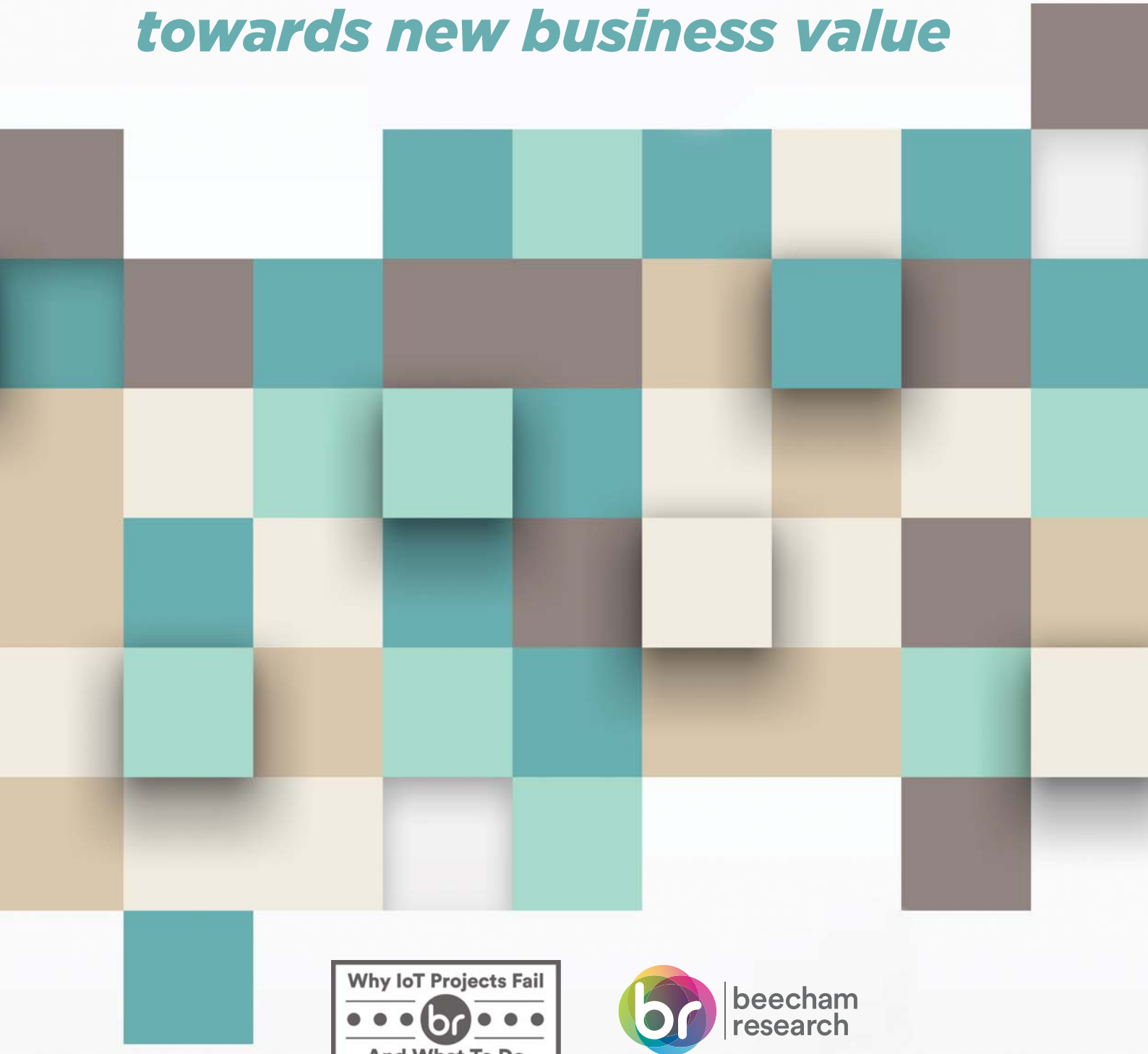
INSIGHT REPORT

Why IoT projects fail: towards new business value



Why IoT Projects Fail
And What To Do About Them

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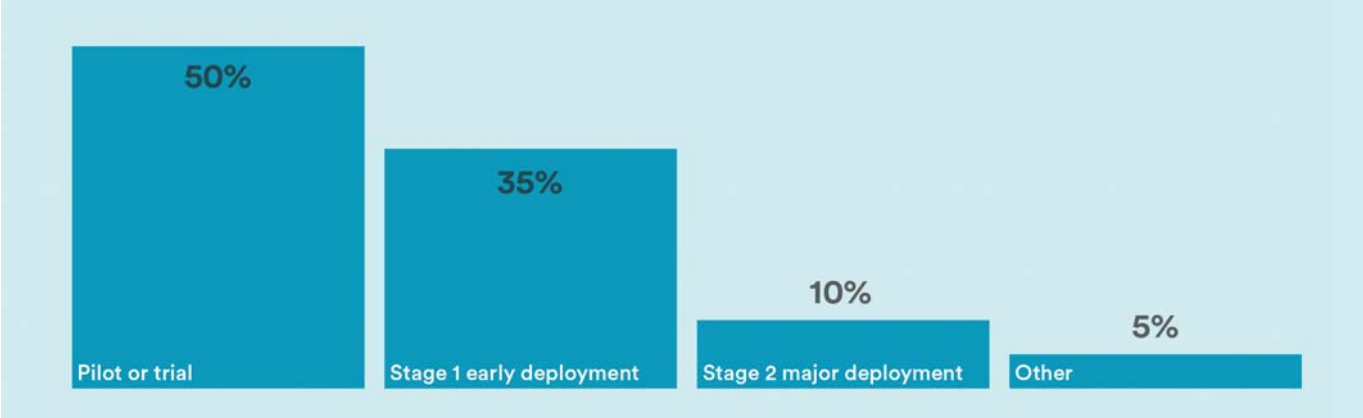
Robin Duke-Woolley,
Beecham Reearch

Beecham Research's 100+ page report 'Why IoT Projects Fail' is available for free download at **www.whyiotprojectsfail.com**. It is full of research identifying the reasons for IoT project failures.

74% of companies consider their IoT projects to be unsuccessful*

IoT projects are being reported by their owners as unsuccessful and this is hampering efforts to move deployments forward. Beecham Research has recently published an in-depth study to understand why failure happens and what to do about it. Here, Robin Duke-Woolley, the chief executive of the research firm, shares some of his findings

Figure 1: At what stage was your IoT project?



In our research, we investigated industry sources and numerous surveys conducted by leading IoT companies. These surveys highlighted reasons for IoT project failures – an issue of prime importance to IoT adopters, typically enterprise users, who are investing increasing amounts in IoT and need to see the benefits of those investments, as well as vendors and solution providers who assist adopters in bringing IoT projects to successful fruition.

In addition, Beecham Research's own survey of enterprise users was drawn from a base of 25,000 IoT adopters and buyers. This survey yielded a split between those IoT projects considered to have been successful (42%) and those considered to have been unsuccessful (58%), which provided a basis for direct comparison.

This Insight Report details some of the key findings from our survey of enterprise users, then relates those to creating new business value and the data required to achieve this.

Survey – overall view

As shown in **Figure 1**, 50% of the IoT projects assessed were pilots or trials – proof of concept (PoC) projects – with a further 35% being Stage One early deployments. It is certainly the case that project failures overwhelmingly occur in early deployments, so this is consistent. This also helps with the definition of 'project failure'. A PoC that fails may not be the end of the story – it may be the start of a continuing thought process within a company that ultimately leads to a successful project. On the other hand, a failed PoC may lead to the company deciding not to proceed at all in spite of potential benefits downstream. Other factors related to success or failure then come into play, such as management, funding and technical resources.

The purpose of the survey was to investigate potential differences between IoT projects considered by their users to have been successful compared with those considered unsuccessful. Of the total sample, 42% considered their IoT ▶

* several research sources

Figure 2: How successful was your IoT project?

