms. We are not talking about science fiction here, but rather a very concrete vision of today’s product design scenario.

Smart objects are manufactured products that interact with users and digital platforms. Products that no longer wait for users to push their buttons, but proactive machines that interpret their user’s habits and tastes, to then propose new functions autonomously. They are changing our daily habits and ways of living in the world.

At Design Group Italia, we believe design is about helping people, companies and communities create meaningful objects, systems, services and solutions that take care of all of us as human beings.

In our 40 years of history, we have embraced new technologies that help us in our quest and smart objects are another exciting frontier to help us keep user needs at the center of our design to create value for the final consumer. Never stupid gadgets, but meaningful design that lasts, that respects our earth, that fulfills a real need or emotion.

We dare to believe that the most important design on the horizon will be the ones that is able to adapt and plan specific mental processes as well as behavior with other objects and people: a mind-centered design.
The term ‘smart’ refers to the quality of intelligence that will increasingly characterize our products in the future. Intelligence is the mix of cognitive and behavioral abilities used to achieve specific goals in a given context. So it is clear that the more intelligent an object, the more it will understand its context and its user’s goals. That is why a human-centered approach is paramount. In the end, understanding people is the key to innovating products with success. With technologies like sensors, processors and internet connections, objects are becoming more effective at doing what they were always meant to do: serve their owners.

### FROM MATERIAL TO SENSORIAL
Products are becoming ever more capable of sensing their surroundings. Evolving perceptive qualities makes it easy for the object to remember user behavior and then proactively propose new uses and services.

### FROM ISOLATED TO SYSTEMIC
Objects are no more than nodes in a web of communication between users and products, online and offline. This allows the products to communicate more information and of course receive more information from other nodes in the web.

### FROM OBJECT TO SELF
With increased intelligence and high proactivity levels, there is no debating that objects now have a real personality, a self. Their way of interacting directly influences the manner in which others perceive them.

### FROM OWNED TO SHARED
The logic of inclusiveness works for hard products just as much as with social media: more and more often, even classic commodities like cars and homes are shared rather than owned. Newer generations see little use for the burdens of ownership when sharing is so easy and economically accessible. In fact, each person has the ability to share their lives with others and find new social possibilities.
Today, we are experiencing a shift in the paradigm of smart objects: they are not just passive monitors anymore, they can sense and interpret what happens in the world, becoming more and more active. We can now break down the relationship into three simple stages: passive, reactive, pro-active.

At the same time, the relation with smart objects is changing. In the past, we had a 1-to-1 relation with our devices. Now, they are starting to create an ecosystem where each object that we own interacts with the others, exponentially increasing the processing power and the quantity of data gathered. For example, our smartphone can inform our thermostat that we are on our way home, so it can automatically start to warm the house, or our washing machine can regulate its cycle in relation to the power absorption of other appliances in the house.

The next step in this evolution is a seamless relationship of everyone’s ecosystem with others, moving towards the building of a smart city. When all the devices can communicate with each other, they can also regulate the streams of energy, information, resources and people to achieve a more sustainable and livable city. This evolution is already happening: for example, GPS navigators can sense if traffic is slow on a certain road and warn others nearby to take a different route.

With so much information available nowadays, we need objects not only smart enough to filter it, but also wise enough to interpret it for us.

**TRANSPARENT INTERACTION**

Influenced by the aeronautical, military, medical and gaming avant-garde, the ways of interacting with technologies progressively gain new channels in a more efficient way even for the consumer. Interaction methods like vocal, gesture, and eye movement are...
replacing dials, buttons and touch screens. The progressive integration of sensors and processors in objects and clothing will transform our way of communicating.

**SELF - AWARENESS**

Early-adopters are using a new generation of tools to monitor just about everything about themselves. Whereas just a few years ago “quantified self” was a sparsely populated market, the space has since become saturated with activity trackers embedded in clothes and worn on body parts, from your wrist to your dog’s collar.

**Tracking and wearable devices** - from wristbands to stay fit, to headbands to focus, to pillows to track posture, and so on - are monitoring and taking data from almost everything [see the wearable database http://vandrico.com/database], but there’s still a gap between the collected data and the real meaningful values that the users might get.

The recent proliferation of “quantified self” devices, like FitBit or Apple Watch, has been shifted into everything from a piece of jewelry tracking sun intensity and exposure to promote healthier skin to a sensor-laden sleep number bed monitoring sleep patterns. Beyond wearable devices, quantified health sensors may find their way into even ordinary household items.

The better we know our own bodies - and can integrate, analyze, and understand the trends - the more we are empowered to own our own health, and the earlier we can catch and prevent anomalies: shifting from analytics to “predictalytics”.

