

L7 Assessment B
Introduction to Innovation Management (ACPA7005)

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Critically evaluate the uncertainties and technical/business risks inherent within any innovation-based activities.

Synthesize a detailed view of how individual, team and corporate behaviour can both facilitate or stifle innovation, in relation to best practices.

Recently I worked at SRT, a company that designs and manufactures maritime tracking systems based on the Automatic Identification System (AIS) standard.

Over the past few years, the advantages of AIS such as cost-effective, mass-produced transceivers and free over-the-air transmissions have been utilised by fishermen around the world to electronically mark fishing buoys and nets. AIS is a marine navigation and safety system operating on radio VHF used to electronically mark vessels or aids to navigation such as buoys or light houses on marine electronic charts. The system is robust and cost effective but – in a similar way to mobile phones – must work according to well defined and stringent certifiable standards to ensure all transceivers are interoperable on the AIS network. AIS transceivers come in differing specifications according to requirement and vary according to vessel size and whether it will be used to mark a navigation aid or as an emergency tracker. However, in many cases the use of ultra-low cost, uncertified AIS Class B devices – designed for use on small vessels - rather than using a certified AIS Aid to Navigation (AtoN) transceiver – specifically for use on buoys or aids to navigation - is compromising the AIS network and therefore, ultimately safety.

There are three major issues with using low-cost uncertified Class B AIS devices to mark small fishing buoys. Firstly, the AIS Class B standard was developed for AIS transponders used by smaller vessels and leisure craft. Therefore, the transmission from the AIS device on the buoy is misleadingly shown on an electronic chart display as a vessel rather than a buoy.

Secondly, the use of uncertified transponders that do not correctly work within the AIS framework of transmission slots can lead to message collision so disrupting legitimate AIS transmissions. This can have safety implications if vessels in distress or commercial vessels have their messages blocked. Thirdly, the quality and published specifications of many devices, does not correspond to their actual performance and feedback from many suppliers globally indicated that the transceivers do not work or do not work for long.

1. The principal driver/s for the innovation.

Globally, one of the most popular fishing techniques is Drift Netting, where drift nets hang vertically from water floats. Drift nets can be deployed and then left for hours – or days – and fish are caught when they get entangled in the mesh. When the fishing vessel returns, it identifies the net using marker buoys attached at each end of the drift net. However, the buoys can be difficult to visually locate in choppy waters running the risk of loss or of being run over by other vessels – jeopardising valuable catches and fishing buoys and lines.

The most popular way of marking these fishing buoys was to use cheap uncertified AIS Class B transceivers, which as explained above is problematic and unsafe.

The idea was to use our in-house expertise and adapt one of our existing AIS AtoN markers to a product that would mark a fishing buoy or net. The advantages would be that the electronic marker would work properly in the AIS network and would not jeopardise the correct operation of other AIS messages and it would allow for the correct marking of a fishing net as a stationary navigation object rather than looking like a vessel on an electronic chart.

All the skills required for the development, which would require some hardware modifications and quite a bit of software development, were already in-house. The company understood the certifications requirements very well and so no external resources would be needed.

In looking at the product innovation, Kahn (2018) describes the following types:

1. Cost reductions
2. Product improvements
3. Line extensions
4. New markets
5. New uses
6. New category entries
7. New-to-world products

This innovation could best be described as a *Line extension* where new features/options are added to an existing offering, which provide unique benefits and functionality that the original product or current set of product offerings does not have. Or referring to Mumby (2023, p. 15) it would be *Incremental Innovation* where the technology remained largely the same and the regulatory frameworks were well known.

The aim was to lock in the competitive advantage through formal certification and thus erect legal barriers to the use of competitive products. This would lead to “monopoly gain” according to Schumpeter (1991, page 415) by using a new product derived from the company’s exertion to get strategic advantage for a limited period of time.

Looking at (NESTA, 2006) in their report on the “The Innovation Gap” in the United Kingdom, which laid particular emphasis on “hidden innovation”, this innovation was one created from a novel combination of existing technologies and processes and is a good example of innovation activities that are not reflected in traditional indicators such as investments in formal R&D or patents awarded.

SRT is a leader in the field of AIS and executives in the sales and marketing function would travel extensively visiting potential and existing customers globally. We had an extremely good understanding of the marketplace, the companies operating within it and of customer and market requirements. However, generally – as was the case in this instance – new products generally originated from the Chief Executive (CEO), who had a combination of skills which included a highly creative mind, great determination and an ability to be very unreasonable both to himself - and to a lesser extent - his employees.

