Connected Devices

Place the Device First!
Mass-market connected devices still have not found much of an audience and have still to meet the tremendous success that was predicted for them only five years ago.

The reasons are well-established: their perceived value is too low and their price too high.

First of all, let us just rule out pointless inventions like connected toilet paper holders to focus instead on actually useful products. Even when a product’s connected capabilities are actually considered useful, the price difference with the standard equivalent remains too substantial (see figure 1).

Is that reason enough to retire the idea of developing mass-market products with smart capabilities? Of course not. Some rare success stories attest to the fact that it is possible. But after the frenzy of the last few years, industrial companies now need to go back to the basics of product development: perceived value, cost management and time to market. The bottom line is, if you’re considering launching a smart device, be smart and place the device first!

However, we have noticed that smart capabilities caused issues in our clients’ usual product development process on three distinct levels.

The first problem is increased difficulty to assess with precision the actual perceived value for consumers to make sure that the development team is heading in the right direction.

The second lies in the need to rapidly acquire expertise in and assess new and unfamiliar technologies — electronic sensors, networks, etc. — during the development phase.

The last issue is the added complexity, which interferes with quality assurance and time to market. Industrial companies wishing to go in that direction will be meeting new partners and facing new challenges: online privacy legislation, data security, data management, application development, etc.

In short, there are three conditions to reach success:

- confirm the product’s perceived value as soon as possible;
- keep control over design and costs;
- adjust to a more complex ecosystem to keep your time to market goal.

Fig. 1 — Price difference between mass-market products and their connected equivalents

![Price difference between mass-market products and their connected equivalents](image_url)

1. Source: retail prices for similar standard and smart models found on various shopping websites in May 2017.
Jean-Baptiste Guillaume

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He is also responsible for modular design projects in a variety of sectors: household appliances, medical equipment, industrial roller shutter doors, shipyard compressors, etc.

Clients:

Partner

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Confirm the Product’s Perceived Value

The choice to develop a connected product can be justified by one of several distinct strategic goals, presented below in an Ansoff matrix(2):

<table>
<thead>
<tr>
<th>Existing product</th>
<th>New product</th>
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<tbody>
<tr>
<td><strong>Reacting to a new standard on the market</strong>&lt;br&gt;Example: roller blinds, with the growing prevalence of home automation.</td>
<td><strong>Pursuing breakthrough innovations</strong>&lt;br&gt;Example: connected watch offering a wide array of services beside time-keeping.</td>
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<td><strong>Reaching a more profitable audience</strong>&lt;br&gt;Example: connected pressure cooker with access to hundreds of recipes for twice the price.</td>
<td><strong>Introducing a diversification strategy</strong>&lt;br&gt;Example: connected activity-tracking bands by printer specialist EPSON.</td>
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Once the strategy has been decided and whatever the angle chosen, the first important order of business is to define in very practical terms what needs your product’s smart capabilities will be addressing, and to confirm the concept’s relevance as soon as possible.

Though broad market surveys are useful to draw the first outline of a project, the best approach is unquestionably to establish direct contact with potential consumers. Focus groups led by marketing professionals are an opportunity to put various hypotheses to the test in order to confirm your product’s (actual and monetizable) added value, and move past ideas that simply look good on paper.

In a market development situation (as defined by the Ansoff matrix: existing product / new market), the difficulty is learning to target new customer profiles with precision. Marketing professionals can of course seek the counsel of a wide array of specialised consulting firms.

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2. Matrix by product and market types (existing or new) to identify an appropriate growth strategy.
Confirming the relevance of a concept can prove quite challenging for experienced professionals used to developing standard products, especially when it comes to unfamiliar technologies and features.

At this point, conducting a PoC (Proof of Concept) can help solve this difficulty, while providing a chance to actually experiment with various options in terms of materials and software solutions — thus exploring user experience (UX).

For instance, one of our clients used an iPad to simulate the control panel of an air compressor, using a PowerPoint presentation to mimic the user interface. This inventive solution was an opportunity to have potential consumers test two concepts before any financial decisions were made.

The use and monetization of product-generated data is equally strategic and can take one of three forms (see figure 3):

- CRM: connecting consumer profiles with product uses;
- predictive maintenance: learning how to anticipate failures depending on how the product is used;
- Marketing analytics: studying product-generated data to produce useful indicators.

![Data monetization?](#)

**Fig. 3** — Benefit of data management on development process

Ultimately, the decision should also be guided by the following question: are profit and productivity increases superior to the total cost of developing smart capabilities (TCCA: total cost of connecting assets)? This is the second condition for success: keeping control of design and costs.
Keeping Control of Design and Costs

During a connected product’s (re)development phase, there are two main aspects that require careful consideration to keep costs under control.

