Engagement & Change

Exploring Management, Economic and Finance Implications of a Globalising Environment

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Australia's Industrial Performance

How does Australia's industrial performance compare with other nations and what are the implications for the role of innovation? Table 1 reflects Australia's rankings in four of the United Nations Industrial Development Organization's indicators for industrial performance in 1990 and again in 2002.

UNIDO's industrial performance indicators focus upon countries' competitive ability to produce and export manufactured goods. Australia ranked 25th in 2002 for manufacturing value added per capita, falling one place from 24th position in 1990. While Australia improved the dollar value of manufacturing value added per capita, so did many other countries resulting in a fall in the relative ranking.

Australia ranked 43rd in 2002 for manufactured exports per capita, falling eight places from 35th position in 1990. This indicator reflects the component of manufacturing value added that is exposed to international competition. Australia more than doubled the dollar value of manufactured exports per capita, but it did not match the increases in many other countries resulting in a significant drop in the relative ranking.

Table 1
Australia's Industrial Performance (World Ranking)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1990</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Value Added</td>
<td>$2488 (24th)</td>
<td>$2797 (25th)</td>
</tr>
<tr>
<td>Manufactured Exports</td>
<td>$688 (35th)</td>
<td>$1390 (43rd)</td>
</tr>
<tr>
<td>Technological Structure of MVA</td>
<td>50.6% (27th)</td>
<td>49.5% (35th)</td>
</tr>
<tr>
<td>Technological Structure of ME</td>
<td>31.3% (43rd)</td>
<td>41.3% (52nd)</td>
</tr>
</tbody>
</table>

Australia ranked 35th in 2002 for the share of medium- or high-technology production in manufacturing value added, falling eight places from 27th position in 1990. The higher a country ranks on this indicator, the more technologically complex is its industrial structure. This indicator reflects a disappointing setback in the agonisingly slow structural shift in Australia from lower technology to higher technology activities.

Australia ranked 52nd in 2002 for the share of medium- or high-technology production in manufactured exports, falling nine places from 43rd position in 1990, despite a significant improvement in the indicator. It reflects the slow evolution of Australia’s industrial and export structure compared with a large number of other nations and further highlights the need to shift both manufacturing value added and exports up the technology scale.

It is clear that Australia’s recent industrial performance does not compare favourably with the industrial performance in many other nations. Despite improvements in three out of the four performance indicators, Australia has slipped in all four relative rankings. If we want to entertain any notions about playing in the major league of exporting nations, then we need to refine our ability to identify new ideas with genuine commercial potential and bring them to market.

**Purpose of Early Assessment**

An innovation is a complex series of activities in which an idea is conceived, proceeds through a succession of developmental steps and culminates in a product, a process, or a service that is accepted in the marketplace. It starts with an idea, or initial discovery, that needs to be assessed, developed and tested. Everything, from the smallest incremental improvement to the most radical innovation, starts with an idea.

Prospective innovators generally believe that the leap from an idea to market entry is only a short distance and they often do not recognise how complex, costly, and time consuming the process can be. Consequently, it is important to be able to assess the commercial feasibility of new ideas very early in the innovation process, because it is the least costly stage in which to identify and eliminate likely failures (English & Udell, 2004). Inasmuch as many new ideas turn out not to be commercially feasible, indiscriminately investing time, money and effort in them only dilutes the resources available for projects with genuine potential. Innovation is not a democracy in which all ideas are created equal. It is a meritocracy in which those ideas with demonstrated commercial merit should be developed further.

There are scores of systems designed to evaluate business plans that have been compiled after market research and product development have taken place. The Innovation Development Early Assessment System, or IDEAS, however, is designed to make an early assessment of the commercial feasibility of a new idea.
An IDEAS assessment takes place long before there is enough tangible information to do a business plan, and its purpose is to decide if further development of the idea is warranted. Idea assessment does not need to be expensive or time-consuming, particularly in the early stages of the innovation process, but it does need to be systematic and comprehensive. There are three basic approaches to determining if an idea warrants further development.