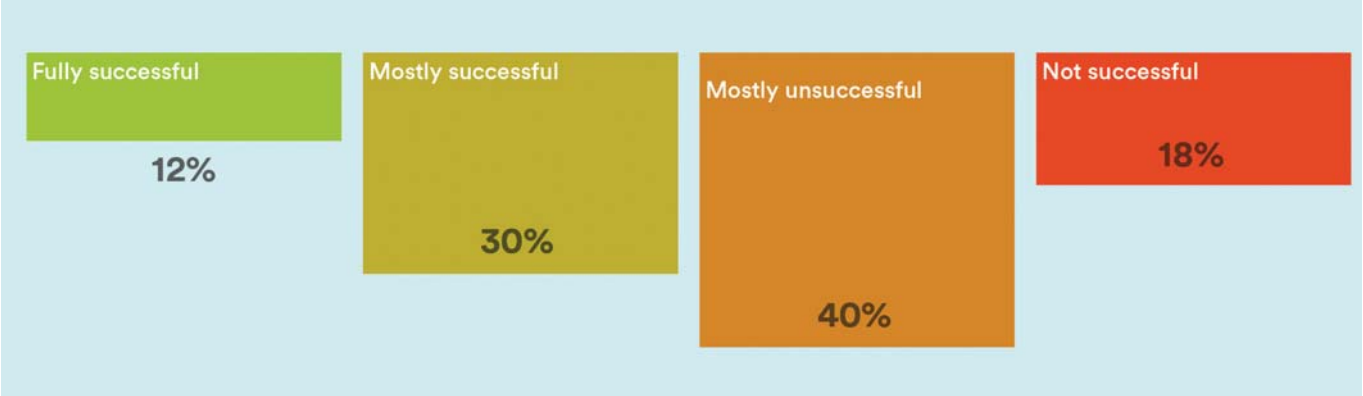
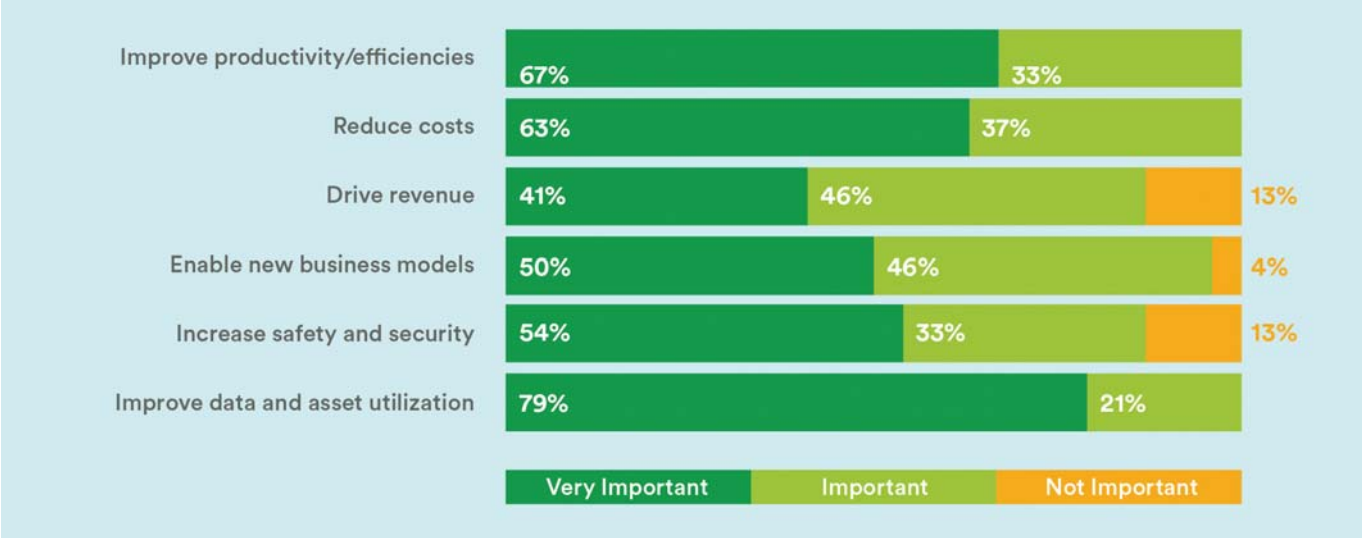


