

PERFORMANCE ASSESSMENT IN INSTITUTIONS OF
HIGHER EDUCATION UNDER CONDITIONS OF
FINANCIAL STRINGENCY, CONTRACTION AND
CHANGING NEEDS:
A MANAGEMENT ACCOUNTING PERSPECTIVE*

by John Sizer

Many institutions of higher education in Western Europe and North America have entered, or are entering, a period of financial stagnation, falling real income per student, and perhaps actual decline in student numbers during the remainder of this century. Like many other non-profit making organisations, they are increasingly being asked to justify their activities and account for their use of resources and their performance in terms of their effectiveness and their efficiency, not only to external financing bodies but also to other influential groups in society.

Reimut Jochimsen (1979) Minister for Education and Science, North Rhine-Westphalia, Federal Republic of Germany, reflected the prevailing view of such groups in many Western European countries when he said:

“Put in a terse, exaggerated and deliberately provocative manner: as a consequence of the loss of central esteem for progress, growth and consensus within society, the higher education sector is in danger of being stamped as a steady drain on public resources - as an area of doubtful value on which considerable public funds are wasted while dissatisfied students are inadequately trained for their future tasks in society by equally dissatisfied academic staff.”

Furhermore, within institutions, consideration has to be given to the efficiency of the various academic and service departments, decisions made concerning the allocation of resources, and in some cases decisions have to be taken involving major cutbacks and reallocations of resources. Clearly managements need a sound basis upon which to arrive at and justify such decisions; in particular they need to develop and employ appropriate methods for allocating resources and for subsequently assessing the performance of the component parts of their institutions. Inevitably, there is a demand for performance indicators which will aid, and possibly over-simplify, this process; and for relevant financial information for planning, decision making and control.

In the United Kingdom, institutional performance assessment has to be undertaken against the background of the longterm trends identified in the Department of Education and Science's documents *Higher Education in the*

* An amended version of this paper will also be published in Accounting and Business Research.

1990s (1978) and *Future Trends in Higher Education* (1979); the requirement to charge overseas students full economic fees; at the time of writing, a policy vacuum in the Department of Education and Science; severe short-term pressures to reduce the level of government expenditure on higher education; and considerable uncertainty as to the level of long-term resource provision. Within institutions there is a need to balance the pressure for increased cost efficiency and possible restrictions on student admissions in the short term with the actions that need to be taken if the organisation is to be effective in the long-term.

Various aspects of institutional performance under conditions of financial stringency, contraction and changing needs have been examined elsewhere by the author (Sizer, 1979a, c, d); this paper concentrates upon management accounting aspects. In particular it is argued that academic accountants should take a greater interest in performance assessment within their institutions. At the outset it must be recognised that effectiveness and efficiency are elusive concepts in higher education, and that the process of institutional performance assessment carries with it potential liabilities which warrant careful consideration (Romney, Bogen and Micek, 1979).

What do we understand by the term “effectiveness”, and should a distinction be drawn between *effectiveness* and *efficiency*? Is an organisation effective if it achieves the objectives it has set itself, and should those objectives be appropriate to the needs of society? Is it *efficient* if it achieves those objectives with optimal use of the resources available to it in the long run? What is the relationship between effectiveness, efficiency and performance assessment? Is institutional performance assessment concerned with the measurement or observation of the effective and efficient accomplishment of the expectations of the institution’s constituencies (Romney, Bogen and Micek, 1979)? Is it an examination of the objective achievement process, which consists of at least four distinct stages in which objectives are set; resources are committed for the purpose of achieving these objectives; committed resources are expended to achieve the objectives; and outcomes result (Romney, Gray and Weldon, 1978)? If it is, should indicators of performance be viewed in this context?

Objectives for Institutions of Higher Education

Non-profit making organisations, such as institutions of higher education, exist to provide a service. Not only are services provided more difficult to measure than profits, so is the process of identifying, quantifying and agreeing an overriding objective in such organisations; developing a hierarchy of primary and secondary objectives that flow from this overriding objective; and subsequently measuring and comparing actual performance against these objectives. These difficulties, which are central to the process of performance assessment, are particularly acute in institutions of higher education.

Is an institution of higher education *effective* if it achieves objectives which are appropriate to the economic, socio-political, technological, ecological, and

educational environment in which it operates? Should its objectives be congruent with the long-term needs of society? Many of those involved in the management of institutions would probably answer such a question positively. However, would they be able to reach agreement on the long-term needs of society, the contribution their institution should make to satisfy those needs, and the objectives for their institution?

In his book, *The Effective University: A Management by Objectives Approach*, Norris (1979) argues:

“Until the goal question is resolved and meaningful priorities set for institutional policy as a whole, it is impossible to say what is really important for that institution, and hence where resources should be allocated.”

He asks whether the time has now arrived for setting and obtaining agreement upon objectives. A study conducted in 1976 by Romney (1978) for the National Center for Higher Education Management Systems of measures of institutional goal achievement is relevant to this question. Romney undertook a survey of 1,150 persons - faculty, administrators and trustees at 45 American colleges and universities of six different types - which surprisingly indicated that faculty, administrators and trustees largely agree on what their institution's goals should be. Respondents were asked to rate with respect to appropriateness for their institution twenty broadly stated institutional goal areas. Goal preference generally varied across institutional types, but there was a large degree of agreement among trustees, faculty and administrators within institutional types.

However, even if agreement can be reached on the broad objectives for an institution, can these be translated into agreed quantifiable goals and desired performance indicators? What weighting should be given to the different objectives, and how should conflicts between objectives be resolved? If it cannot, how can more detailed objectives and performance indicators be established to measure effectiveness and efficiency for the component parts of the institution? In some academic departments, particularly large multi-discipline departments, could agreement be reached amongst members as to what the objectives are for the department, for the courses offered by the department, and for the research programmes undertaken within departments? Therefore, where do members of academic departments, heads of academic departments, and deans fit into the spectrum ranging from goal conflict to striving towards goal congruence within institutions of higher education? Does today's environment encourage goal congruence or goal conflict within institutions?

