A CONNECTED WORLD AND CONNECTED COMPLEXITIES

Basic questions you must ask before starting your smart connected product development project.

2020: Connected Chaos

Connectivity despite anything is everything. That is one way to describe our current world situation.

Organisations that are better connected, and who rely on connected product and services have fared much better in the scenario than traditional businesses. While we still operate in a physical world where goods and services are produced, stored, transported, sold, deployed, operated – for daily use, or to create more goods and services - connectivity adds a new dimension to it. And a connected world also lends itself so much better for physical isolation – a favourable contradiction.

More importantly connectivity helps organisations build differentiation and create new vistas of revenue through introduction of innovative business models, allows better customer centricity, enables better monitoring and control, and provides an opportunity for market expansion in an overtly service economy. And what is central to all this? Internet of Things (IoT) - a concept that relies on what some might describe as super-connectivity; one having the ability to know what you need to know regarding your business anytime and anywhere. And not just know, but monitor, control, optimize, and in some cases automate. A simple concept that can be extremely intimidating when broken down to its simplest components. The complexities relating to the choice of hardware and software, and the ensuing integration can all be exhausting. Before heading down this rabbit hole, let's go over a series of questions that can help you understand how to best approach this.

An Idea that Transcends

A quick search on Google about IoT will yield an immense amount of information covering Smart Homes, Smart Factories, Smart Cities, Smart Buildings, et el. While they can all be grouped together in these relatively straight forward categories, they may each use completely different technologies and yet they are all incredibly successful. Why is that? Because like a bespoke tailored outfit the best solution is the one that is built for you; and in some cases where it is available off the shelf it still requires to be altered to your requirements. How do you get through all the marketing materials, the unending webpages that all talk about IoT or the infinite possibilities/benefits? Focus on YOUR company, YOUR needs & YOUR vision.

Most of the people that we have spoken with regarding smart product development often ask two deceivingly simple questions: "What do we do first? Do we go for the hardware, the software or the desired integration to our internal systems?" Our answer is always the same: none of the above. The first set of questions must be "What does our company need and why?". What business challenge do you intend to solve or opportunity you intend to explore? For now, forget about software, hardware and related discussion. Focus on YOU.

▶ **Q1: What is the business imperative that made us investigate this? What is the business use case where we see the best returns, or which solves our biggest challenges?**

Business First

Now that we have the what, how about we focus on the why? We hear everywhere that IoT has the potential to bring and/or save billions of dollars. But how does it all fit into your scheme of things? Our colleagues commonly insist you assign it a metric. What formula, statistic or any other financial or operations number(s) best captures the value of this challenge for you? What KPI or ROI calculation justifies going after this? How often are the machines breaking down? How often are your employees calling in sick because of work related injuries? What is the recurring expenditure relating to warranties? How much is the opportunity cost of asset not performing to its capacity? How much money are you losing/not making? The first section helped us find a business problem, this makes sure that you quantify it.

While these questions seem straight forward, you would be surprised how often a technological hype instead becomes the main driver. Unfortunately, hype very rarely is a justifiable metric for any sort of investment. Another catch that we commonly see is the overextended business problem. This often happens when a good business problem and metric have been established, but the technological hype has expanded the project so far that it is no longer viable. Remember: focus.

- Q2.a: How do we know it is worth going after?
- Q2.b: What number are we trying to reach?

Stick to Your Guns

Now that we now know where it hurts and how we can measure the pain. Or what would work and the value we ascribe to it. With everything going it is easy to get lost in all the alphabet soup of technical terms: 5G, I4.0, IIoT, LoRa, ML, DL, AI, BLE, GPS, edge compute, edge orchestration and the list goes on and on... Trying to understand everything regarding the intricacies of IoT platforms, communications protocols, securities protocols and integrations processes will certainly hinder your efforts. Worst of all, it may discourage you. This is the step where most projects are dropped. At all times what you are definitely great at is your own business, your core competency. And it is better to stick to that core and get technology insights from the experts.

- Q3.a: What are our current strengths we can build upon?
- Q3.b: Do we have any preferences towards a specific technology? Why?
- Q3.c: Does it help us achieve our future goals, consistently?
- Q3.d: Does it protect our investments in the legacy technology / applications?

The Right Vision and the Right People for the Right Job

Once a measurable business use case is framed and the likely technology direction is identified, it is relatively simple to put the other pieces in place. Each of these projects requires the hardware to monitor and control the asset, the software to in turn capture, aggregate, transfer, store, and act upon the information, and the expertise to link the systems to your asset or operations. Now it is time to find the right person or the right group to make all this work seamlessly and to meet the business vision and goals. Are we looking for skillset for a specific project only or for the upcoming future projects as well? Do they meet your long-term vision?

The words scalable are easily said, not so easily upheld. Many projects eventually transform or evolve, into something more. And hence it is imperative to have a comprehensive long-term vision. A tracking project that starts off with handling indoor heavy equipment may turn into a worldwide asset tracking system. A machine monitoring system that deals with daily operation can transform into an AI based system for predictive maintenance or further extend to prescriptive applications.

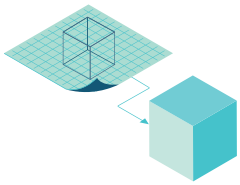
It is ok to start small and simple; it is equally important to have the larger picture in mind at all the times.

- Q4.a: Do we have the resources to undertake this task in-house?
- Q4.b: Would I like to develop that expertise internally?
- Q4.c: Who can we partner with to meet our goals effectively?
- Q4.d: Am I planning on exploring Artificial Intelligence technologies in the future?

Together

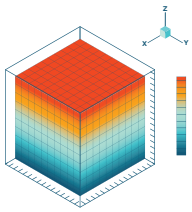
It takes an integrated approach beginning with understanding the business use case and keeping that central to any solution. From concept design and product engineering to software development and building a mechanism to facilitate communication with the asset, everything must encompass the bigger picture. Organisations need a toolset that has an open architecture, that fits into their existing framework, and has capability to help them build and deliver scalable solutions to their end customers.

1 Product Design



CAD Studio
Generative Design
Rapid Prototyping

2 Product Engineering

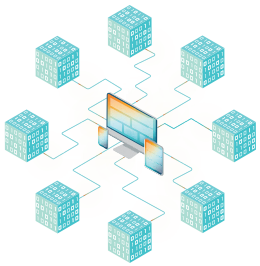


EM Wave Simulation
Electric Motor Simulation
Topology Optimization
PCB Simulation
Manufacturing Simulation
Motion Simulation
MBSE/Multi-physics

3 Embedded Development

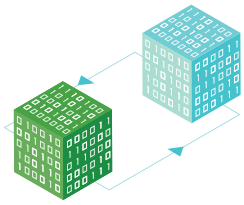
Embedded IDE
Code Generation
HIL Simulation
RTOS
Edge Orchestration

4 Software Development



Device Management
Data Storage
Stream Processing
REST API
User Access Control

5 Continuous Improvement



Real-time Dashboards
ML Model Training
ML Pipeline Deployment

Real innovation is all about creating unique value. It doesn't matter if you're focusing on B2B, B2B2C, or B2C. In the end your customers are willing to invest in what solves their toughest challenges, improves their revenue, and/or creates an outstanding experience leading to end customer retention. "Why?" is the key question that puts the customer in the center of all the efforts. It is about understanding your customers leveraging real operational data, allowing for easy customizations, and improving their user experience.

Learn more on everything you would want to know about **Altair Smart Product Development**.

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