The first aspect resides in the product’s new technologies (TCCA):

Electronics, software, network, data management, etc. The temptation is great to outsource architectural and technical decisions to an outside consultant offering turnkey solutions.

The danger is to find yourself stuck with a proprietary solution and miss the chance to evaluate all options available, which translates to a negative impact on direct costs, as well as associated management costs.

It is essential to take the time to conduct a comprehensive review of potential partners and technologies, taking into account the evolution of norms and formats, as well as the solution’s degree of openness.

For example, we could mention the choice for a low-power wide-area network (LPWAN), which offers several options, including the LoRa and Sigfox technologies, in addition to the LTE-M standard (heralding 5G expected for 2020).

The second aspect is related to defining your priorities between developing new features and cost management.

Many smart product development projects see their time to market uncontrollably delayed, which often leads project managers to take a safe way out and settle for expensive solutions. Direct costs should remain a key element of your reporting process, as is the case with any other industrial project; it is the beacon that will help collaborators navigate this unchartered terrain.

Aside from progress reports, and to avoid having to choose between minimizing costs and shortening time to market, efforts must be invested into keeping calendars, regardless of the growing number of stakeholders in your environment.
During the preliminary phase, experts can provide support on designing app prototypes or exploring User Experience in general, or even on identifying potential customers and organizing focus groups in order to define the product’s specifications.

During the development phase, the challenge is to integrate specialist technologies: sensors, software programmes and networks – a very broad and constantly renewed offering that will need to be assessed and integrated into the process (see figure 4).

During the rollout phase, different possibilities for challenging established processes can be used, from processing and updating data to integrating predictive maintenance, or even shifting your entire business model.

Adjusting to a More Complex Environment

The greater the number and diversity of parties involved in the development process, the stronger it needs to be.
Ecosystem of a mass-market connected device

1 – Sensors

- Optical
- Presence, proximity
- Electric, magnetic
- Position, speed, tilt
- Acoustic, sound, vibration
- Flux, flow, leakage
- Force, couple, pressure
- Temperature, humidity, gas, chemical
- Digital platforms: QR code, NFC

2 – Applications

Applications are designed by developers using APIs — Application Programming Interface.

- Developer
- API
- Connected device
- Application

3 – Connected capabilities

Different technologies depending on bit rate and range.

<table>
<thead>
<tr>
<th>Bit rate in Kbits/s</th>
<th>NFC</th>
<th>Ant+</th>
<th>Z-Wave std</th>
<th>Ant+ std</th>
<th>Zigbee std</th>
<th>Bluetooth std</th>
<th>WiFi std</th>
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Three measures can help you compress and manage your time to market.

01 Develop Brand New Planning Tools as Soon as Possible

Recipes of the past do not continue to work as complexity increases. Experience has shown that methods like Value Stream Mapping (VSM) can help the project team identify all of the project’s stakeholders and phases.

02 Involve Outside Stakeholders from the Very Beginning

This is a way to identify upstream and downstream parameters, as well as each phase’s duration and resources needed – all basic information for effective time to market management (see our December 2016 publication).

03 Conduct a Risk Assessment for the Project and Define Resulting Action Plan

A project combining new technologies, new partners and organizational changes is by definition riskier. However, risks can be identified and assessed early into the project, and those posing the greatest threats can be anticipated. Tools like FMECA can provide a very effective tool for this purpose.
In Conclusion

The few guidelines presented above constitute a healthy framework to ensure your project’s success, provided the market responds to your product. But this methodology, with a few minor adjustments, can also be used for developing connected equipment for a B2B market.

And this is precisely where connected devices will find the greatest potential. Pay-per-use, predictive maintenance, leasing, route optimization, logistics, etc. The possibilities are endless.

As a result, industrial companies have no choice but to start exploring how smart capabilities could impact their market, their business model and industrial processes, in order to anticipate future breakthrough innovations and strengthen their position.
Inter Action Consultants Provide Support Throughout the Development Process

01 Preliminary Studies

- Identifying and qualifying consumer needs and behaviours
- Conducting market surveys
- Defining and challenging business models
- Designing prototypes and testing concepts (UXD, product, etc.)
- Defining a data strategy

02 Development

- Designing to cost or value
- Identifying and picking competitive suppliers
- Communicating and co-designing with suppliers and partners
- Implementing a data management strategy (technologies, migrations, new corporate IT services, developing in-house data management tools, etc.)

03 Rollout

- Managing complex projects
- Compressing time to market
- Assessing and managing risks and defining corresponding action plan
- Monitoring and analysing results (reporting, etc.) + building predictive models (maintenance, costing, etc.)
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