



In its traditional form, R&D commercialisation can be defined as the ability for research to introduce a new product into the market (ITAC, 2004). But with time, R&D commercialisation is treated as *"the process through which research discoveries are brought to the marketplace and new ideas or discoveries are developed into products, services or technologies that are sold"*. No longer is it the domain of engineers and hard scientists that relate commercialisation to tangible marketable products only.

R&D commercialisation is linked to the sale of products and processes, transfer of technology and provision of professional services. Sale of products and processes include outright sale and licensing of intellectual property rights, royalty collections and profit sharing arrangement from the use of the products and processes. Transfer of technology is seen as the dissemination of knowledge and new technology including the provision of advisory services and adoption by end users including farming and business communities. Professional services involves the provision of consultancies based on knowledge generated from R&D projects.

Nowadays the most common form of commercialisation that prevails in many institute of higher learnings (IHLs) and research institutes (RIs) around the world is the demand for professional services, normally referred to as consultancies. The professional services are normally in the form of expert assessment, problem solving ideas and also direct earnings from the use of special testing methods/processes developed in the research project. These forms of commercialisation are much welcome by Government agencies and the private sector as these stakeholders could obtain up to date and direct services from the IHLs and RIs at a more reasonable rate than from domestic private and international consultancy firms. Further, the offering of consultancies and other professional services gives the opportunity to researchers to convert the findings from their projects for application in the real world and for them to be in touch with the needs of stakeholders including from government agencies, the private sector and the public. This

PEOPLE HAVE DIFFERENT VIEWS ON WHAT CONSTITUTE R&D COMMERCIALISATION

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has been able to shed away the conventional 'ivory tower' image given to the IHLs and RIs.

STATE OF R&D COMMERCIALISATION IS STILL LOW

R&D commercialisation takes time to develop. At least 5 to 10 years after research projects completion. In this context, to gauge R&D performance in the country one can assess the performance of research grants of the Seventh Malaysia Plan intensification of research in priority areas (7thMP IRPA) given during the period 1996-2000. Despite the Government call for greater R&D commercialisation, the performance is still inadequate in the country. A basic requirement is that an initial research project should proceed towards applications that could lead into an end product or a service capability. However, some 46.7% of completed projects ended there and did not proceed into any further development or applications (Mohd Shahwahid et al. 2005). Several reasons have been identified to contributing this situation. Among them are;

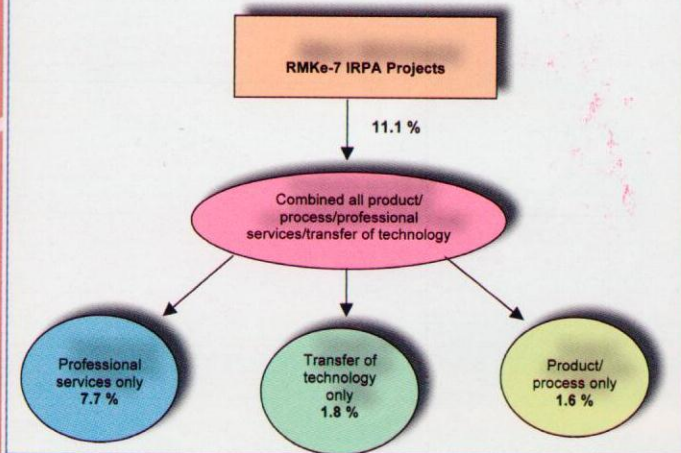
- their projects are fundamental in nature
- inability to obtain further funding
- believed that research completion is a fulfillment in itself and need not continue further
- contented with generating some publications (journals or conference papers) or for graduating PhD and MS students in the universities and
- researchers moved on to other research project, which were submitted under the Eighth and Ninth Malaysia Plans.

The other completed projects (53.3%) attempted to make further development and proceeded to the next level. A large proportion were able to continue their research endeavour towards applications (26.6%) while others were more successful and able to generate tangible products (19.8%), processes (4.8%) and





COMPREHENSIVE DEFINITION OF COMMERCIALISATION



Source: Data from Survey

Figure 1: Commercialisation of all Projects in the 7th MP IRPA.

software development (2.1%). Yet not all of these projects were able to penetrate into the commercial world. Depending on which definition is adopted, R&D commercialisation involved only 1.6% of the research projects if the traditional definition is used and 11.1% if the broader view is used (Figure 1).