**PATTERN RECOGNITION**

There’s a growing number of companies and startups that are using pattern recognition [face and gestures] for security and mostly marketing purposes to better understand their customers, their motivation and buying triggers.

Just a few examples: PittPatt was recently acquired by Google for Marketing purposes and Face.com by Facebook to improve the face recognition of 200 million* photos uploaded per day, or 6 billion per 6 months [Source: Quora]. This technology is breaking out out (from deceptive to disruptive) right now. First, it may be derivatives of Microsoft’s Kinect, or Google’s new Project Tango.
As Google demonstrated in February, this technology gives smartphones the ability to do realistic 3D mapping. Your phone will be able to create 250 million 3D measurements per second to build a 3D model.

**Augmented Reality**

Imagine wearing low-cost, lightweight sensors that pick up your body's precise movements and replicate them perfectly in a virtual world. As you raise your arms, twirl around, flex your muscles or do your best runway walk, the sensors gather real-time data and reflect those movements in a virtual world.

This technology exists. Developed originally for the video game world, PrioVR came out of, naturally, a successful Kickstarter campaign (see www.priovr.com).

The next piece of tech is the Oculus Rift VR headset – virtual reality goggles you wear to enter into a virtual world. Just 18 months after a $2.5 million Kickstarter campaign in Aug 2012, Facebook acquired Oculus VR for $2 billion.

Their next generation of headgear, DK2, is potentially spectacular (check it out here: www.oculusvr.com). Augmented reality lenses to monitor sugar in our blood, glasses to have real time information, system powered exoskeletons which allow ill people to walk, bionic arms, feet, hearts, bones and so on... are just starting a next phase of augmented humanity.

**Big Data**

Big corporations and startups alike are focusing their major business models on data collection and analytics, combining hardware with software and cloud services.

The volume, complexity and variety of today's data is challenging organizations to find new ways to grow and innovate, but we believe that the most remunerative technology in which corporations should invest is predictive analytics.

In the present-future everything will learn from big data; smarter classrooms, smarter stores, smarter medicines, smarter privacy and protection, smarter cities and cognitive computing systems will learn and interact naturally with people.
The co-evolution of technology and user is circular: starting with humans’ initial impulse, products go even farther than the imagination expected. For this reason we can say that they influence each other in a reciprocal and cyclical way.

+ EMOTIONAL COMFORT
We live in a stressful society and this influences the lives of many. For this reason business must create contents and experiences that gratify on an emotional level and fuel our self esteem.

In this realm, the relationship role of objects will extend into our very own personality and identity, and will create new opportunities to create truly great products.
AWARENESS

In our increasingly more complicated world, consumers - or better yet prosumers - will have an increasing necessity to gain awareness on many fronts; higher ecological standards, transparency and sourcing to name just a few.

Patients that check their doctor’s sources and the latest innovations in medicine. Not to mention citizens of many countries that realize the limits of their humanitarian and political condition and organize on social networks to create a better future. They all feel the need to gain knowledge. And to think that it was once only for the privileged! Information is now for everyone!

On a more personal level, there is clearly greater awareness through self-tracking: we do not have to write down our exercise program in a spiral notebook anymore. A bracelet can remember everything, analyze the information and even make recommendations on how to improve. We start asking ourselves: can we have a better and more gratifying experience with a bracelet than with an annoying personal trainer? In many cases, the answer is YES!

PEAK TIME

Time is becoming our most precious commodity. We always have less and less and it is diluted into
micro-moments. We search for new services and products to help manage our time, but then we do not have the time to even try them, never mind enjoy them. This is a problem especially when we add the fact that employers ask for greater and greater efficiency and production from each employee. Thus more pressure from work, more pressure to be socially active in the digital realm and the person is stuck in the middle, feeling inadequate. In the end, it is clear that successful smart objects will find fertile terrain on the market if they both manage time and help balance our emotional needs.

The reduction of time maximizes the need for efficiency and tests people’s resilience. For this reason, we always find ourselves delegating information and services to technology. These products are becoming an extension not only of our needs, but also of our identities, as we will see in the next point.

**+ IDENTITY EXPRESSION**

Identity is now fluid, never set in stone, as it is represented and communicated not only by our online profiles and by the communities we have joined, but also by pairing with smart objects that have a certain autonomy and personality. They can be just as important as a personal pet like a dog or cat to express our personal world, and our identity.