Planning and Control Systems

A management accountant might argue that at a time when resources are scarce and likely to become more so, there is an obvious need for a planning and control system structured around areas of *responsibility* which will permit the organisation to plan and subsequently measure its progress towards

effectiveness and efficiency. Such systems may be seen to act as positive motivators by encouraging responsible managers to plan and control their own performance. They recognise in part or in whole that planning is the basis of control and that the process is a continuous one and comprises of:

- analysing historical performance and existing provision;
- forecasting the future economic, socio-political, technological, industrial, and educational environment to identify long term needs of society;
- developing long term objectives relevant to these needs;
- agreeing performance indicators that measure progress towards these objectives;
- formulating strategies to achieve these objectives and hence to close the gaps, if any, between existing provision and perceived future needs;
- translating these strategies into operating plans for the medium term and more detailed budgets by responsibility centres for the current year;
- allocating resources in accordance with these plans;
- motivating people to achieve these plans, recognising that planning and control systems themselves influence behaviour both positively and negatively;
- continually comparing actual with planned performance and establishing the feedback to improve short run managerial performance and to update, modify and improve longer term planning and the effectiveness of the planning and control system itself.

Within the framework of such long-term and short-term planning and control systems, institutions and financing bodies would appraise individual investment decisions (capital projects, new course proposals, etc.) and short-term tactical changes (course changes, class sizes, etc.).

Such long-term planning and short-term budgetary planning and control systems are used extensively in profit-making organisations. Such systems are particularly attractive in those situations where the product is well-defined and can be measured, the economic and socio-political environment is stable or is changing only slowly, the technology is established, innovations are infrequent, and the precise nature of the relationship between inputs and outputs is known. In these circumstances the implementation problems of the planning and control cycle are likely to be largely behavioural not technical, and mathematical models can be developed to facilitate a rational allocation of resources.

On the other hand, in those situations where joint costs and products are normal, the external environment is complex and unknown, the horizon, the “production function” is not defined, and the ultimate impacts of the outputs of the organisation are long term, as many profit-making organisations have discovered, such systems require a great deal of exacting and time-consuming effort and may still fail to cope adequately with the ambiguity, complexity and uncertainty. Institutions of higher education come into this category. Not only may some institutions be characterised by goal conflict rather than by striving towards goal congruence, they have joint inputs and multiple outputs and outcomes, the ultimate impact of which is extremely

hard to measure. In these circumstances not only is it difficult to develop long-term planning systems and resource allocation models, but also performance indicators which measure the effectiveness and efficiency of the institution as a whole. One attempt to adapt such systems to non-profit organisations was reflected in the development of Programme Planning and Budgeting Systems. More recently efforts have been directed at the development of inter-active computer based financial planning models and multi-dimensional analysis.

Non-Profit Performance Evaluation Techniques

Have attempts to apply non-profit performance evaluation techniques, such as Programme Planning Budgeting Systems (PPBS) and Cost Benefit Analysis (CBA), to institutions of higher education been successful? Both techniques attempt to relate costs to outcome assessments. They require the introduction of cost collection and allocation systems. While allocation of joint costs poses many problems, it is the measurement of outcomes that is the critical factor in their rejection. PPBS requires the specification of objectives which can be readily transformed into outcome quantities and statistics, and CBA the transformation of essentially non-monetary outcomes into monetary outcomes. Thus, Balderston (1974) states:

“Because the operational definition of objectives and the measurement of achievement towards these objectives are still difficult and incompletely resolved, the dream of planning towards long range goals and budgeting for results remains (some would say blessedly) incomplete.”

Drawing upon an extensive review and critique of PPBS in higher education undertaken with G. B. Weathersby (1972), Balderston observes that the specifics of measurement of the quantity and quality of results achieved are not very far developed; that a university abounds in multiple processes, and the analysis of costs and results in the presence of substantial jointness and inter-dependence is difficult, and that the problem of time horizons has proved to be, politically, the most serious of all, because funding sources were unwilling or unable to look beyond very short commitments - typically, the single budget year. However, he decides that:

“The most enduring legacy of the program budgeting experience of universities has been the development of a much more sophisticated analytic spirit, both within the university, and in state and federal agencies.”

(Balderston, 1974)

The proponents of PPBS did successfully identify a series of strategic weaknesses in the planning and management of public resources (Dennison, 1979).

If PPBS, which aims at directing resource allocation, according to the objectives of institutions, and subsequently comparing actual with planned performance, is not feasible, can this legacy be built on in the development of performance indicators for the various activities that take place within institutions of higher

education? Farmer (1976) argues that while PPBS may be expensive and difficult to operate, "the technology associated with PPBS may significantly improve the art of management by improved insight into the higher education process". For this reason, he suggests, "an administrator would be negligent if he did not invest in the time to learn about PPBS and its technology".

Balderston (1974) also sees that the spirit of informed inquiry, leading to more careful evaluation of alternatives and rational decision making, can be realised in *policy analysis* without "the formal baggage of PPBS". Thuse, he and Weathersby (1972) wrote:

"The approach of policy analysis is to bring careful analysis to bear incrementally in specific decision problems and build a planning and management "system" on a case law of precedent basis."

Similarly, Ostergren (1977 and 1978) sees *activity evaluation*, or *institutional self-evaluation*, as providing "a starting point for the reappraisal and alteration of activities":

"Certainly the emphasis is on developing the institution's own capacity to critically examine its organisation and activities, to reorder its priorities, to raise its effectiveness, efficiency and innovative capability."