The pathways to the commercialisation of products and processes involved obtaining royalties from licensing of technology emanating of the research findings, outright sales of products generated and profit sharing of joint venture activities. This pathway is very rewarding but may take time involving lengthy negotiations. With the broader definition, R&D commercialisation that includes professional services was generated mainly in the form of consultancies and transfer of technologies by way of extension activities to the industries. Many researchers favoured these latter options since their research findings could be utilised immediately and that significant income and revenue could be contributed into the coffers of the IHLs and RIs.

MANY FACTORS ARE IMPEDING R&D COMMERCIALISATION

The relatively low rates of R&D commercialisation in the country may be due to several factors, namely:

- Lack of involvement of private sector in the research projects.
- Most of the research projects are not market driven instead are knowledge driven. This implies that research projects are not geared towards commercialisation.
- Past attitude of most researchers were not considering commercialisation as an important output expected from their research.
- Past administration did not place commercialisation high in the agenda.

In addition to the above factors, a review paper by Hii (2003) highlighted several other reasons why commercialisation rate in Malaysia was low. Four key issues were raised and they are related to the root cause of the problems, namely:

i. Weak innovation infrastructure

There was a lack of industrial linkages that could bring innovation to the marketplace. IHL and RI were not having adequate commercialisation infrastructure whereby skilled and competent technology transfer or commercialisation officers are recruited. Commercialisation was not fully understood by many researchers and IPR protection was facing financial difficulties in many institutions.

ii. Paucity in diffusion of new S&T knowledge

There has been shortage of diffusion mechanism that could accelerate adoption of technologies across different sectors. Many research projects were carried out without the involvement of other experts from other disciplines.

iii. Man power issues

There is lack of researchers that possess commercialisation skills and expertise needed to drive successful technology transfer and commercialisation to the industrial market place. Many researchers during 7thMP were not driven by commercial interest and only a small percentage was interested to proceed with commercialisation activities. Poor reward system for researchers also contributed to low drive for commercialisation.

iv. Linkages

Networking with the industries for better input in research undertaking was not realised. Early involvement of industries in product development research at Universities or RIs is extremely important for enhancing the quality of research and improves its chances to successful commercialisation. There is a need for stronger linkages between academic, IHL, RI, industry and government agencies.

WAY FORWARD & LESSONS THAT COULD BE LEARNT

Management of R&D has to be improved to raise commercialisation of research findings. The following are some considerations for funding agencies, IHLs and RIs:

- 1) A key element in good research projects is to obtain relevant sources of the initial idea conceptualisation. These sources of idea could be in the form of:
 - a. Demand driven R&D, either directly in response to the needs of the industry



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- b. Indirectly through market analysis or from felt needs of society to overcome a recurring problem or from international academic and industry interactions.
- 2) An important factor is to obtain early involvement of industry partners in the R&D project. Early involvement of industry partners has the advantage of the R&D efforts being demand-driven with potentials of greater market acceptance of the R&D outputs. Industry is used in the wide context of end-users of the R&D efforts.
 - 3) High networking and collaboration enables sharing of resources that included expertise, financial, facilities and marketing channel.
 - 4) A conducive commercialisation of R&D support within the institution is central in ensuring that the outputs reach the market. The support pathway obtained vary between case studies. Supports came in two categories: a) Reducing constraints on researchers to allow private parties to refine the outputs and eventually commercialised the products, b) Direct commercialising services offered by an administrative centre to facilitate the licensing or sale of the technology developed.

Several strategies could be adopted by R&D funding agencies, IHLs and RIs to raise R&D commercialisation. These include:

- Bridging fund is required to enable researcher to perform up-scaling & prototyping
- Reward system should be made more attractive
- Mechanism of funding for up-scaling and pre-commercialisation (pilot scale) need to be clearly formulated
- Well-defined role of industrial partner in R&D. The Partner should bring in the industry earlier during proposal stage itself
- Establish a more effective commercialisation centre at Universities/RIs in order to strengthen its effectiveness

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