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HOUSE OF REPRESENTATIVES  
STANDING COMMITTEE ON  
SCIENCE & INNOVATION

The Secretary  
**Standing Committee on Science and Innovation**  
**House of Representatives**  
**Parliament House**  
**CANBERRA ACT 2600**

Submission No. ....15.....

### **Pathways to Technological Innovation**

I would like to submit my views on innovation and pathways to commercialisation with particular reference to success factors. I appreciate this opportunity to provide the Committee with an overview of the area of innovation and training in innovation.

These views are formed from twenty years of funding innovation under the IR&D Act as an Assistant Director with the Department of Industry, Science and Technology. During this period (1977-1997) the IR&D Act changed from assisting the stages between ideas to prototype to all of the stages between ideas and commercialisation. I was responsible for about ten percent of Australia IR&D funding due to my area (IT) and location (NSW). These schemes form the basis of present funding schemes. Some new schemes have been added, one of which is funding for incubators. I have asked Dr Richard Vaughan to comment on this area as he was funded under this scheme and has relevant comments. His story will highlight some of the impediments to success.

#### **Success factors – the theory so far**

I have long studied the factors, which are able to determine success and failure in innovation. My Masters' thesis (1991) on product commercialisation looked at these factors with a sample selected from projects assisted under the IR&D Act. This thesis identified work by R. G. Cooper in Canada in 1977, which looked at success factors in one hundred and three companies- project Newprod. These factors were grouped into facilitators to success, weakly related factors, barriers to success and factors with no impact on success.

In 1993, these same factors were examined in Project Succinct on forty IR&D Projects. These factors were later adopted as the IR&D Merit Criteria and were used for screening of grant proposals. An evaluation study of five hundred projects in 1996, which I helped conduct, evaluated the actual successful projects against predicted successful projects. Impediments to success were identified. One of which was the gap before commercialisation. Commercialisation loans were used to take a prototype to an investment ready stage.

The Cooper study has since been updated and new studies on success factors, which have significant sample sizes, have been completed. The environment has also changed with the emergence of new dotcom and ebusiness models. The success factors are often thought not to be current by the rapid changes in the market environment and the delay before success is apparent.

I started my consultancy in 1997 to work with innovation companies (one of which was Dr Vaughan's) and later changed to teaching at TAFE and business schools with their pathways for learning. The transition was easy as the pathways for innovation and pathways for education are very similar. Some subjects are top down where you follow an incremental path, which is like a recipe, other subjects are bottom up where the solution emerges from a set of rules. I concentrate mainly on the bottom up subjects. Innovation can emerge from a bottom approach (the eureka moment) or follow on from top down (HP's PC product line). The pathways of education allow students to find their own pathway. The line from Frost "I took the road less travelled and that make all the difference" is very appropriate.

**Success factors – they depend on the type of innovation pathway.**

The typical innovation pathway is top down (idea, churn the numbers, invest in product). The non-typical innovation pathway demands creativity, an area not well understood in education. The pathway is bottom up (disruptive idea, guess the numbers, find crazy investors). Most projects lie along this spectrum. They are combinations of ideas sometimes protected by IP sometimes stolen with different backers.

The trick is to educate the people along this pathway to appreciate the needs of the others. Sometimes the people are greedy and the pathway fails. At this point the IP is very important. The laws on IP, copyright, breach of confidence, patents are not easy to either use or enforce. I would suggest the Licensing Executives (I was a previous member) be approached as they have members daily working in this field. Their experience is at the technical side of the deal.

The problem is helping people to identify success factors is that they need to understand risk factors and communication skills. These are basic skills but need to be aligned to innovation.

I have recently helped set up an RTO (<http://www.ausacademy.edu.au>), which is seeking to train people in innovation. There are some courses around (MBA modules) but I believe that creativity resides in a few and that these few do not always undertake MBAs. Another course is NEIS, which helps the unemployed set-up a start-up.

Somewhere in between is the key. Those who wish to know more about innovation should not be restricted by either being too smart (MBA) or too poor (NEIS).

**VET – pathways for innovation training.**

The mainstream modules of business are needed. The provision of these courses in the past has been driven by industry need. Wine industry people advise what is needed for a winemaker. The various Skills Councils develop for their area (a top down approach). I was impressed to see innovation grouped with business with the new ANTA structure in late 2004. I have not seen the Innovation and Business Skills Council thoughts on innovation and remain hopeful that there will be substance behind the name. Their website is <http://www.ibisc.com.au>.

## **VET training – my approach**

I believe in the bottom up approach of training. This approach is to provide the fundamentals of business plans and to create a virtual marketplace with a simulation where they can play against each other and to see what emerges.

The theory of success factors can be used to select the top players and students can see if they can beat the system. I am currently in discussions with innovation simulation providers. The system will use online learning and may take some time, as funding is not available even from programs such as Flexible Learning.

The difference is that I wish to provide an internet friendly and international approach to innovation. Teams form in different countries to compete against the theory and each other. The Australian teams need training in the innovation process. The use of playing against the computer allows people to evaluate their own impediments to success.

This was my role with the IR&D Board, seeing the potential for successful commercialisation in people and then assisting them to identify risks. A comparison of IR&D assessors placed me close to the top in this field. The reason was that I understood the success factors rather than to blindly hand them to the companies. When the companies understood the reasons they were more aware of the innovation process. The new term for this type of work is mentoring, the educational term is understanding the subject, but the usual term is project success. The person with the ideas directs their energy into the project. They need to know where to look for the risks. The tricky areas are mapped out and when you have seen many innovations you gain the necessary experience.

## **Conclusion**

The existence of an understanding of success factors is vital for commercialisation. The success factors training do not provide magical properties to prevent failure. They act as a framework to understand the scope of the potential risks to the project. Success factors based on the research of many projects aid with the extraction of believable factors. The next step is to educate those creative driven to innovate. They might not like training but the benefit sell is to save them time and money.

The impression, which I am forming from recent Harvard Business School articles, is that Australia is seen as creative and interesting from the alignment of education to industry. The British system integrated training into industry programs under one Department (DTI). The articles are influenced by products such as defence (Metal Storm); networking (the Macquarie University professors network company sold to Cisco) and medical products (Bionic Ear) which are cheap disruptive technologies (compared to the USA). The Australian education system is both national and adaptive. These are strengths of our system.

I think that we have also weaknesses. We have the titles in education sector (Innovation and Business Skills Council, Flexible Learning) but there is no connection with the IR&D sector. The sector has passed by the system and may become involved but with high growth comes little time to deal with education issues. I would see that there remains a chasm between the educational direction and the people who will one day make the industry. These people are the future IR&D industry. The innovation sector should be treated as a community disadvantaged by location (the online approach overcomes the transaction costs).

I would suggest that the linkages between education and innovation be examined. The IR&D database should have figures on the educational levels of the industry. These might serve to see where innovation training should fit.

Regards,

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