Similarly, Romney (1978) suggests "... consensus building techniques can facilitate the selection of appropriate goals and measures within institutions".

Can we see a logical development from quantitatively based PPBS and CBA techniques, towards the increasing interest in quantitatively and qualitatively based participatory institutional self-evaluation, and consensus building techniques? Will inter-active computer based financial planning models assist consensus building?

Inter-active Financial Planning Models

One way large profit-making organisations have attempted to cope with the increasingly uncertain and dynamic environment over the last decade, has been through the use of computer based, inter active financial planning models. Some universities have utilised similar models. For example, Stanford University has developed an inter active computer model called TRADES (Dickmeyer, Hopkins and Massey 1978). "TRADES" is a convenience term for "trade-offs". It was developed to provide answers to such questions as: "Can we keep tuition fee increases down and give our faculty the pay rises they deserve?" "If utility prices continue to rise can we still allocate a portion of our budget to new programs?" With TRADES Stanford's administrators have also sought to implement some more dynamic concepts, such as planning the transition to equilibrium of a university budget during periods of high inflation and consequently falling real income (Massey, 1976, and Hopkins and Massey, 1977). This work was directed towards achieving budget equilibrium within a relatively short period of time, say, three to five years, under deterministic conditions. More recent work (Grinold, Hopkins and Massey, 1978) has been directed towards finding optimal control policies for the university's budget over an indefinitely extended future and under conditions of uncertainty.

More specifically, the Stanford administrators are seeking measures to stabilise budget growth over the longer period in face of major uncertainties about the future course of inflation, endowment returns, and other external economic factors; a not unfamiliar problem facing British universities.

Such models do not dismiss the uncertainty surrounding university planning, but they assist in understanding the nature of the uncertainty. They allow administrators to test the sensitivity of the plans to variations in key variables, to evaluate trade offs and test tactical decisions, to revise plans quickly when variations in key variables do take place, and to identify key future performance indicators relating to the primary planning variables. The availability of such models in British universities would have facilitated the preparation of a response to a request from the University Grants Committee to consider the effect on student and staff numbers of three possible levels of allocation for home students in terms of pay and prices ruling at 31st July 1979 for the quadrennium 1980/81 to 1983/84. The responses were prepared against the background of a phased introduction of fees for overseas students based on the full costs of providing their education and the possibility that the allocation for home students may not be supplemented in full for future pay and price increases. The models might have been used to test the sensitivity of financial forecasts to variations in numbers of overseas students, staff-student ratios, "incremental drift" (ie: the difference between average salaries paid by the university and the mid-point in the scales provided by the UGC), supplementation for inflation, changes in student mix by course, etc.

Also, at Stanford, the basic concepts of the model proved to be explainable to a wide audience and provided the administration with a rationale for what by all odds was going to be a bitter pill of budget-reduction medicine. Thus, they assisted consensus building within the university. British universities are currently in the process of responding to similar medicine.

Multi-dimensional Analysis: The Efficient Frontier

Has there been any work recently in the area of multidimensional analyses of institutional performance which is of interest to accountants? Work by Carlson (1972, 1975) and Truehart and Weathersby (1977) in the United States, and by Calvert and Birch (1978) in the United Kingdom has been concerned with applying Farrell's work (1957) on the measurement of productive efficiency to institutions of higher education. Farrell distinguished between a firm's *technical* efficiency and its *price* efficiency; Carlson's and Truehart and Weathersby's work has been concerned with identifying technically efficient, or frontier, institutions, and analysing their characteristics. Calvert (1978) is extending this work to examine the non-frontier institutions, and to test the possibility of *within* institution mappings using the data base established in the Lanchester Polytechnic/Loughborough University of Technology study of performance indicators for the teaching function (Birch, Calvert and Sizer, 1977).

Research on the application of the „efficiency“ frontier to date constitutes a first step in the development of an overall ranking criterion for multi-objective

organisations. It could make possible:

- a) a multi-regression study of the frontier institutions/departments to reveal their resource use characteristics and so facilitate advice aimed at improving the performance of non-frontier institutions.
- b) The specification of a mechanism facilitating management by exception both across and, if the Calvert (1978) research proves this to be possible, within institutions.

However, as Balderston (1979) has pointed out, there are obvious pitfalls in attempts to calculate the efficient frontier institutions when all you may be doing is to generate noise from different technologies of scholarship across disciplines. The author remains to be convinced of the practical value of this work.

"Partial" Performance Indicators

Given the complexities and difficulties surrounding the objective setting and planning process, and the difficulties associated with non-profit performance evaluation techniques and multi dimensional analysis, it is not surprising that there is a tendency to recognise those parts of the system that can be measured and monitored with a considerable degree of precision. While it may not prove possible to agree objectives, measure outcomes and develop performance indicators for an institution as a whole, it often proves possible to do so for parts of the organisation; ie: to develop performance indicators that relate physical and monetary inputs to physical and monetary outputs and outcomes, and to build these into the planning and reporting system. However, do those who develop and employ such partial performance indicators always remember that optimising the parts does not necessarily optimise the whole?

Sorenson and Grove (1977) have summarised the objectives and properties of various service performance indicators: availability, awareness, accessibility, extensiveness, appropriateness, efficiency, effectiveness, outcomes/benefits/impacts, and acceptability. From these, the author has developed partial performance indicators for institutions of higher education (Table 1) (Sizer, 1979b).