Figure 3: How important were these criteria to your IoT project's success?



projects to have been either fully successful (12%) or mostly successful (30%) while 58% considered their IoT projects to have been either not successful at all (18%) or mostly unsuccessful (40%). These results are as shown in **Figure 2**.

We noted throughout the research that users are generally considerably more inclined to discuss success rather than failure – a somewhat natural human trait. Nevertheless, 58% of our sample were prepared to identify project failures. We therefore consider it highly likely that the real rate of failure in the market is considerably higher and may well be in the region of 70%.

Business outcomes not thought out

Figure 3 measures the importance of potential success criteria chosen by respondents. While health and safety is of primary importance for all employers, IoT projects are seldom initiated mainly to improve this. Instead new regulations may require the introduction of new applications which in turn then require new business models in order to operate. An example is the introduction of smart metering in many countries. Others include environmental and pollution monitoring, often associated with smart city projects. The introduction of autonomous vehicles, including driverless cars, will also have a significant impact in this area.

The starting point for IoT projects should be an understanding of the required business outcomes. we will return to this later – see the fulfilling business outcomes section later in this report.

For many IoT adopters, the starting point tends to be cost savings, as these are easiest to measure and justify in terms of return on investment (RoI). They also tend to require the least changes in organisational deployment. Enabling new business models and driving revenue, on the other hand, may require the introduction of new business processes or even changing a company's offering from essentially product-focused to service-focused.

Enterprises embarking on IoT projects for the first time may not appreciate the full promise of IoT for unlocking new possibilities, use cases, business models and so on. IoT implementations beyond PoC are characterised as a first step by the large amounts of network connectivity which are required to provide the data to a central point for subsequent processing. Such connectivity – in particular wireless connectivity which dominates IoT connections – requires the correct selection of connectivity type for the use case required. This element is also covered in more detail below as part of the business outcomes section. Complex architectures for aggregating and pre-processing of data at the edge may also be required. Implementors may also not have initially understood the complexity of IoT solution components and how these interact.

As part of the research, Beecham Research also conducted interviews with solution providers, since those who provide IoT solutions have a very different perspective to enterprise users. These listed unclear business objectives or outcomes as

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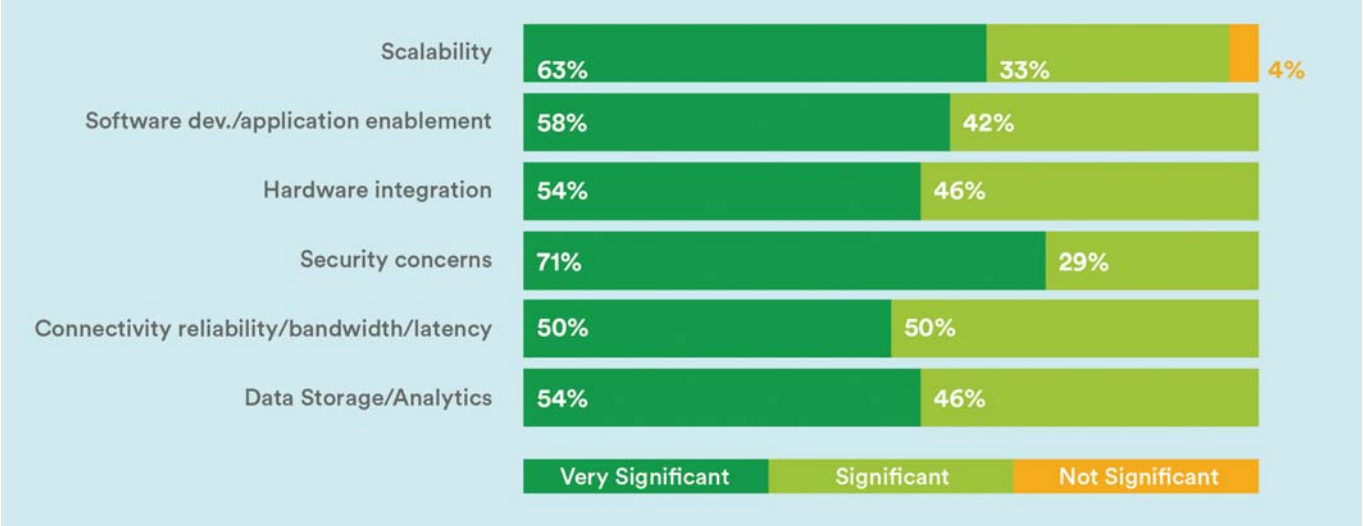
Figure 4: How significant were these technical challenges?



