

Appraising and Financing Flexible Manufacturing Methods: Lessons for Cyprus

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The emergence of microelectronics as a powerful tool in the creation of new types of technology which can be electronically controlled has revolutionised methods of production. It has allowed manufacturing to become more flexible by combining microelectronics with mechanical engineering to bring economies of scale to batch work. It is now possible, it is claimed, to produce a wide range of products in small numbers. The Japanese appear to have maximised the potential of this new type of machinery by combining it with new methods of organisation.

The new type of technology and methods of organisation can not only absorb substantial amounts of investment but are relatively new in their application, which makes production data hard to come by. It has been 'acts of faith' in the potential of these new technologies and methods of organisation that have prompted some companies to undergo such changes. This uncertainty over the perceived benefits from such investments is summed up well by a manager of a machine tool company [quoted by Bessant and Haywood, 1986]: 'The problem lies in the banking and financial sectors which view every company only as good as its last quarter's results'.

The problems associated with appraising this new technology arise due to the relatively recent emergence of such investments, which makes reliable data difficult to obtain. More importantly, however, the optimisation of the perceived benefits can only be obtained through a change of management attitudes and organisations.

The problems of appraisal and financing can be categorised in more detail as follows:

- intangible benefits are difficult to quantify due to their 'unquantifiable' nature;
- tangible benefits can be quantified but with limited data available;
- management attitudes and ability to change are similarly difficult to evaluate;
- traditional bankers place more emphasis on fixed asset investment and its security value.

We will examine each of these problems in more detail so that possible solutions may be indicated for making the appraisal and financing of such investments more appropriate.

Intangible Benefits are Difficult to Quantify

Most of the substantial benefits are claimed to arise from the intangible advantages of such investments. These can take the form of maintenance of market shares by the company or even of improved market penetration. For example, improved response time, plus flexibility in producing various differentiated products by a clothing firm, may allow the company to obtain higher profit margins, or help it counter-balance similar investments by competitor firms. Flexibility in production and improved response time are increasingly assuming paramount importance in those sectors of manufacturing (usually clothing, footwear and furniture) which are more exposed to the whims of the consumer. These investments may not necessarily increase the first quarterly sales revenue, but those in five or ten quarters ahead. A similar improvement in company competitiveness, which may or may not result in increased sales, is the increase in quality that new investments may help to bring about. An example would be the acquisition of new machinery by a metal working firm which would drill holes in metal sheets according to the required position, depth and accuracy, thus improving the quality of the final product. The benefits to accrue from this increase in quality will be difficult to quantify but will obviously be recognised by the firm's customers.

For many companies changes of this type will have to be made in order to allow survival in an increasingly competitive market place. Traditional banking criteria, however, tend only to consider the immediate cash position of the company. This may not necessarily be improved in the short term by new machinery introduced for 'defensive' purposes, since this may not create immediate sales. Also, even if the new investment is intended to improve the company's sales performance, this will be difficult to quantify because of the relatively short history of such investments by others, and the lack of perceived reliable data. All these imply that cash generation in the crucial first few years of the life of the loan repayment schedule will be limited.

Tangible Benefits can be Quantified — but with Limited Data

Some tangible benefits can be quantified, but with difficulty, which leads evaluators to be hesitant in their appraisal. These benefits arise mainly from the introduction of 'Just in Time' methods of production and usually involve:

- a reduction of the labour force or, as in the case of Sweden, the retraining of displaced labour to carry out other tasks within the organisation;
- a reduction of working space;
- lower work-in-progress and inventories;
- increased machine utilisation.

Research carried out [Bessant and Haywood 1987] shows that the tangible benefits may bring about the desired returns and shorten the pay-back period if the changes are implemented successfully. This is likely to arise initially from the considerable reduction of stock levels which may release cash for the repayment of new loans, as well as from improvement in response times and quality which helps market penetration and improves profit margins.