The idea was completely his, reflective of (Trott, 2016) where he refers to a study by Boston Consulting Group reporting in Business Week (2006) of over 1,000 senior managers that the

explanation of the innovative capability of Apple was due to the chief executive. In our case a large part of our innovative capability was due to our CEO. I was tasked to conduct a market analysis to determine the potential for the product. This involved a great deal of liaising with existing customers who understood the requirement, with fishermen and with the respective regulatory authorities in the territories of interest. A fair proportion of the market analysis was already in the heads of the CEO and other executives within the company because we communicated extensively with authorities and companies in the marketplace and attended the major trade shows. Therefore a great deal of knowledge and understanding was tacit and was being ingested as part of our day-to-day working lives; this product fitted with requirements that we understood well and we knew we had the expertise to deliver.

2. The barriers and risks faced by the company in developing this innovation

The innovation seemed a “no brainer” as it responsibly solved an extensive global problem and the company had the in-house expertise to develop the product by enhancing an existing one: the hardware already largely existed and the development was mainly software. We just had to get the relevant certification and agreement from the respective fishing authorities that the transceiver could be used for this purpose.

Any software and hardware development has a cost especially to a small company with limited resource. The new transceiver would be sold at a premium as buoys would be correctly shown on electronic charts and the transmissions would not interfere with the existing AIS network. However, the risk was that fishermen would still buy the cheaper transceivers and that fishing authorities would not enforce correct radio spectrum usage.

The technical risks were low and the certification costs were well understood. An environmental problem needed solving but disparate fishing grounds would have different management regimes and each national telecommunications authority would have a different approach.

3. The key determinants in the process of committing to develop the innovation

Approvals from any fishing and telecommunications authorities would take time but we were so confident that the new product would be so compelling that we decided to initiate the development – and therefore start to incur costs.

The company operates on a global scale and deals with many client companies working with fishermen and the company had relationships with a wide range of authorities working with fisheries. Our research involved many conversations with suppliers of fishing equipment particularly in Norway, Iceland and Canada where the problem seemed especially acute and where regulations were more likely to be enforced. The CEO assembled a team consisting of a project manager, software, marketing, sales, quality, production and certifications managers; the project was only part-time for the whole team.

4. The processes and technologies which the company used to carry this development forward

In (Kahn, 2018, p.454) we understand that *“Those organizations focusing strictly on outcome will minimize process, leading to inefficiencies such as duplication of effort and resource overconsumption.”* To an extent – and particularly when you listen to feedback from the technicians and developers tasked with delivering the project - our organisation fitted in to this model of duplication of effort and resource overconsumption. However, I would argue that things generally seem worse when you are immersed in particular problems and challenges but were better managed with the benefit of hindsight.

The company was experienced in developing new products and had evolved organisational behaviour routines, which to an outsider may have appeared a little unstructured. However, these mechanisms or routines had evolved in the light of experience that works. As cited by (Tidd and Bessant, 2018 p.68), they had become the mechanisms that “transmit the lessons of history”.

Likewise the actions and paths required for achieving certifications and setting up the factory for production were well trodden as stated in (Levitt and March, 1988, p. 340) who describe routines as involving established sequences of actions for undertaking tasks enshrined in a mixture of technologies, formal procedures or strategies, and informal conventions or habits.

5. The extent to which the development relied on resources external to the company and the ways in which the deployment of these resources was managed

The company did not require external resources apart from the buy-in of companies supplying fishing gear in the respective territories and of the agreement of the relevant certification and fishing authorities. The certification process was very formulaic and was well understood and took as long as it took but we continued to liaise with fishing authorities to ensure acceptance once the product was available.

6. How management overview of the development was maintained

The team – and therefore frequency and makeup of meetings - did not maintain a rigid structure which varied according to issues that needed discussion and items that needed pushing forward. The strong CEO was a bit of a maverick and was not a particularly structured person. He was forceful in getting the changing priorities and agenda moved forward and called on whatever resources were required at that particular moment in time.

Although this sounds like a recipe for inefficiencies and effort duplication, the inherent learned mechanisms, seemed to limit too much resource overconsumption.