a major reason for project failure, often not understanding what the project needs to deliver in order to meet the business objectives. Other respondents saw the problem as some businesses wanting to be seen as embracing technological developments for the sake of keeping up with market trends, without understanding the implications for getting IoT to work. A full 96% of online respondents viewed the clear understanding of the business results desired as being important or very important. The same number also viewed having senior management involvement, sufficient financial and technical resources as very important or important.

Following inception, there was no view of how an IoT programme would develop and go forward. Projects may run on for several years before the management recognises they are bound for failure and should be cancelled. Solution providers typically advise that projects should start small and be testable at the early stages.

Technological problems not foreseen

Figures 4 and **5** then explore the significance of technical and business challenges in successful projects. From a technical perspective, security represented the most significant challenge. Security has consistently scored highest among concerns for enterprise users over the last five years, so this is not a surprise. The need for end-to-end security across the whole IoT solution means that, as these solutions develop, the security to go with them must also continue to evolve – it is not a one-off activity – and this is inherently challenging. The second most significant technical challenge was then software development, followed by scalability. Scalability when moving projects from PoC to initial implementation is often identified as a key challenge – a project catering for a few connected devices represents a completely different challenge when grown to several thousands or tens of thousands of connected devices. This is also closely related to software development, where solution platforms have initially not been designed with scalability in mind and then need to be completely redesigned for a larger implementation.

Our research showed that the complexity of the connectivity part of the solution is not always understood. In our online survey, all respondents identified connectivity – coverage, reliability, bandwidth, latency – as posing significant technical challenges.

Customers accustomed to setting up wireless networks are often inclined to believe it is a simple matter of plug and play, not understanding that wireless devices were not designed with IoT in mind. Scaling networks from 100 sensors to hundreds of thousands is not straightforward; different technologies may be needed to ensure scalability. In addition, networks may be located in hard to reach areas, far flung geographical locations where it is not easy to find wireless support. For example, for a logistics company included in our research, success in its nationwide monitoring project was not achieved simply because of the lack of rural wireless coverage in the country. Not being able to collect the right data at the right time led to project failure.

One interviewee relying on cellular networks highlighted the lack of one universal worldwide network, hence agreements must be forged with several mobile network operators (MNOs) to achieve full coverage. The alternative is an embedded SIM (eSIM) approach with a connectivity provider who has worldwide coverage through multiple MNO agreements.

Company organisational issues

Regarding business challenges, the most significant was identified as organisational – having sufficient expertise, followed by keeping the project to schedule.

On the whole, the more difficult challenges are most often business and organisational related, on the basis that technical challenges can often be overcome given sufficient time, budget and technical ingenuity.

Different mindsets between different business units within an enterprise embarking on a programme of IoT projects are cited as factors inhibiting progress. For complex projects involving more than one business unit or department, resistance to change by some parties inhibits operations. Some first time implementors are also unable to integrate new IoT practices with older working processes. Respondents rated the organisational issues of integration between technical, managerial, and other groups and working with ecosystem partners as critical factors for success.