New Management Methods require New Appraisal Techniques

Management methods appear to be more important than new technologies in deriving benefits. Assessing methods of organisation requires somewhat different skills, because these are new management methods and not enough experience has yet been gained in their implementation. This is not to say that with traditional investment appraisal the management methods were not appraised. Nevertheless, this is a revolutionary style of management which the appraisers need to be acquainted with. For example, the role of the Cyprus Industrial Training Authority could therefore be enhanced not only by training the manufacturers themselves in the new methods of production but also by training bankers, consultants and government officers so that they also become acquainted with the new methods.

Bankers place Emphasis on Security Values

Security valuations by bankers place emphasis on fixed assets, whereas the new systems of production are more likely to concentrate in the short run on what is traditionally viewed as 'current' expenditure.

Typical examples are:

- training of the labour force, which now becomes more of a fixed asset;
- the acquisition of computer software, which is subject to rapid change;

- consultancy advice, especially on management reorganisation.

This problem is not insurmountable, and there are ways which can be used to alleviate it. What is required at the outset is the recognition by the relevant authorities (and this may include Development Banks) that these types of investments are strategically significant in ensuring long-term competitiveness. This may be achieved more from the intangible benefits of increased flexibility, a reduction in lead times, improvements in response times and better quality.

Once this is accepted, the problem of trying to quantify them is by-passed, but not necessarily solved. Management is considered to be essential in helping these benefits to materialise. In the early stages of restructuring most of the benefits are derived from organisational changes leading up to automation, and far less from the automation itself. Although the quantification of these figures needs to be further evaluated in the light of more experience, it appears that organisational change must accompany an investment in new technology. This is well recognised by the slogan of one of the UK firms we visited — 'Organisation before Technology'.

Although it appears that changes in organisational methods can be transferred to Cyprus more easily than new machinery, this may not necessarily be the case. There are three major problems that can be foreseen. These are the availability of competent consultants, their cost (which may be rising while the cost of machinery may continue to fall drastically) and management's attitude towards accepting changes which may be recommended by the consultant. Unlike other countries, the problem in Cyprus will not be to convince the middle management of the need to change their organisation methods (for example, flatter hierarchies, four-way communication, similar status for blue-collar workers etc.) because middle management does not exist in small companies. It is the owner-manager who needs to be tackled.

Lending Schemes may help mitigate Appraisal Problems

One way forward for a financing institution is to initiate a special 'Restructuring Loan Scheme'. The purpose of the lending scheme is that it presupposes that such investments are necessary and desired. This will give the entrepreneur the signal that he or she will receive a sympathetic ear from their bankers. The concentration of such loans into a special restructuring scheme also helps to by-pass the problem of having to quantify the almost unquantifiable but strategically important benefits that are expected to arise from such investments. Furthermore, the scheme can assist — or

'force' — those changes that are needed in the company in order to help it realise those substantial benefits that can be derived. This can be done by tying the restructuring changes needed to a new 'soft' loan facility as a condition for obtaining the loan. This can be a very powerful tool in motivating change.

Our recommendations as to the possible characteristics of the lending scheme are as follows:

- Assess the immediate tangible benefits of the introduction of the new technology, as explained above, so that the extent of the quantifiable banking risk is ascertained.
- Use the loan as leverage in order to motivate the company to employ competent management consultants to help it reorganise production. This should be made a condition for the loan. (This assumes that steps will be taken by the government so that competent consultants are generated within the country).
- Provide loan assistance not only for fixed assets but for items of current expenditure such as consultancy fees, training of the labour force, market research, participation in exhibitions, expenditure on design-related costs such as software, and so on.
- Obtain a government guarantee for the scheme's operations so that the perceived 'risk', as seen by the traditional conservative banking criteria, is mitigated.
- Provide an extended grace period (of perhaps two years) and have interest rates so that the initial painful stages of management and technology reorganisation are alleviated. The overall repayment period should, of course, be of a longer-term nature.

Conclusion

Competitive production now requires a combination of new automation technologies and organisational change. This puts an emphasis on new investment, not all of which can be reflected in fixed assets. The banking sector is finding difficulty in adjusting to these changes and needs to adopt a new set of leading criteria. But if development banks are sensitive to the required changes they may be able to act as a powerful lever of change.