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INDUSTRIAL DESIGN CONSULTANCY

Six Keys to Successful Product Development

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Avoid cost and pain while delivering results.

Developing a new product can be an expensive and potentially complex process. People new to product development frequently ask “How long and how much does it cost to develop a product?”. The answer is that it depends on the product. Simple products can be developed in a matter of months. On the other hand, development of technically complex or mass produced products will frequently run into years. Many products will also need to comply with significant regulatory standards.

Poorly run development projects can overrun on cost and time and may ultimately have to be aborted with a large financial and opportunity cost. For small businesses and start ups this can threaten the future of the whole company. According to a detailed study by Castellion and Markham, around 40% of all new products that are launched end in failure (ranging from 45% failure in consumer goods down to 35% in healthcare). Of course, many projects may be abandoned before launch. So, before embarking on the development of a new product, it is important to understand the process and the potential pitfalls. From our experience of hundreds of development projects over 45+ years spanning a wide variety of industry sectors, we’ve picked out six key points for you to help steer you towards successful product development projects.

- Stephen Knowles, MD

1. Start with your PRS

The Product Requirement Specification (PRS) defines everything about your product. It is probably the most important document for your whole development as is involved from the beginning to the end of the development. It's obviously very important from a regulatory point of view but it is also vital from a commercial and practical point of view. In a poll of product development professionals carried out by IDC, changes to the product specification was the top cause of project delays. Therefore, getting this right, agreed across the business and sticking to it are all critical to enabling the rapid development of a successful new product.

A typical detailed PRS is likely to include the elements listed in the following table. This should serve as a starting point.

To create a complete and comprehensive product requirements specification can require significant time and effort. Much of the detailed information required is not going to be fully known at the outset so when completing the first versions of the PRS, it is important that requirements or details that aren't known are marked as not known or provisional, rather than a guess or a requirement omitted. The PRS is a document that continues to evolve and develop as the product development programme progresses so this creates a dilemma: If getting a clear PRS is so important, how can a business feel confident to start a project before all the requirements are known? The answer is to get enough clarity to allow the key decision to start the programme. The purpose of the PRS in the early stages is to create a clear target of what the project should achieve and therefore the focus should be on defining the key commercial and technical requirements such that the initial PRS should give everybody a clear vision of what the product to be developed will achieve. At a high level this should be able to be summarised into one or two sentences. A key part in getting that clarity to proceed comes from eliminating risk and having a plan.

The table below is by no means a full product requirement specification, but the example questions listed offer an idea of some of the aspects to consider.

Functional	What must it do? What is the performance level needed? What features? What is the product life?
Physical & Visual	What size, weight and shape? What colours and branding are required?
User	Who are the users? What skill, knowledge or impairments do they have? What age? How do they interact with it? Why do they want it?
Environment	Where will the product be used? What will be the temperature and humidity range during use? What might the noise conditions be? Must it withstand drops, vibration, water, etc?
Safety & Regulatory	What standards apply? What is the pathway for regulatory approval? Are any trials required?
Commercial	Which markets will it be sold in? What is the route to market? What are the manufacturing, distributor and end user prices? What are the realistic sales volumes?
Intellectual Property	What patented technologies do competitors have? What are the key patents to avoid?

At IDC we use the following method to check that there is a clear vision and purpose to the development:

"If we make a ***device*** that ***these users*** can use to perform ***this function*** with ***this benefit or performance level***, that can be sold profitably at ***this price***, and can be available in ***this market*** by ***this time*** then we know we can sell ***this many units***"

An example of this would be the recent IDC development of the Protean injection pen. During the course of the development, the PRS became a very comprehensive document detailing all the requirements for the product but at the beginning the requirement was expressed as below.

"If we make an injection pen that patients with type 2 diabetes can use to daily self-inject diabetes drugs with the equivalent performance of the existing market leader and avoids infringing competitor patents, that can be sold profitably at X% below the price of the existing market leader and can be available in the US market by 2022 then we know we can sell between 1 and 5 million units per year."

This gave all the stakeholders and team members a clear vision of what the project would achieve and, in our experience, has proven to be a really effective way to identify any big unknowns that could pose a risk to the project.

2. Make a detailed plan

Making a plan for the project stages and activities is critical to estimating two of the most important elements for the commercial success of a device development project. These are:

- How long will it take?
- How much will it cost?

Knowing these is critical for assigning investment and making business plans around the development and once the project is live enables the project to be carried out efficiently. Making a realistic plan requires an understanding of all the activities that need to be carried out in order to bring a product to market. At IDC we have a four-stage development programme which acts as a top level framework for planning new developments. The four stages are Explore, Create, Define and Deliver.

Experience of similar developments can be used to give an overall range for the budget and timeline for the development of a particular product but, invariably, the projects we see tend to have their own set of challenges and require a specific project plan tailored to addressing the unique requirements of each development. A detailed list of tasks and a development timeline in the form of a Gantt chart is the standard format for the project plan.