7. The extent to which you feel this innovation process represents best practice

The resulting product was a an evolution of an existing product line and so would be classified by Schilling and Hill (1998, p.71) as a derivative project. This product did not develop new competencies – and so was not strengthening – the company’s core capabilities. Rather it was taking advantage of a market requirement and using existing technology that needed some modification, lots of marketing and new certifications.

Schilling and Hill (1998, p.67) state that successful new product development requires:

1. maximising the fit with customer needs
2. minimising time to market

The company had done a great deal of market research – both subconsciously as part of our day-to-day liaising with customers and the fishing industry and from direct requests and information gleaned from companies servicing the fishing industry. Therefore, we were extremely confident that we had a product that fulfilled a market need. There were no doubts as to the market requirement.

The company had a very good understanding of the development requirements, which were mainly software modifications with a small amount of hardware work. Therefore, when Schilling and Hill (1998, p.73) talk about using a parallel – rather than sequential – development process to both reduce cycle time and to better incorporate customer and supplier requirements in the product and process design, the company naturally did this as some software design changes were incorporated in to the product as the process design was progressing.

As the innovation was a derivative development, the team resembled a Lightweight Team, as described by Schilling and Hill (1998, p.75). Although we had a project manager, a software, marketing, sales, quality, production and certifications managers, the project was only part-time for the whole team.

Another aspect of best practice as described by Schilling and Hill (1998, p.74), which was fulfilled in the project, was the use of an executive champion to ensure that the project had access to the resources and organizational commitment necessary for completion.

The biggest obstacle on the critical path was the time taken to get approvals from the relevant telecommunications and Coastguard/fishing authorities. However, as we believed that our new product was so compelling that achieving the required certifications was only a matter of procedure and time. Our thinking was that as the only other system being used – cheap Chinese transceivers which sent misleading vessel type messages which could disastrously affect the radio transmission network – that our new correctly functioning product would waltz through approvals. In fact, we believed that the product was so compelling that there would be few issues deploying our markers in advance of any approvals or certifications. In fact we thought that in many territories certifications wouldn't matter anyway.

When comparing the process to The Stage Gate model cited by (Cooper, 2011), the stage gates happened but on an informal basis. As stated earlier, the company was small and had a lot of experience in developing new products and so informally operated stage gates as a natural output of regular face-to-face and telephone meetings. In truth, the company could just about get away with it due to the relative simplicity of the project and the small size of the company and project development team.

8. Your report should also provide your own critique of the whole innovation process –and an evaluation (to the extent to which one is possible in the case of very recent innovations) of the success of your chosen innovation

The result at the end of the project was that it did not go ahead, although the product was designed and built and worked well. In the end the fishing authorities – in the most regulated areas – were not prepared to enforce the use of properly certified electronic marker buoys for use on fishing buoys and nets. Therefore, in the end the fishermen continued to use the cheap Chinese transceivers, which misleadingly showed vessels where buoys should have been seen on electronic charts and that the radio transmission network was always in danger of being overwhelmed with signals which did not automatically deconflict with each other.

Interestingly, I believe the new product design process did approach best practice – even if the eventual result was a failure: the project was reasonably simple and the company was still small enough for best practice to be the most obvious and natural approach. In fact the project had many similarities to the Agile process referred to in (Mumby, 2023), where interactions with the software developers, hardware and certification managers replaced processes and tools; getting it to work was more important than comprehensive documentation; customer collaboration was an element where we tested prototypes whilst the project was still ongoing and functionality for the product evolved during the development process.

(Goffin and Koners, 2011) state that New Product Development is a complex activity that is dependent on knowledge and learning. Much of the knowledge is tacit; it is difficult to express, connected with problem solving and dependent on interactions within teams. The actual product development was a success, but the overall project was a failure. The success of the development was less down to project management structure and more to the tacit knowledge and experience within the business and the way in which the CEO ran the company. It would almost certainly not work in a larger organisation or with a more complex project.

(Mumby, 2023) refers to Goffin and open innovation whereby the innovation tunnel is porous with ideas and technologies entering and leaving at any point. SRT certainly reflected that model where a large part of the product strategy was to license-out products and technologies to third party companies to be sold under their respective brand. The company also brought in new technologies, most notably through acquisition, when it acquired a company that had developed software to show a maritime area in 3D within which ships and aids to navigation using AIS could be shown.

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