TABLE 1
Properties of performance indicators in higher education

<i>Focus of measure</i>	<i>Conceptual content</i>	<i>Tells</i>	<i>Examples</i>
AVAILABILITY	Amount and type of course, research facility, or central service provided.	What can be obtained	List of services available in Careers Advisory Service; list of research facilities and opportunities available in academic department; number, capacities, and locations of lecture and seminar rooms.
AWARENESS	Knowledge of User Population of existence; range and conditions for entry or use of courses, research facilities, or central services.	Who knows about what is available	Knowledge of prospective students of courses offered by an academic department. Knowledge by prospective users of services provided by central computer centre.
ACCESSIBILITY	Indicates if services can be obtained by appropriate groups.	Ease of reaching and using facility	Availability of photocopying facilities; Location of car parks; average waiting time for literature search by library information service; opening hours of medical centre.
EXTENSIVENESS	Compares quantity of services rendered with capacity available and/or potential demand.	„How Much” but not „How Well”	Students enrolled on courses compared with course quotas; number of users of Library; clients in medical centre; percentage of final year students using careers advisory service; % utilisation of lecture and seminar rooms.
APPROPRIATENESS	Correct type and amount of service rendered, course offered, or research undertaken.	Is quantity and/or quality of facility offered that required?	Demand for courses: number and quality of applicants; mis match between computing facilities required and available; comparison of class sizes to lecture and seminar room capacities.
EFFICIENCY	Compares resource inputs with outputs	How much resource was used such as – how much did it cost per unit – how much did it cost in total – how much time did it take – what grade of employee was used	Cost per client service in medical centre Cost per F.T.E. student by course Cost per literature search Cost per meal served

<i>Focus of measure</i>	<i>Conceptual content</i>	<i>Tells</i>	<i>Examples</i>
EFFECTIVENESS	Compares accomplishment with objectives (or what was intended) – Qualitative – Comparative	Characteristics Duration Content Effect Proportions served Variances from budgets, standards	Comparison of planned with actual: % utilisation of lecture and seminar rooms; number of students graduating; number of graduates employed; ratio of actual utilisation to planned utilisation of computer; comparison of budgeted cost of central service with actual cost; comparison of actual cost per F.T.E. for course with planned; comparison of planned course content with actual course content; actual wastage rate compared with planned wastage rate.
OUTCOMES/ BENEFITS/ IMPACTS	Identifies Social or Economic Benefit	Monetary effects Non monetary effects	Increase in earnings arising from attendance at/graduating from course; benefits to society of successful research into previously incurable disease; benefits to local community of cultural programme. Patents and copyrights registered.
ACCEPTABILITY	Assess match of Service/Course/Research outcomes with user/participant preferences.	User satisfaction with services; Student satisfaction with courses; Client satisfaction with outcome of sponsored research	Demand for courses; number of complaints to Librarian; course evaluation at end of lecture programme; repeat sponsoring of research

Many of these partial performance indicators are traditional *process measures* of institutional performance, such as staff-student ratios and cost per FTE, rather than *outcome measures* or ones that substantiate progress towards achieving objectives. As might be expected, traditional process measures of institutional performance were rejected by almost all categories of respondents in the Romney (1978) study. Objective measures pertaining to impacts of higher education such as satisfaction, ability to apply knowledge, publications, and value added were most preferred.

No doubt Romney's respondents would argue that if an effective institution of higher education is one which achieves objectives which are appropriate to the economic, socio-political, technological, ecological and educational environment in which it operates, its effectiveness should be measured in terms of outcomes/benefits/impacts of its teaching and research programmes on society. There is a danger in using short-term input indicators of performance, such as cost per full-time-equivalent student or cost per graduate,

that sight might be lost of the long-term measure of the effectiveness of institutions, ie: their contribution to the needs of society. A head of an academic department may argue that while his costs per FTE student compares unfavourably with other similar departments in his own and other institutions, the long term impacts/benefits of the research and teaching programmes in his department compare favourably and outweigh the higher costs. Furthermore, questions concerning the quality of outcomes and their impact on society are bound to be raised by governments determined to get better value for public expenditure in higher education. In other words, short-term quantitative input and outcome measures and performance indicators are inadequate, and quality of outcomes and long-term impacts/benefits should be assessed.

“If the management of retrenchment is to preserve excellence, however, there must be some way of obtaining quality assessments and use them for making selective priority decisions.”

(Balderston, 1979)

This argument is fine and logical but the difficulties involved in developing impact/benefit/outcome measures, and incorporating them into management information systems, should not be underestimated. Is it likely that highly sophisticated research designs will be required, which not only will prove expensive but involve a degree of complexity which may be regarded as impractical, probably rightly so, by administrators? Balderston (1974) has observed that the data base is not available, nor are the techniques for segregating the specific impact of one university from the other forces at work. Romney (1978) put it more strongly when he concluded:

“The art of measuring the outcomes remains in a distinctly primitive state. We have done almost no research to chart the maze of differences in value that various external constituencies of higher education assign to the range of objectives that might be agreed to within the enterprise. We do not know how to measure the quality of institutional outcomes, or research outcomes, or community-service outcomes.”

Nevertheless, it may well be that the time is right in many European countries to attempt to assess the quality of institutions, and the social value of different disciplines.

It is not surprising that to date administrators and decision makers have tended to fall back onto quantitatively based process measures even though they know these are inadequate measures of institutional effectiveness, though many of these measures (such as staff-student ratios, and cost per FTE) are relevant to decisions regarding internal planning, control and resource allocation, and for measurement of efficiency as opposed to effectiveness. As Delany (1978) has pointed out, the function of control “. . . does not cover other aspects of the problem of policy making which deal with the quality of outputs”. It is concerned with the relationship between expected and actual inputs, and expected and actual outputs. Romney (1978) suggests:

“A good many legislators are quite willing to admit that the heavily numerical, efficiency-based accountability perspective is inappropriate to higher education”,

and considers institutions should concentrate, for the purposes of assessing institutional effectiveness, upon the development of measures that substantiate progress towards achievement in those few goal areas that constituencies consider appropriate. At the present time there is a strong case for developing *progress measures* of performance in addition to *process measures* and *measures of outcomes/benefits/impacts*.