The first approach is an informal and unstructured yes or no assessment that amounts to little more than a beauty contest. It is the least expensive approach, but it is also the least beneficial because it is not likely to provide much insight into, or information about, the idea. Moreover, there is no way to control for quality or to insure the use of uniform criteria.

The second approach is an in-depth analysis by a panel of specialists who have the requisite technical and marketing expertise. This approach usually provides the best possible assessment and the greatest amount of information about strategies for commercialisation. However, it is also the most expensive approach and beyond the capacity of most individuals to underwrite.

The third approach is the IDEAS approach. It consists of a standardised analysis designed by a cross-section of specialists representing a broad range of technical and commercial expertise. It is a low-cost, comprehensive and systematic analysis that can be undertaken by anyone trained in the IDEAS protocol. It provides a uniform, easily communicated and easily understood basis for assessment coupled with comprehensive and valuable feedback. It is intended to be an efficient and cost-effective way to provide an assessment of the commercial strengths and weaknesses of an idea.

Most assessment models require information that does not exist or is too costly to obtain in the very early stages of the innovation process. The result is that many prospective innovators skip assessment altogether and move directly into research and development. In other words, the day of reckoning for low potential ideas is postponed until the cost of abandonment is much higher. The rationale for making an informed decision early in the innovation process is twofold. First, few prospective innovators have the resources to withstand failure and early assessment can be extremely valuable in order to avoid costly mistakes. Second, both individuals and organisations need to focus their resources on the most promising innovations, and early assessment is an important tool in identifying ideas with genuine commercial potential.

Origins of the IDEAS Program

IDEAS is based on the Preliminary Innovation Evaluation System (PIES) developed by Professor Gerald G. Udell and his colleagues at the Experimental Center for Invention and Innovation in the United States with financial support from the US National Science Foundation, the US National Bureau of Standards and the US Small Business Administration (Udell, 2004). Professor Udell formed the
Innovation Institute in which his system has been used to evaluate an estimated 30,000 ideas and inventions — primarily in the United States and Canada. A European version of the system has also been launched at the University of Nottingham with a planned rollout throughout the European Union.

In the initial version of PIES, the criteria were selected after a considerable amount of research in the new-product literature and discussions with a number of experts involved in invention and innovation — including independent inventors, technologists, patent attorneys, consultants, licensing agents, corporate researchers, and new-product planning specialists. Since that time, new criteria have been added as experience, changes in market conditions and continued validating research have suggested they are warranted.

A study of the PIES protocol found that it was effective in discriminating between success and failure in 1223 cases in the United States (Knotts, Jones, & Udell, 2003). Table 2 contains the results.

For each evaluation category, the difference between the mean scores for failed firms and successful firms is significant, except for social impact. This exception might have been the result of a de-selection process in which firms with products that were illegal, unsafe or inappropriate for the mass market might have chosen to withdraw earlier from the program. Overall, failed firms had a lower mean rating than successful firms (66.8% to 71.5%, $p < .001$).

A license was granted by the Innovation Institute to adapt the PIES system for use in Australia and New Zealand. Now called IDEAS, the Australian adaptation takes a broader approach and expands the scope of assessment beyond products to include processes and services. It also incorporates an assessment of the strategic alternatives for commercialisation by applying a resource-based model of the firm that was originally designed to teach entrepreneurship at the University of Tasmania (Jones & English, 2004). In addition to changes made as a result of the experience gained from using the system, the Australian version also reflects research and study by Australian academics as well as input from Australian specialists.
IDEAS Assessment Framework

IDEAS is concerned with commercial feasibility. There are many ideas that are technically feasible, but not all of them are commercially feasible. If an idea is both technically and commercially feasible, then it is generally worthwhile to develop the idea further with a view to identifying a commercialisation strategy and compiling a business plan. IDEAS consists of a series of questions that do not require a great deal of information in order to make a preliminary judgment. In most cases, there is sufficient information inherent in the basic concept to arrive at an informed assessment about the commercial feasibility of an idea.