Customer/vendor problems

Customers may also be disappointed and led to have unrealistic expectations because of vendor claims and market hype for a particular technology.

Our research found that many customers began by developing their IoT project in-house, then turned to solution providers and consultants for help when these failed. Customers also need guidance on getting the motivation right for the project and getting a clearer picture on feasibility and expected return on investment.

Our research with live interviewees and online respondents echoed the published surveys' views that insufficient IoT skills contributed to project failure. In our online survey, 96% of respondents cited sufficient expertise as being significant or very significant to project success.

Figure 5: How significant were these business challenges?

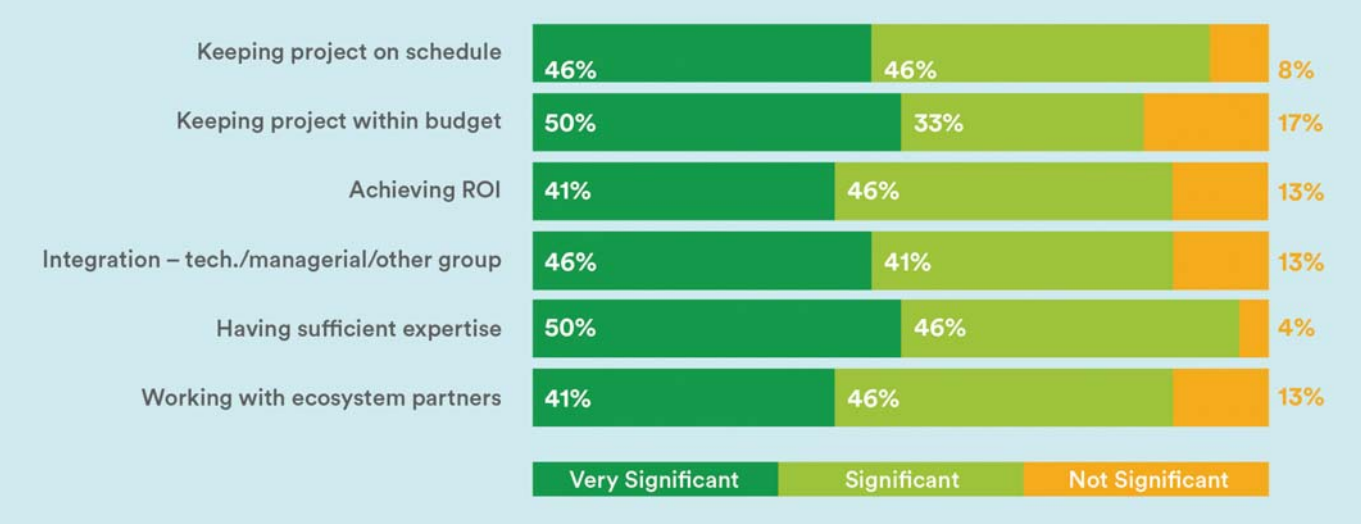
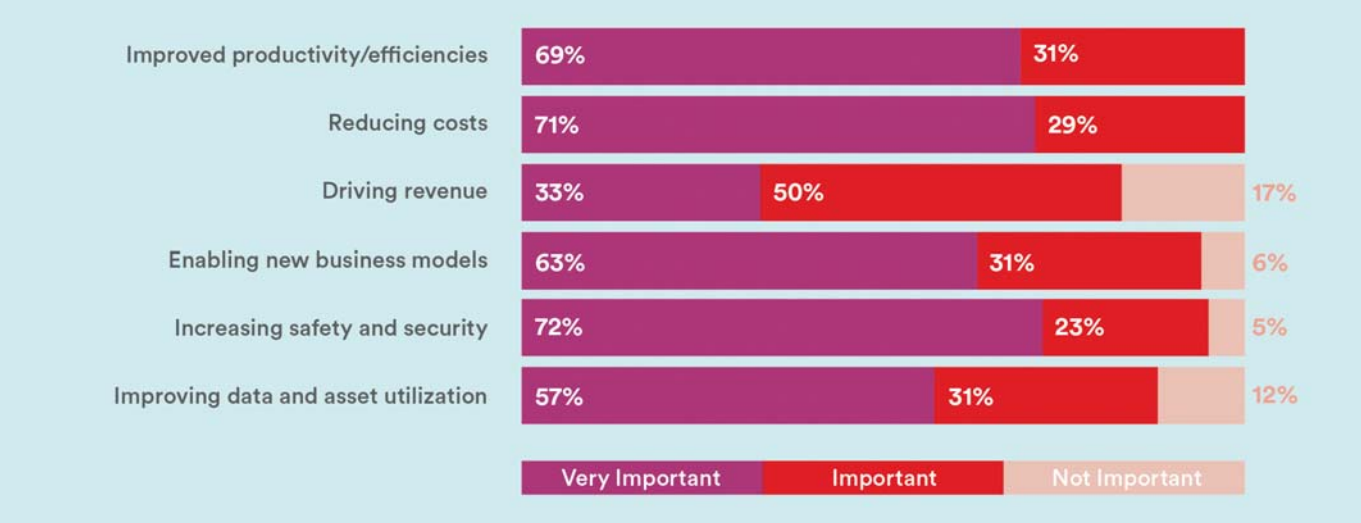


