

THE GAP BETWEEN IDEAS AND DELIVERY

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ABSTRACT (500 WORDS MAXIMUM)

The problems are well known. The solutions are well described. There are multiple technologies available which are meant to aid in solving these problems. Yet we do not have widespread solutions in operation. There is a gap between solution ideation and solution delivery.

Why is this?

Using a case study of wireless, low-powered sonar sensing to monitor stormwater overflows, Downer has developed insight into the gap between solution ideation and solution delivery. This case study covers over 12 months of development in the water and Internet of Things (IoT) space. Sonar sensors have been deployed in a variety of environment types as mechanism for alerting to overflows, tracking flows for resource consent monitoring and identifying diurnal flows.

However, it is the lessons learnt during this project which is the focus of this paper. This covers the learnings around determining technical requirements for solutions and how that is underpinned through collaboration.

KEYWORDS

Technology, management, process, change, Internet of Things (IoT), collaboration

PRESENTER PROFILE

Roselle has a background in counselling and social change initiatives. She has been at Downer four years and worked across bid management, contract management, quality management and now focuses on technology and innovation. She firmly believes in the importance of developing the skills and knowledge of the workforce in order to take advantage of technology. With a Bachelor of Social Sciences, Bachelor of Management Studies, Post Graduate Diploma in Business & Administration, Masters of Management Studies and is completing a second Masters in Business Studies she has accepted that she will always be studying something although hopes to find cheaper programs to study in the near future.

1 INTRODUCTION

Downer has been working with clients around New Zealand and Australia to find better ways to manage assets and optimise asset management and network decision making.

Throughout this process we gained insight into how to determine the technical requirements for technology deployed in the field as well as the new ways in which solution delivery is achieved.

It is easy to reflect back and make sense of the stages that the development has been through, and have a sense that these were planned out from the start. To some degree this is true, but there is an extensive amount of adjusting that goes on along the way.

The following is a reflective commentary of the lessons learnt along the way.

2 THE CASE

2.1 BRINING THE PLAYERS TOGETHER

The beginning of the journey is marked by an ideation forum which brought together a range of users, technology providers and clients to discuss ways of working together. This event marks the convergence of the three main players.

The technology player put forward a low-powered, ultrasonic device which has the ability to measure distance at set intervals for extended time periods. It does not require an external power system or solar panels.

Clients discussed flood events that caused devastating damage and were costly, both in terms of immediate response and damage done.

Users, in this case, Downer as an asset manager and service provider to the clients, expressed a need to be proactive not reactive.

With these three components on the table the idea of sensors in manholes to identify blockages, though rising water levels, providing advance warning was developed.

2.2 THE FIRST ROUND OF IDEA DEVELOPMENT

Project funding was acquired through a development fund. This enabled several devices to be deployed and for initial data collection. This first round of development enabled the technology player to begin to understand the 'real world' challenges of deploying technology. It resulted in the first determination that the technology worked and provided a particular service. There were many ideas for further development – but this gave rise to the questions:

- What specifically do we want the device to do?
- What are the different requirements of each player (technology provider, client, and contractor)?
- What does having this data mean for our clients?
- Who is willing to pay for this solution? And, how much are they willing to pay?

2.3 IDEA EXPANSION

This phase sought to answer these questions. Downer worked with clients to understand their interest in this solution and how they might apply this to their business.

The bulk of the work of the last 12 months has concerned this phase. Devices have been installed across a variety of locations, aiming to understand different use cases.

The same device has been used for alerting of levels in manholes, identifying diurnal flows, and tracking flows in sand filters for resource consents.

This phase identified different use cases for the technology. These subtle changes in the use of the device, have an impact on how the solutions are delivered. There is intelligence built into both the device firmware and the software supporting the device. Each use case adjusts the needs for how the smarts are structured at each of these levels.

2.4 APPLICATION

Testing across a variety of locations has highlighted both technical limitations and unique client needs. The next stage is to find the balance between delivery of the solution at scale. We are now commencing this stage.

The following two sections reflect on the lessons learnt from technical and collaborative perspectives as we enter the application stage. These lessons have been learnt through this project, but are discussed in general terms as these issues are not limited to water sensor development.

3 LESSONS LEARNT: TECHNICAL

3.1 DO YOU REALLY UNDERSTAND WHAT YOU NEED

I've observed two main things that occur when you ask people what is needed to solve a problem. First is that they often still specify an output rather than outcome. The second issue is even if there is an awareness of the desired outcomes, when operating within this technology space which generates data people do not know the questions the data is supporting. Understanding the desired outcomes and questions that need answering is critical as it shapes innovation, how technology is developed and therefore, ultimately, if the endeavor is successful.

3.2 THE SAME THING – FASTER, BETTER

If you are not clear on your desired outcomes then you will simply ask for the same thing faster, with greater granularity and at a larger volume. There is a desire for the existing solution but on steroids. This is akin to the development of the wheel. The wheel remains circular, but the materials used and application of the wheel has evolved. People still only want the wheel. This is iterative change. It is often linked to general improvements in technology. In this case, it is known what data is required. There are times when this will be the right solution. However, you can only confirm this if you are clear on your outcomes and the questions you are trying to answer.

3.3 THE SAME OUTCOME – A NEW WAY

An alternative approach is a focus on the outcome. This approach demands a focus on the decisions made by the client (or contractor if the contract mechanism is such that allows for that level of responsibility) and what data is necessary in order to make those decisions. This highlights where there are gaps in data, or where existing data sets do not provide the right information. This can be challenging, because it forces people to think beyond existing specifications and standard ways of operating. It may be that part of a solution needs a new way of doing something but a component of the solution is the simply the old needs on steroids. Unless you are clear on your outcomes and the questions you need answered then you cannot be sure.