The first objective of IDEAS is to determine if a new idea ought to be developed further. There are two ways to approach this: identify ideas that have the potential to become successful innovations, or identify ideas that do not have the potential to become successful innovations. The second approach is much easier to operationalise because there are too many unknowns to be able to predict success accurately this early in the innovation process. Occasionally, an idea or invention will occur with such clarity of technical and commercial feasibility that its potential for success is obvious, but this is a rare event.

The second objective of IDEAS is to provide feedback. Without genuine feedback, aspiring innovators can be left confused and/or frustrated because they do not know what to do next. For example, if an assessment shows a short product life cycle, it does not necessarily mean the idea should be abandoned. However, it does mean that certain financial, production, and marketing strategies will be more appropriate than others. Feedback is important because it:

- reduces misunderstandings
- creates an environment that is conducive to creativity
- provides insight into the innovation process
- presents an opportunity to correct errors
- stimulates consideration of strategies for further development.

IDEAS consists of 35 questions. Each question contains five possible responses ranging from very favourable to very unfavourable. The question for stability of demand is an example.

Stability of Demand

Fluctuations in demand are likely to be:

- highly stable — not susceptible to fluctuations
- stable — modest variations can be accurately foreseen
- predictable — variations can be foreseen with reasonable accuracy
- unstable — susceptible to moderately unpredictable fluctuations
- highly unstable — subject to severely unpredictable fluctuations.
During an IDEAS workshop, the information that each question is attempting to elicit and the meaning of each of the responses is carefully explained. The main activity of the workshop is for each participant to rate their idea across the 35 questions by selecting the most accurate responses. The responses are then combined into a series of diagnostic diagrams and a Commercial Feasibility Rating.

IDEAS is organised into three themes: the market opportunity, the associated risk, and the degree of complexity involved in putting the idea into operation. The assessment of commercial feasibility is divided into seven sections depicted in Figure 1.

Opportunity
The first theme is designed to assess the market opportunity. It is divided into three sections composed of potential demand, market acceptance and competitive position.

Potential Demand
One of the important determinants in evaluating commercial feasibility is potential demand. Demand is also difficult to assess because it requires some insight into the behaviour of the marketplace and a certain amount of guesswork about the firm that will eventually take the idea to market. Potential demand questions, although general at the early assessment stage, are designed to explore several key aspects about demand.

- What is the relative size and distribution of the potential market?
- Is the trend of demand increasing or decreasing?
Innovation Development Early Assessment System

- Is demand likely to be stable or unstable?
- How long is the life cycle likely to be?
- What potential is there for related products, processes or services?

**Market Acceptance**
Market acceptance is an important determinant in converting potential demand into sales. It affects both the rate of adoption and the extent to which the market can be penetrated. There are a variety of reasons why the market may accept or reject a new idea. These questions focus on five of the most important reasons.

- Is it compatible with existing attitudes and patterns of use?
- What degree of learning is required to consume or use it?
- What level of need is fulfilled or utility provided?
- How visible are the benefits and what degree of promotion is needed to create customer awareness?
- How difficult will it be to establish distribution channels?

**Competitive Position**
Competitive position questions assess how an idea for a new product, process, or service is likely to fare compared with the dominant competitive pressures already in the marketplace or likely to emerge after market entry.

- How is it different from similar products, processes or services?
- How will its perceived value compare with equivalent products, processes or services?
- Is it vulnerable to the bargaining power of customers?
- Is it vulnerable to the bargaining power of suppliers?
- Is it vulnerable to the bargaining power of competitors?

**Risk**
The second theme is designed to assess the risk associated with an idea by searching for its fatal flaws. Risk is divided into two sections composed of external risks and establishment risks.