**+ PRIVACY**

Our identities are increasingly co-produced and amplified by social networks and the web. On the one hand we can express ourselves freely, but are we losing our privacy? In a context of constant automation of services and user profiling, we must maintain balance and keep the user’s need for privacy as one of the cornerstones for designing smart objects and systems.
In some degree, every design project has to consider relations, human interactions and communication. The objects that we design never live in a vacuum without human interaction. Products live in our ecosystem and in the digitally smart object age, we can even go so far as to say that design creates the networks in which we live.

That is the reason why designers need to arm themselves with psychological capabilities. Designers must become familiar with the motivational processes that govern users’ interactions with products. These are currently represented by change behavior studies, but they are now continuously evolving more and more into frontiers like social incentives in the virtual world, as well as relationships with non-human subjects like robots. These new scenarios naturally bring uncertainty and skepticism. As a response, we need to develop a design of trust, where efficiency and credibility are communicated subliminally through general presentation, form and interface.

Now that objects can be proactive, they can become more human with subjective and independent behavior. So as designers we need to understand psychology, intelligence, cognition, meaning and needs. We are not designing a mere form or graphic interface, we are creating a personality.

The Internet of Things will flourish if it is an Internet of Caring Things.
OUTSOURCING OUR COGNITIVE CAPACITIES TO OBJECTS INCREASES THE NEED TO STUDY DESIGN DYNAMICS WITHIN THE HUMAN MIND
We are now on the edge between cloud computing and the Internet of Things era. Being connected is the natural state of mind for any smart object.

In fact, adding a personality to a digital product or connecting an already digital object to the Internet of Things provides a range of opportunities for business - very tempting for companies looking to bring their goods and services even closer to the needs of their customer base.

Placing an object in a pocket, in a car, on a desktop or in customers’ homes means building a personal, bi-directional, “always-on” communication channel.

If you have a product, then it must be connected.

It must be a system and never a stand-alone identity.

Lately, the gold rush is on. Many companies are attempting to take their traditional products and blindly push them into the digital era. Some have been successful, but many others have fallen into the pitfall of investing without understanding how the digital world works.

They overlook the hardware/software cycle ratio. For many companies, accustomed to long development cycles that involve design, tooling, manufacturing and shipping for months, the rapid software cycle is unfathomable.

There is a rule that compressed into the...
concept of 3y3m: 3 years development cycle for hardware to 3 months for software. This does not mean changing software platforms. On the contrary, developers need to be confident that they can design and innovate in a platform that will remain and will host their future creations - always updateable to guarantee that the user interface is up-to-date and competitive, because the last thing a company wants is an aging UI.

Here are a few general considerations:

1. System rules! Hardware/software development must be planned and evolved in harmony. Consider the 3y/3m approach.

2. Be scared if software or user interfaces are under-considered in your company. Even market leaders tend to rest on their laurels and depend on a rich hardware history. They need to know that users expect seamless interfaces that are intuitive and easy to use.

3. Facebook has more than 1 billion active users and so every time they introduce something new, that means the world learns something new. The learning curve is immense and companies need to be informed.

Never undervalue the consequences of software running on your products. It is the portal through which everything in your business will flow.

Nokia is an extreme example of how to lose market share by underestimating the importance of UI. In the early 2000’s Nokia was the market leader, but they had dozens of models all with the same software. They invested completely in hardware. The customer experience was weak and they left the door open for Apple to come in and take control of the market. Now where is Nokia?

Every day without innovation is a day losing competitive advantage. Companies entering a more technologically advanced world need to sense urgency in creating gratifying user interfaces. If they do not, they will perish and, along with them, the hard work of generations of workers before them.
There are various reasons for which we love certain products. There are functional reasons and practical ones too, but also aesthetic and value-based reasons that reinforce the idea we have of ourselves.

Objects themselves are inserted in contexts where the brand shines as a beacon. In the end, there are unique moments, individuals and emotions that we continue to project onto the use of that object. They accompany us in our personal and professional lives. They should gain importance. Be meaningful. Gratify us and make us feel better through smart technologies and peace of mind. This will keep smart objects from becoming stupid.

Smart objects are extensions of our cognitive capacity.

They will take care of us. A neo-animis will emerge from the influence of smart objects on our perception and imagination.
THANKS

MILAN
DESIGN GROUP ITALIA SRL
VIA ALEARDO ALEARDI, 12 - 20154 MILANO
PHONE +39 02 58325272

Peter Newbould
peter.newbould@designgroupitalia.it

NEW YORK CITY
DESIGN GROUP ITALIA Corp.
234 West 39th Street, 2nd floor New York, NY 10018
PHONE +1 (718) 577-1385

Gabriel Zangari
gabriel.zangari@designgroupitalia.it