3. Identify the high risk elements

Uncertainty equals risk, so in order to reduce the risk it is important to identify any areas of uncertainty and get answers as early as possible in the project. One way to do this is to ask the following questions:

“What things do we not yet know?”

and

“What are we planning to do that is different from what is already commonly done?”

As an example, several years ago we were asked to design an ECG heart monitor for consumers. We started by looking at the clients’ vision for the project. Putting this in our top level vision statement gave us the following:

“If we make an ECG heart monitor that consumers aged 45+ can use to check their heart health with [features to be defined], that can be sold profitably at [price to be confirmed], and can be available in UK and Europe market within 18 months then we know we can sell X units per year.”

This raised a number of questions:

- Are we certain that our target users want a device to do this job?
- Would they prefer to go to a GP?
- How much are they prepared to pay for such a device?
- How easy is it to diagnose heart problems from an ECG?
- Is the technology capable of doing this?
- What is the market size?

So rather than start designing, the first phase of work was focused on answering these questions which naturally led into a research programme with target users and healthcare professionals.

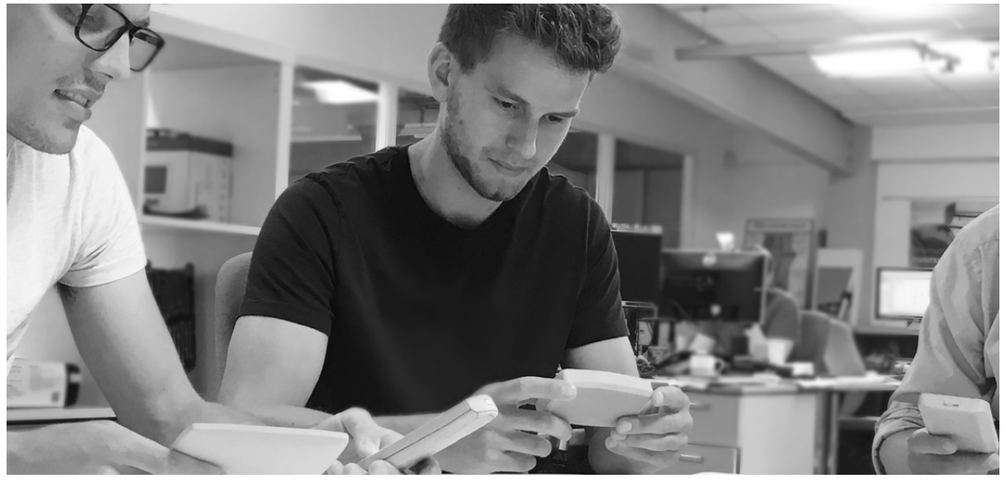
The result was that the technology at the time couldn't reliably diagnose heart problems without a high risk of false alarms. The research identified that users didn't feel confident interpreting ECG data themselves and therefore anyone with a concern about their heart wanted the support of a professional rather than buying a device and managing it themselves.

Consequently, we advised the client not to go ahead with the development. For the injection pen projects the biggest challenge was avoiding competitor IP so the first activities were patent searches and reviews. For the video laryngoscope, the key risk areas were a combination of user, technical and cost based: can we get a high quality video image of the intubation from a camera in the tip of the device to a large conveniently located screen on the device. Consequently, the first phases involved electronics research and making mock ups and prototypes to test with clinicians. Once these were approved, the full design and engineering development could begin.

4. Define the ideal user experience

Product development always involves compromise. In order to make the most successful product possible, we believe it is essential to define the ideal user experience. We know that because of commercial or technical limitations, the ideal user experience may not be achievable. However, by defining the ideal, we can understand the elements which negatively impact the user experience and ensure that we get the best possible user experience within the constraints of manufacturing processes, technology, cost and regulations.

This applies throughout the development as decisions about necessary changes are always done keeping in mind what is best for the user. Taking this approach has long term benefits too. Technologies develop and become cheaper over time. Even hugely successful devices get replaced by newer, better versions. Keeping a picture of what the best possible product might look like allows you to identify the opportunities created by new technologies, materials or processes to rapidly create the next innovation in the market.



5. Don’t squeeze out time for quality

Some development projects can take years to get from kick off to market approval and launch. Reducing the time to market can create competitive advantage so there is always pressure to go faster and reduce development timescales. New product development cycles can be compressed but it is important not to squeeze out the time to deliver something of real quality through robust creative thinking.

The concept generation stage is where the product takes shape and new innovations and value added features are created. It is important to allow time for the designers to uncover the real user needs, define the ideal user experience and create designs that address these needs in the best possible way. This typically takes place in the first month or two of the project and sets the direction for the whole development. Rushing this and making poor decisions or missing opportunities has implications for the rest of the project and the whole life of the product. To accelerate the development, some other activities can happen in parallel and once there is an agreed product vision and design concept, then the development can proceed at full speed. This brings us to the final point.