Failing to detail the needed outcomes from the start results in a project drift, and using the technology in ways in which it was never designed. This is not inherently a problem. It is only a problem when those involved in a project do not know the limitations or what the original use case was. This is when people blame the technology as it did not deliver

to their expectations. However, most people will say that the technology was the issue. The thing about inanimate objects is that they only do what they are designed to do. They operate within a set of defined limitations. The issue is not that the technology failed. The issue is that the technology was applied in an inappropriate manner.

3.4 QUESTIONING ACCURACY AND REAL-TIME DATA NEEDS

One of the largest challenges that this project has come up against is the justification of why a data output needs to be the way it is specifically with regards to: 1) what degree of accuracy does the data need to be and 2) what does real-time data actually mean. This has three components to it. The first is a follow on from the focus on delivering an existing solution on steroids. The second component is an integration issue. When data must be integrated into existing software or models the existing system can limit how much change in the solution can be adopted. The third and final element is that with increased ability comes an almost insatiable desire to do more and more. However, just because something can be done, does not mean it should be done.

The summary here is that there trade-offs must be made. If you understand your desired outcome and focus on that then you won't over deliver. The right data is worth more than a hoards of data.

In term of solution design this has significant implications, most typically related to cost. A device may be able to achieve a certain level of accuracy, for example in order to identify diurnal flows, however, is that same level of accuracy required for alerting to water levels? No. However, this is only made clear when the outcomes are clarified and the use of the data is detailed.

3.5 TECHNICAL SUMMARY

In order to develop technical solutions that are appropriate there needs to be a clear understanding from the beginning about the desired outcomes and questions in which the data will support. This is not to say that the desired outcomes do not change over time. But without outcomes and questions as your guiding lines you will not get clarity on the following questions:

- How often do you really need the data?
- In what format do you need the data?
- How will you get the data into where you need it?

In order to deliver on the technical aspects of a solution with these levels of complexity a new way of solution delivery must be engaged. This approach to solution deliver is underpinned by collaboration.

This is not collaboration in the sense of 'oh we have partnership'. It is a new way of delivering the end outcome in which delivery is no longer about each party taking their information and applying their specific knowledge to the situation before passing it on. It is about all those with specific knowledge coming to the table at the same time.

4 LESSONS LEARNT: COLLABORATION

4.1 WHY IT IS NECESSARY FOR THE CONTRACTOR TO BE INVOLVED IN DEVELOPMENT

It is asked, why should the contractor be involved in the development of technology – can't this be done between the client and technology partner? I say no (and not just because I work for a contractor). Solution development needs to involve the whole value chain. Many would argue that I am biased as the contractor. But the reality is there is applied and theoretical knowledge. Both have their value. Solution development without the applied knowledge is not going to provide a solution that is functional. Applied knowledge asks different questions as it looks at things through a different lens.

A second reason that the contractor should be involved is that solution development needs to be both iterative and is often becoming bespoke between clients. This means that trialing of the next evolution of a solution needs to happen fast. Having the contractor at the table during these discussions enables the quick turnaround of each evolution.

4.2 THE COURAGE TO HAVE THE TOUGH CONVERSATIONS

This process works best when parties are willing and able to have tough conversations. Acknowledging organisational limitations and objectives from the start is critical to solution delivery. Organisational limitations includes budget limitations, an understanding of the processes each party must go in order to participate and perspectives on agile trialing and levels of risk. Clear objectives are necessary, not only as outlined above for guiding the technical requirements but also in order to ensure that there are clear steps in the process. The iterative nature of development means that it can often feel like 'nothing has been achieved'. Clarity on outcomes means that each iteration is able to be tracked. These elements are largely supported by a supportive organisational structure and appropriate systems and mechanism for development.

Having tough conversations, however, ultimately sits with individuals being able to have those conversations. This starts with trust, which is not a given. While there may be an initial sense of trust and willingness to engage, this trust is not tested until one of the participants becomes vulnerable. At this stage, individuals must be able to express their concerns and the other partners must be able to listen and respond appropriately. This is not a given within traditional models where there are ideas that technology providers only want to sell devices, and where contractor and client often feel the other party does not understand them. This change is not always comfortable and by its nature is not smooth. There will be days where parties are not satisfied – the key is being able to come back and talk about the issue. It is not a negotiation up front. It is a discussions where parties, who are clear on their objectives are able to connect back to those objectives and outline the limitations.

5 CONCLUSIONS

Through working on the development of ultrasonic sensors as a means to address several different pain points we have learnt that:

- Out-of-the-box solutions do not exist – multi-party collaboration is necessary.
- Collaboration is taking on a new meaning – solutions require complete integration along value chain due to the demand for flows of information.

- Development occurs iteratively – this means changing ideas of how projects and trials are run.
- Technology is not a solution – it enables solutions; therefore you need to have a question you want answered (note this NOT the same having a problem).

ACKNOWLEDGEMENTS

I would like to acknowledge all those who have had the courage to take the first step. Change is not always the exciting new developments. Most often it is doing something a little bit different here and there. Without the individuals within both Downer, our client organizations and partners who are willing to try something even though there may not be a direct significant benefit to them, but off which we learnt something – thank you. You are the real change agents.