Despite Romney's view (1978) that much research is needed regarding the translation of institutional goals into measurable, observable objectives; in the United Kingdom there is a strong case for a concerted effort to be made to develop and obtain agreement within institutions on their academic policy and objectives for the 1980s and into the 1990s. The Department of Education and Science's discussion document, *Higher Education in the 1990s* (1978) examines future demand for higher education by projection of student numbers under certain assumptions, and the document, *Future Trends in Higher Education* (1979), revises these projections downwards. Neither document fully considers the demand for outputs from the educational system. In looking forward into the 1980s and on into the 1990s, should not institutions examine the environment in which they will be operating and attempt to identify what the needs of society will be, given this environment? Inevitably it will be argued that we are not very good at forecasting the future needs of society, but surely it is better to attempt to identify and satisfy future needs than to assume in a rapidly changing society that today's needs (frequently measured in terms of applications from school leavers) are the best indicators we have of future needs?

The author has identified elsewhere (Sizer, 1979d) trends which are, and will continue to influence significantly the environment in which institutions of higher education in Western Europe will be operating. Consideration of these trends indicates that it is not simply a question of examining the impact of falling numbers on the higher education system, but it is also necessary to recognise that society is likely to require a different mix of outputs from the system than at present. Thus, Jochimsen (1979) has argued that while "... a policy directed towards preserving, and making the necessary improvements to, the standards of efficiency at universities can be implemented only if members, professors, administrators and students join in a new effort"; an essential precondition for such an effort is that "policy makers and society in general can really be convinced that such higher education institutions are not only willing to fulfill, but are also capable of fulfilling, the tasks required by them from the societal aspect". Is it important that institutions recognise these trends and not only plan for declining numbers, but also for the need for *resource mobility* on the one hand and for research in anticipation of new course demands, research and consultancy opportunities on the other? *Therefore should the performance of an institution be assessed in terms of its responsiveness to these changing needs of society and appropriate performance indicators be developed to measure an institution's progress in responding to these changing needs?*

An examination of the planning and managerial implications of this

conclusion is beyond the scope of this paper. It has been argued elsewhere (Sizer, 1979c) that institutions need to compare *strengths* in various subject areas relative to other institutions with the *future attractiveness* of subject areas to provide a starting point for internal discussions on the institution's long term strategy for resource mobility. The policy directional matrices employed by the American General Electric Company (Allen, 1978) and the Shell Group (Robinson, Hichens and Wade, 1978) have been adapted for this purpose. As will be seen from Figure 1, it is envisaged that such a strategy would classify subject areas into *growth*, *consolidation* and *withdrawal* areas. The agreed strategy would need to be translated into a detailed action plan including key result areas. Measures to assess *progress* towards implementing the strategy, particularly in these key result areas, would flow from the plan. Under conditions of financial stringency and uncertainty, do institutions need to complement their long-term strategy for resource mobility with a short-term strategy for financial emergencies (Donaldson, 1970) and a medium-term strategy for financial mobility (Donaldson, 1969)? The existence of computer based financial planning models facilitates the preparation and updating of such strategies.

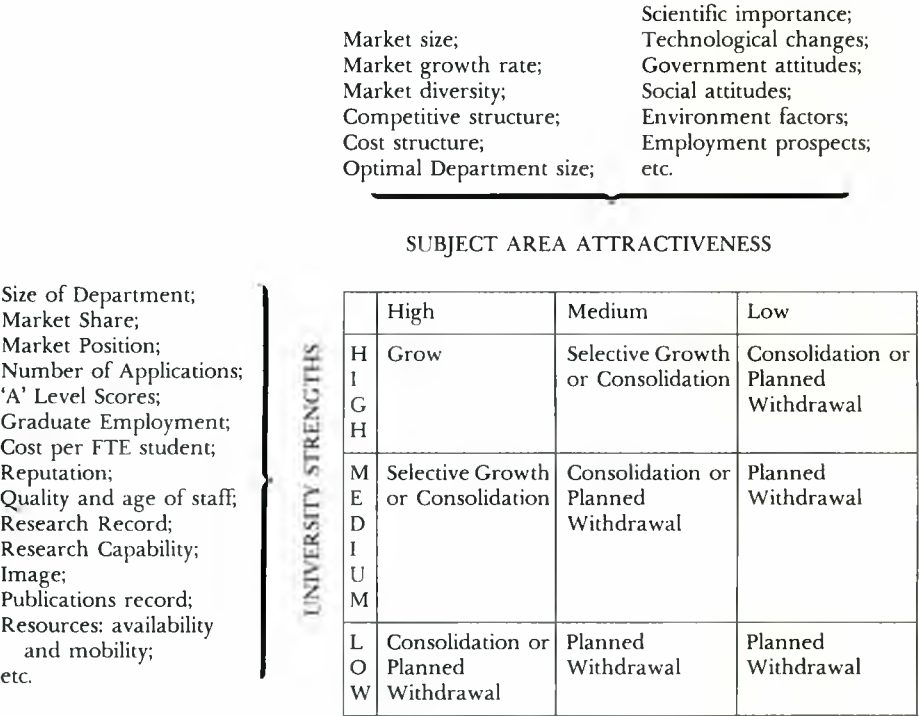


Figure 1

The strategic planning approach advocated elsewhere (Sizer, 1979c) should enable institutions to develop a set of alternative strategies and operating plans including strategies for *long-term resource mobility*. As changes in the external environment do occur the range of strategies can be narrowed down and the

appropriate strategy and operating plan implemented. Hopefully, the existence of parallel plans for short-term financial emergencies and medium-term financial mobility will ensure not only an appropriate *speed of response* to a rapidly changing external environment which is compatible with the strategy for long-term resource mobility, but also increases *flexibility* in planning. It will help to ensure an appropriate balance is obtained between the pressure to increase cost efficiency in the short-term and actions needed to be taken if the organisation is to be effective in the long-term.