6. Create a team focused on delivery

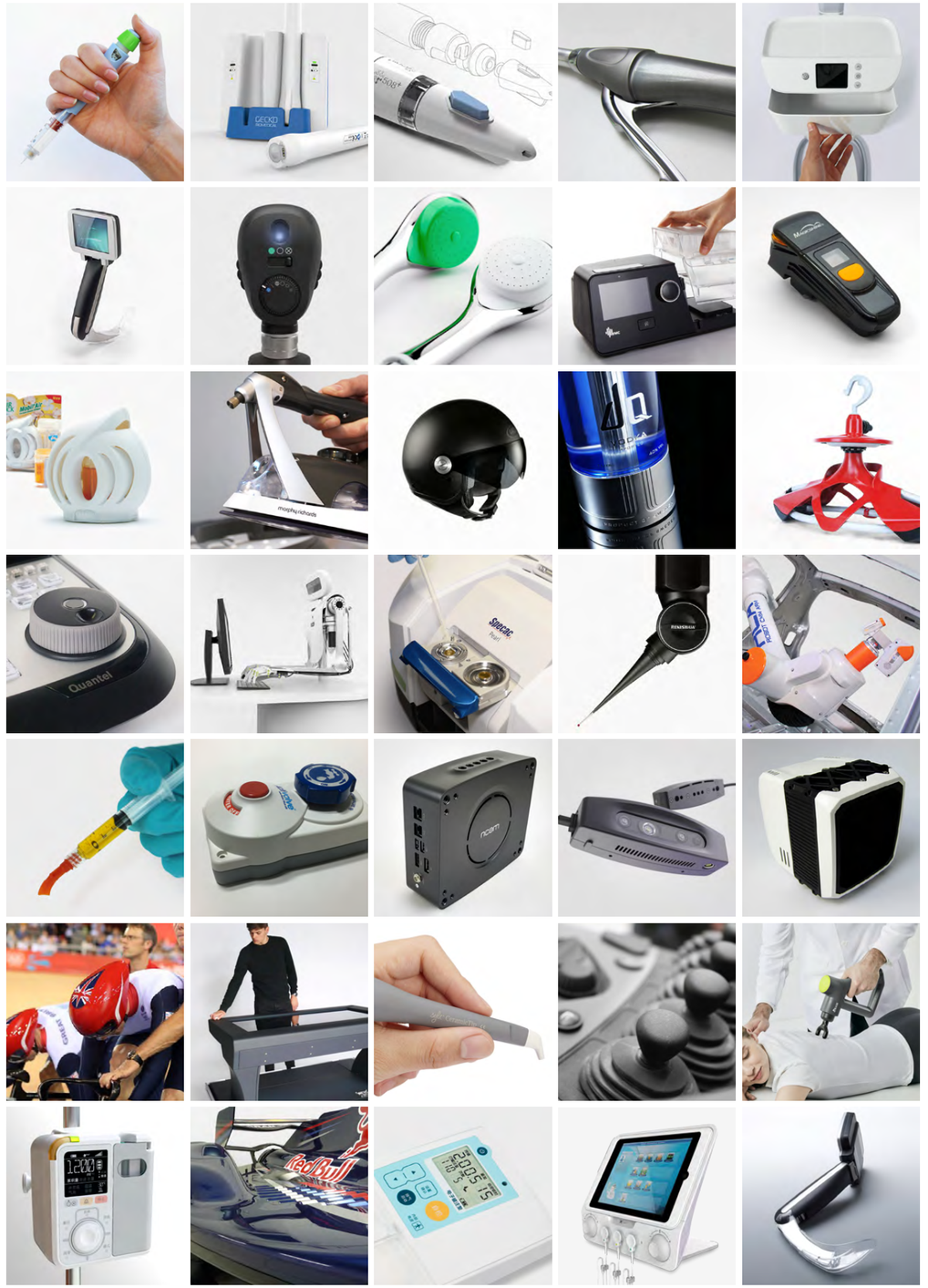
Once the product vision is defined, the risks are understood and mitigated and the design concept visualised and selected, then all stakeholders should commit to the development plan and delivering the agreed product. At this point it is essential that all efforts are focused on all the activities that need to be completed before the product can be launched.

The project plan should be revisited and updated on a regular basis and potential causes of delay identified and mitigations planned. Delays to decisions are a very common problem, particularly in corporate environments where scheduling a meeting which all stakeholders can attend can lead to a delay of several weeks. Pre-scheduling meetings months in advance or assigning deputies can limit such delays.

At this stage, it is important that the project becomes the sole focus for the key members of the team responsible for driving the project forwards. Staff with other day to day activities will invariably get pulled away from the project causing inevitable delays. It is in these stages that it can sometimes be possible to accelerate the plan by adding additional team members. Ideally, these should also be solely focused on the new device development.

If problems with the development do occur, a dedicated team focused on delivering the project vision will be more committed and better able to create a rapid action plan to resolve the difficulties. A dedicated and motivated team can achieve more in one year than a disparate and distracted team would achieve in two.

It is for this reason that brands use external specialists like IDC to create the dedicated and focused team to rapidly develop their innovative new products.



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IDC is an international product design consultancy with 45 years' experience developing breakthrough products for world-leading brands.

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