**External Risks**
External risks are dangers that are generally beyond an innovator’s control but nevertheless affect the commercial feasibility of their idea. They originate from a variety of sources such as government, advocates of various popular causes, existing and potential vested interests and the public. The questions in this section deal with the following types of external risks.

- Does it meet legal, safety and other regulatory requirements?
- Is it vulnerable to changes in technology?
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- Does it have an effect on the environment?
- Is it vulnerable to any of the dominant forces in our society?
- To what extent could sales be limited by dependence on other external factors?

Establishment Risks
Establishment risks also represent obstacles that have the potential to affect the commercial development of an idea. The difference between these and external risks is the degree of control that an innovator may have over them. The innovator needs to recognise what they are, the extent to which they can be resolved or avoided and whether or not they want to take these risks. Establishment risk questions focus on the following five business-related uncertainties associated with commercialising an idea.

- Will this product, process or service actually perform the way you want it to?
- Are the start-up components available and reliable?
- What market research remains to be done?
- What research and development remains to be done?
- What sort of money will it take to get started?

Complexity
The third theme is designed to assess the degree of complexity associated with trying to put an idea into operation. Complexity is divided into two sections composed of critical competencies and critical resources.

Critical Competencies
For the most part, an innovation is the result of a successful marriage between commercial potential and the essential expertise and resources to make it happen. The relative importance of the critical competencies depends upon the sophistication of the idea and the nature of the market it faces. At times, very sophisticated ideas can be relatively easy to implement. It is also true that some very simple ideas can require a high degree of management, marketing or financial expertise. We are concerned with identifying the critical competencies needed to develop and successfully launch an idea and whether the innovator can realistically provide or acquire them. The critical competencies examined include:

- marketing expertise
- technical expertise
- financial expertise
- operational expertise
- managerial expertise.
Critical Resources
Successfully commercialising an idea not only depends on expertise, but also on key resources that, together, form the basis for creating and sustaining value. These questions are concerned with identifying critical resource intensity as well as what the innovator can realistically provide or acquire. Critical resource requirements form the basic dimensions for a business plan. The critical resources examined include:

- operating resources
- human resources
- financing resources
- knowledge resources
- reputational resources.

Commercial Feasibility Rating
The objective in an IDEAS workshop is to arrive at a judgment about the overall attractiveness of the opportunity, the risks associated with commercialisation and the degree of complexity involved in putting the idea into operation. The result is a Commercial Feasibility Rating, together with diagnostic diagrams for the underlying drivers. A Commercial Feasibility Rating is not merely a mechanical procedure. It is a method designed to assist an innovator to exercise their judgment. It depends upon an understanding of the IDEAS protocol and the extent to which the assessment has been objectively undertaken.

An integral part of the assessment process is to plot diagnostic diagrams of the responses. This can be done for each of the sections and each of the themes. The example in Figure 2 is a template for the diagnostic diagram for market opportunity. The diagrams help to visualise the way in which the responses have contributed to the overall assessment. Each diagram contains an Area of Concern. Responses that fall into the Area of Concern highlight potentially important issues that may affect an idea's commercial feasibility. Engaging in a visual evaluation for each component of the system reveals a great deal more insight into the strengths and weaknesses of an idea than the overall.

The commercial feasibility rating consists of a standardised scoring system with a maximum score of 100. The purpose of the Commercial Feasibility Rating is to provide a prospective innovator with an overall estimate of the commercial potential of their idea. The estimate should not be taken too literally because it is basically a 'best guess' based on their own evaluation. The commercial outcome of a new idea is essentially a function of three variables: the idea, the enterprise that will take it to market and the marketplace itself. During the early stages of the innovation process there is typically very little information about the enterprise that will take the idea to market. In addition, information about the target market is often incomplete. Hence, there are inevitably a number of unknowns that
remain unanswered at this very early stage. The Commercial Feasibility Rating falls into one of three bands that are described in terms of a traffic light.