Tests of Appropriateness

Clearly, a whole range of process, outcome and progress performance indicators should be considered when establishing appropriate indicators for the research, teaching and central service functions within an institution of higher education. Given that higher education abounds with joint inputs and multiple outputs and outcomes, and the ultimate impact of many of the outcomes is long-term and extremely difficult to measure, what tests should be applied to various possible indicators to determine whether they are appropriate for the purpose intended? Can the American Accounting Association *Statement of Basic Accounting Theory* (1966) standards be applied to performance indicators in higher education? These are the standards of relevance, verifiability, freedom from bias, and quantifiability. It should be recognised at the outset that *trade-offs* frequently have to be made between standards.

1. Relevance

Should relevance be the dominant test applied to any proposed or existing performance indicator? Is a relevant performance indicator one which bears upon the activity or is useful to those concerned with managing that activity? Who determines "relevance"? While the administrator should provide guidance, should it be the decision maker, either an individual responsible for the function to which an indicator relates or a policy committee that oversees the function?

Do we always recognise that a performance indicator may be relevant for the purpose for which it was developed, but not relevant when used for other purposes?

Accountants will recognise one of the major problems facing those who wish to produce (for internal planning, control, and resource allocation purposes) financial performance indicators for the research and teaching functions in higher education is the unscrambling of joint costs of research and teaching functions and the central services that support them. It may be wise to recognise at the outset that it is not possible to unscramble the joint costs, and that any attempt to do so is riddled with assumptions that do not stand up to objective assessment and criticism. As illustrated by Table 2, prepared by Cossu (1978), most attempts to unscramble joint costs in institutions of higher education employ an absorption costing approach to produce full costs.

TABLE 2
Costs in Some University Planning Systems

<i>Name of system or university</i>	<i>Operational (O) Study (S) Project (P)</i>	<i>Elements</i>	<i>Input costs nature</i>	<i>Disaggregation</i>	<i>Elements</i>	<i>Output costs Nature</i>	<i>Activities</i>	<i>Disaggregation</i>	<i>Bibliography</i>
<i>1-Models</i>									
CAMPUS VIII	O	Salaries Operating Capital	Average Linear function Average	Grade High 7	Operating budget Investment budget Cost/stu- dent/hour	Full	All — Teaching	Cost centre Type of facilities Sub-pro- gramme	Hussain (1977) Compere (1977)
RRPM 13	O	Salaries Operating Capital	Average Linear function Average	Grade Low Low	Operating Budget Investment budget Cost/stu- dent/hour	Full	All — Teaching	Cost centre Global Sub-pro- gramme	
RRPM 16	O	Salaries Operating	Average Linear function	Grade Single	Operating Cost/stu- dent/hour	Full Direct	All Teaching	Cost centre Program- me	
HIS A HIS B	O	Nil			Nil				
HIS C	P	?	?	?	Budgets Unit costs	?	?	?	
MSAR	O	Salaries Building	Average Average	Grade Type of fa- cilities	Salaries budget Investment budget		Teaching Mainte- nance	Global Global	Hussain (1977)
TUSS	O/S	Salaries Operating building	Average Linear function Average	Category Single Type of fa- cilities	Operating budget Investment budget Cost/stu- dent	Full Full	All — Teaching	Global Global Depart- ment	Hussain (1977) Compere (1977)
<i>2-Budgetary procedures</i>									
University of Wisconsin Oskosh	O	Salaries Indirect costs Capital	Average Unit	Category Various	Budget	Full	All	Depart- ment	Adams (1977)
University of Bradford	S	Salaries Operating Capital	Average Cash flow Oppor- tunity	Depart- ment Depart- ment	Budget	Full	Excluding research	Program- me	Bradford (1975)
University of Copenhagen	S	Salaries Overhead	Average Average/ Teaching hour	Depart- ment Depart- ment	Budget	Full Excluding capital	—	Depart- ment	Jensen (1972)
University of Lancaster	S/O	Salaries Other expenditu- re		Grade/De- partment Depart- ment	Five year Plan Budget	Full Except building	Teaching	Depart- ment	Lancaster (1972)

(Source: Cossu, Claude, „Costs: Tools for University Planning”, *International Journal of Institutional Management in Higher Education*, September 1978, Vol. 2, No. 2, p. 210)

Do university administrators who use such approaches to generate and supply financial indicators not only test their cost allocation procedures against the standards of relevance, verifiability, etc. but also explain the assumptions underlying the indicators, and the uses that can and cannot be made of them, to those who receive and use the indicators? Do they always recognise:

- i) There is no one way of apportioning joint costs to cost centres or absorbing joint costs into cost units. It is quite possible that two equally competent accountants would arrive at different unit costs from the same basic data.
- ii) In institutions of higher education a high proportion of the costs are fixed or period costs, therefore, the average costs are unsuitable for determining the *incremental costs* of extra or fewer students, changes in course design, etc.; or the *avoidable costs* if a department is closed, a course no longer offered, etc.
- iii) Methods that allocate staff costs on the basis of diary analysis, timetable analysis, etc. do not answer the question: If the lecturer was not lecturing to this course, what would he be doing with his time? If the lecturer has to allocate his time to competing demands, is the cost of his meeting one demand the best alternative foregone, ie: the *opportunity cost*, not the *sunk cost* of his salary he will be paid regardless of how he allocates his time?
- iv) Nor do such systems consider *societal costs* of higher education, such as the opportunity costs and benefits to society of students attending institutions of higher education.