Figure 6: How important were these project objectives?



By contrast, in one case, the enterprise users were disappointed in their third-party advisors, saying that they had been misadvised; they then developed a solution themselves which worked.

58% of the survey sample considered their IoT projects to have been unsuccessful. While **Figure 6** shows the project objectives were similar for this sample compared with those for successful projects shown above in Figure 3, the outcomes were distinctly different. **Figure 7** shows the extent to which project objectives were achieved and it is evident that only increased security and safety scored highly for this. As noted earlier, although important this is not usually the main reason for introducing an IoT solution and in fact achieving improved productivity and reducing costs were considered the two most important objectives by this sample. It is also evident from Figure 7 that these were certainly not achieved by the majority. The score for enabling new business models was especially poor.

Fulfilling business outcomes

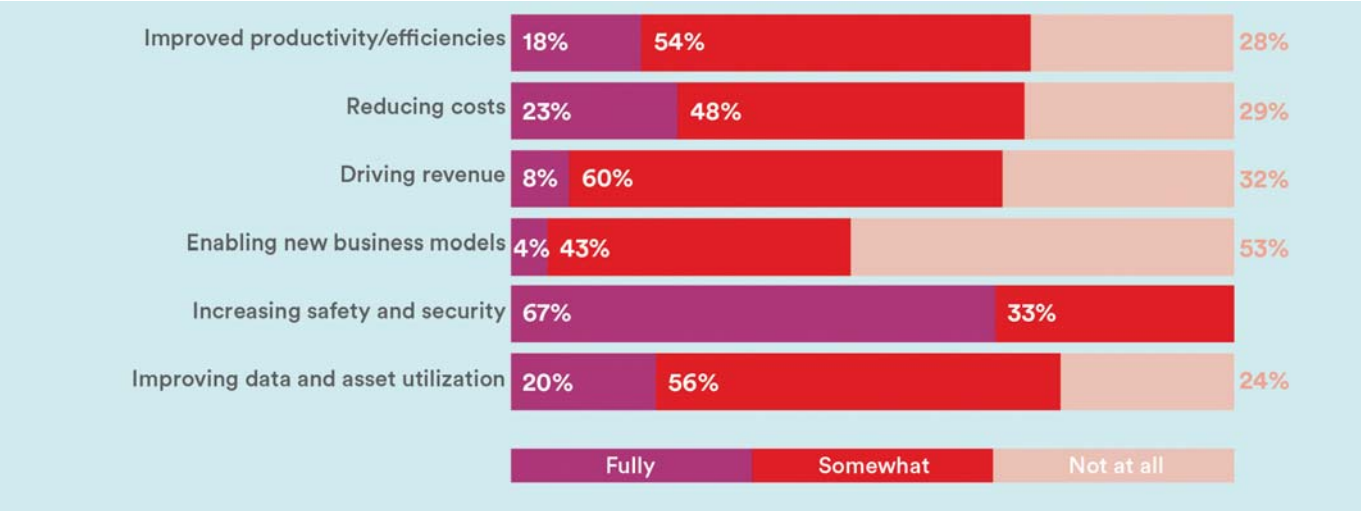
As noted earlier in this report, business outcomes are often not thought through for unsuccessful projects. One aspect of this is not collecting the right data for the business outcome to be achieved or failing to be able to collect it. This then relates the issue closely to connectivity, which we have found to be an often-ignored component until the latter stages of a project.