**Red Light**
If an idea's Commercial Feasibility Rating is under 60, then its commercial potential is considered unacceptably low and further development is not recommended. A Commercial Feasibility Rating below 60 generally represents a poor opportunity, unacceptable risks, and/or impractical operational complexity. In this situation, abandonment may be the best course of action. Sometimes it is the idea itself that is flawed and sometimes the flaw is in the marketplace.

**Yellow Light**
If an idea's Commercial Feasibility Rating is between 60 and 79, then its commercial potential is considered marginal, but it may nevertheless warrant some degree of cautious development. A Commercial Feasibility Rating in the lower half of this range generally represents a modest opportunity, significant risks, and/or considerable operational complexity. It may have sufficient potential to warrant very limited and cautious development. A Commercial Feasibility Rating in the upper half of this range generally represents an appealing opportunity, but typically has some significant unknowns about risk and/or operational complexity that ought to be resolved before further development takes place. Development should be limited to those activities that are not costly and they should focus on resolving some of the unknowns that contributed to a low rating.
Green Light
If an idea's Commercial Feasibility Rating is between 80 and 100, then its commercial potential is good and further investment of time, energy and money is usually recommended. A Commercial Feasibility Rating in the lower half of this range generally represents a good opportunity, an acceptable level of risk and is operationally realistic — but it may still have one or two important unknowns that need to be resolved. A Commercial Feasibility Rating in the upper half of this range generally represents an excellent opportunity, a low level of risk and is operationally practical.

This does not mean that an idea with a Commercial Feasibility Rating over 80 is automatically accepted. On the contrary, all new products, processes and services have some degree of risk and managing that risk is part of the key to long-term success. Ignoring even relatively minor risk factors can be serious, if not fatal, to the commercialisation process. Therefore, careful attention is paid to responses that fall into the area of concern even though the Commercial Feasibility Rating is high.

Reaching a Decision
It should be apparent that IDEAS does not make decisions. Its purpose is to provide a useful framework for assisting a prospective innovator to exercise their judgment about whether or not to move to the next stage in the innovation process. There are three more factors that are also likely to influence a decision to abandon, revise or go ahead with their idea.

The first factor is their willingness to accept the risk and how far they will go before saying 'No.' Some people can tolerate very high levels of risk and others have a very low tolerance for risk. Most successful innovators, however, do not fall into either group. Rather, they are willing to take some risks, but they also work hard to avoid or overcome them. There are always concerns with every new idea, so it is expected that some responses will fall into the Area of Concern. The questions in which a response falls into the Area of Concern need to be carefully reviewed. Many of these concerns can be resolved. What seems to get so many individuals into trouble is their failure to deal with these concerns early in the innovation process.

The second factor is the financial returns that that an idea is expected to generate. If an innovator can see the potential for a very high return, then they may be more likely to invest their time and money in a high-risk venture. If they expect a moderate return, then they will probably be more conservative.

The third factor is the relative size of the initial investment. The more money they need to invest, the lower will be the degree of risk they consider acceptable. However, this may be mitigated by the financial returns they expect to earn. In other words, ideas that offer big margins and appeal to large markets generally warrant a greater investment than specialty items with limited market appeal and modest prospects for profits.
Conclusion

Launching a new product, process or service is far more difficult than most people anticipate. This is, in part, due to the complicated nature of the innovation process and the unexpected obstacles that inevitably occur along the way. IDEAS is one method for evaluating the attractiveness of the market opportunity, the risks involved and the degree of complexity in attempting to commercialise a new idea. The objective is to help prospective innovators to come to a conclusion about the commercial feasibility of their idea and whether or not they want to develop it further. To the extent that Australian innovators become skilled at identifying and acting upon genuine commercial opportunities, the more likely Australia will see its rankings improve in UNIDO’s indicators of industrial performance.

References