2. Verifiability

The A.A.A. *Statement* (1966) defines verifiability as “that attribute of information which allows qualified individuals working independently of one another to develop essentially similar measures or conclusions from an examination of the same evidence, data, or research”. In institutions of higher education is this an extremely important standard, when, for example, a performance indicator, such as staff-student ratio, is applied across a number of teaching departments, and subsequently forms an input into the resource allocation process? Is it unlikely that the absorption costing systems referred to above would meet this standard? Does the standard of verifiability aim at protecting the teaching department from arbitrary subjective judgements by those who use the data, and protect the user from similar judgements by those who generate the data? Given the democratic nature of institutions of higher education, is verifiability essential if harmonious relations are to exist between administrators and academics, and between heads of departments and units and resource allocating committees? If one accepts the continuing need for verifiability, one also recognises the importance of reliable initial source data, data banks, and appropriate management information systems.

3. Freedom From Bias

Should the performance indicator be free from both *statistical* and *personal* bias? Statistical bias can result from inappropriate techniques of measurement, and “personal” bias from conscious manipulation of information for personal gain. This leads to the questions: Are the techniques of measurement appropriate? Can the performance indicator be manipulated by individuals to their advantage?

4. Quantifiability

How important is this standard to performance indicators in higher education? It may be necessary to trade-off between quantifiability and relevance. Care must be taken not to give greater weight to quantifiable less relevant indicators, than to non-quantifiable but relevant indicators. For example, number of research publications may be less relevant than the quality of research papers. The quality of lecturers' performances in classrooms may be more relevant than their average lecture hours. Östergren (1977) has recognised that "activity evaluation is very liable to be dominated by those aspects of activities and results which are more amenable to quantitative description". He asks: "How can a proper balance be struck between qualitative and quantitative aspects?" Reports on French experience (Cuenin, 1978 and Fardeau, 1978), and studies conducted by NCHEMS (Lawrence, Weathersby and Patterson, 1970; Micek and Arney, 1974; Micek and Walhaus, 1973) and Chan (1978) in the United States, confirm that this is a particularly relevant question when considering research performance indicators. Furthermore, as Romney (1978) has pointed out, if the external financing bodies continue to emphasise indicators of process, rather than progress, effectiveness and efficiency when assessing institutions, administrators and faculty will begin, or continue, to function in accordance with incentive structures which are not consistent with an institution's goals and objectives. (See for example examinations by Gross (1979) of formula budgeting and financing of public higher education in the United States, and by Cuthbert and Birch (1979) of the operations of the Advanced Further Education Pool in the United Kingdom.) Nevertheless, are relevant quantifiable performance indicators more likely to meet the tests of verifiability and freedom from bias, than relevant qualitative and non-quantitative indicators?

A fifth standard proposed by the A.A.A. Committee on Managerial Decision Models (1969) should also be applied to performance indicators in higher education.

5. Economic Feasibility

Having established appropriate performance indicators in the areas of teaching, research and support services, accountants will recognise that an information system has to be developed for reporting physical measures of inputs and outputs and financial indicators, such as unit costs, and agreed measures of progress towards institutional objectives developed by consensus building techniques, to responsible management. However, will the cost of producing the performance indicator be outweighed by the benefit derived from its availability and use by decision makers? Economic feasibility is part of the trade-offs between relevance, freedom from bias, and verifiability. Fortunately, as the A.A.A. Decision Models Committee (1969) has pointed out, in institutions of higher education, as in other organisations:

"... the costs of gathering, storing, and presenting information are expected to decline in the future, so the standard of economic feasibility may be expected to encourage rather than deter requirements in information systems."

For example, the TRADES model allows administrators at Stanford to assess

rapidly the effects of different assumptions and present outputs of a highly relevant nature at about 60 cents a run! (Hopkins and Massey, 1977)

Balderston (1974) has argued: "Universities will do well to install the best data systems they can afford and tolerate". On the other hand, many would agree with Romney's view (1978) that "Throughout higher education the potential for information overload is overwhelming". While Somit (1979) has suggested that "So long as universities enjoyed constantly increasing funding the fallacy that management decisions could be based entirely on "information" if only we have enough, remained unchallenged. When that era ended, the inherent limitations of data and of systems which provided them became all too apparent."

In theory the manager of a responsibility centre, be it a service department, an academic department, or a research centre, should be required to agree objectives; to quantify targets; to evaluate and choose between alternatives; to plan and budget for the resources required; to organise, motivate and direct those resources; and to compare actual performance against the plan, and, when appropriate, take action on adverse deviations. The design and implementation of an information system to support this range of tasks is a demanding exercise even where objectives are clear cut, the output is well defined and input-output relationships established. It has been emphasised that it is immensely more difficult in higher education "... given the intangible and inherently immeasurable nature of the values which pervade higher education and which in the long run determine our actions" (Somit, 1979). Nevertheless, society and financing bodies are not prepared to exempt education managers from assessment in terms of their effectiveness and efficiency, and certainly they should be encouraged to assess their own performance. Therefore, despite Romney's and Somit's observations, provided the information system meets the standard of economic feasibility, should it concentrate on:

- a) providing a base for planning and controlling *resource utilisation*;
- b) monitoring the level of *response* to and *outcomes* of the institution's provision of learning opportunities, research facilities, and central services and expressing these responses in the form of non-financial and financial, quantitative performance indicators; and
- c) monitoring agreed *measures of progress* towards institutional goals developed by consensus building techniques, so as to provide a meaningful starting point from which qualitative managerial judgements can be made?

6. Institutional Acceptability

Porter (1978) has proposed a further test be added to the five standards.