There has been a perception growing up in the IoT community over the last few years that connectivity is a commodity, with no problems left to resolve. This is frankly dangerous nonsense.

The data that is really needed to fulfil a business outcome may be very difficult to find and then also very difficult to collect at the right time and in the right place. The more unique the data is to its required business outcome, the more likely it is to prove challenging to collect it. We can take as an example a logistics company detailed earlier in this report. The company tried to create a national service relying on timely service data being made available as needed through public cellular networks. This turned out not to be possible from remote locations and the service failed. How much more difficult is it to guarantee 100% cellular coverage in all countries required for an international requirement?

Coverage is not the only issue related to wireless connectivity that matters. Wireless connectivity is now fundamental to the growth of IoT – without it there would be virtually no IoT growth at all. Yet wireless connectivity is subject to a range of parameters that make any particular type viable or non-viable for any particular application. Are the locations remote? What data rate is required? Over what distance? What local power is

Figure 7: To what extent were they achieved?



available? What latency is acceptable for the data? What security is required? These and many other issues often need to be designed in to the IoT solution at the start to avoid potential failures later. In other words, wireless quite often requires a high degree of customisation and pre-planning and this is always going to be the case.

Conclusion

A main difference between the online survey samples was use of in-house versus external resources. A full 57% of unsuccessful projects relied more heavily on in-house resources while for successful projects this was 36%. On the other hand, 49% of successful projects relied more heavily on a mix of in-house and external resources, while only 17% of unsuccessful projects did this. This finding suggests that a focus on in-house resources only is less likely to achieve the results sought – a combination of in-house and carefully-chosen external resources is more likely to yield success.

A balance is clearly required to ensure such arrangements are cost effective, but a rough split appears to be that external resources are focused more on technical challenges and internal resources on business challenges. Some overlap is clearly required to create an integrated project approach.

Compared with IT systems deployments, IoT implementations increasingly involve an ecosystem of external partners. Progress can be inhibited if advancement in one part of the ecosystem is not matched by similar development in another. For example, as the use case of a container port shows, while some container ships have modern technologies, the land side of the port is still labour intensive, relying on manpower and not used to automated data collection. This may require additional ingenuity on behalf of the solution provider or system integrator to create a suitable solution.

On the whole our research found that the majority of IoT project deployments are at a relatively early stage. This is to be expected with the substantial year-on-year growth in the market and there are many IoT adopters who consider themselves to be at the innovation stage.

Customers may not always have a clear view as to how to define the success of their project or may change their view as the project progresses. For user organisations, IoT successes for now appear to be measured in terms of solving short term problems, such as making some savings, creating new types of networks that can be monitored for the purpose of predictive maintenance, improving some operations and so on. Interestingly, the finding from our online survey that commonly aimed for outcomes – improved efficiencies, reduced costs, new business models, increased security and improved data and asset utilisation – were not fully achieved. In fact, between 30% and 50% believed that these IoT project objectives were not met at all.

While successes to date tend to be limited, those users we interviewed directly did have a good idea of what their challenges – both business and technical – were for making future progress. Implementors realise that they must continue with utilising the lessons learned – there was little indication of giving up on IoT altogether . . . at least for the time being. ■

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