"The measures of performance adopted may not themselves be the most reliable indicators of effectiveness or even efficiency but they could be justified if they lead to improved performance or decision taking even though they themselves may not be thoroughly sound intellectually. What is vital is that the people using the indicators should accept them, and the basis on which they are devised, as relevant and fair."

Is Porter recognising the political realities of institutions of higher education? As Argyris (1970) has pointed out:

“New developments for rational decision making often produce intense resentment in men who ordinarily view themselves as realistic, flexible, definitely rational. Managers and executives who place a premium on rationality and work hard to subdue emotionality, become resistant and combative in the back-alley ways of bureaucratic politics when such technologies are introduced.”

Could “heads of departments and units” be substituted for “managers and executives” in Argyris’ statement? Thus, is Romney (1978) right to argue, like Porter, that consensus building techniques, such as those described in his study, can facilitate the selection of appropriate goals and measures within institutions? Will such approaches result in economy of information by concentrating on the few highly appropriate goal areas for which a consensus exists, rather than trying to document progress in every goal area that has been accorded some degree of appropriateness?

On the other hand, should we recognise that such consensus building might be more easily achieved when resources are relatively abundant than when they are relatively scarce? A recent study undertaken by Hills and Mahoney (1978) of the nature of budget decision making in a university is relevant to this question. Their research indicated that relative abundance or scarcity of resources available for allocation is a significant influence in the budgeting process. They found that, while precedent was a significant influence in both situations, it was the *predominant* influence in the allocation of discretionary budget increments under conditions of abundant resources and a *secondary* influence under conditions of scarce resources. In this American study the *predominant* influence during the period of scarce resources was externally based power represented by the existence of advisory boards; an influence not readily apparent during periods of abundant resources. Furthermore, a bureaucratic, or universalistic, criterion, relative workload, was influential in the period of abundant resources but had little influence during the period of scarce resources. Hills and Mahoney (1978) consider their results suggest that “subunit budgeting is a process designed, in part, to ameliorate conflict and to maintain apparent harmony. This is accomplished by the allocation of discretionary resources according to accepted standards (workload) and a proportionate, or fair share, criterion during periods of relative abundance of resources”. This practice is consistent with Porter’s standard of institutional acceptability.

In an interesting critique of the Planning System employed at the University of Aston in Birmingham, Houghton, Mackie and Pietrowski (1979) highlight the limitations of relative workload criteria under conditions of stagnation and financial stringency.

“The major characteristic of Aston’s planning procedures, of which it has been justly proud in the past, is that it has been structured on a quantitative basis so that, in theory at least, academic departments forming the input

can establish the output for themselves. A quantitative system, however, based largely on "immediate past practice and the outcome of the previous year, can only function effectively in an expanding situation . . . In a steady state or reducing situation however, such as that now facing British universities, Aston's system allows little room for manoeuvre since there are in the plan no firmly established priorities as such: these have been expressed only in the broadest sense . . . Thus the matching of academic planning desires with the financial resources available can only be achieved by cutting across the spectrum equally, or in planning jargon, "rateably reducing". The academic plan becomes a race in which everyone wins a prize but no one gets the gold medal."

Hills and Mahoney's research suggests that during periods of scarcity of resources, "it is the powerful subunits that emerge to claim their resources at the expense of other subunits. Further it is the external ties that subunits have which they can use as this power base." Under these conditions, is "cutting across the spectrum equally" acceptable to heads of powerful departments and do institutional acceptability and consensus building evaporate in the "back-alley ways of bureaucratic politics"?

Nevertheless, it is suggested that these standards: relevance, verifiability, freedom from bias, quantifiability, economic feasibility, and institutional acceptability, can usefully be applied to existing and proposed performance indicators in institutions of higher education.

"Managers of Change"

It is in the context of the back-alley ways of bureaucratic politics that the author frequently poses the question:

Can you manage change and achieve resource mobility during a period when institutions are likely to be more concerned with coping with the pressures of revised student numbers and lower provision per FTE? In other words, will the senior academics and administrators, the managers of change, in institutions of higher education be so concerned with today's problems that they will not give adequate consideration, and make appropriate plans, to cope with tomorrow's problems, particularly when many of these managers of change may have retired before the 1990s?

As Richard Cyert (1977) the distinguished organisational theorist and President of Carnegie-Mellon, has emphasised:

"The trick of managing the contracting organisation is to break the vicious circle which tends to lead to disintegration of the organisation. Management must develop counter forces which will allow the organisation to maintain viability."

Furthermore, in the United Kingdom, it is important to recognise that although there are parallels with earlier periods of low growth in institutions, significant changes have taken place in the status and attitudes of university lecturers. They feel there has been a significant lowering of their status in society and they have been badly treated by the Government. They will face

higher teaching loads at a time when their career opportunities have diminished significantly. Not only will they have less time for research, but, if there are few promotional prospects, they may well not feel motivated to undertake research of the type needed to cope with the dynamic changes in society anticipated (assuming research grants are available), and the union that represents them may not accept, though it may recognise, the need for resource mobility and for lecturers' own retraining and redeployment.

"The real danger of contraction, however, is that individuals who by nature desire excellence will begin to settle for mediocrity out of frustration." (Richard Cyert, 1978)

Like Cyert (1977), Sizer has argued elsewhere (1979 a and c) that there is a need to appoint high quality managers of appropriate academic standing who can overcome institutional inertia when the opportunities arise. These managers of change should not only be able to plan and control efficiently the allocation of resources to see their institutions through the short-term "hump" and financial squeeze, but also be able to motivate people to recognise the need for long-term change, and secure their participation in its planning during the period of the "hump" and its implementation during the subsequent contraction.

However, while Cyert (1977) considers management "is our major hope for the future", he also recognises that "... academics resist being managed by expert managers and seek to have an academic in the top management position. Only rarely will this approach lead to an excellent manager." (Cyert, 1978) It may be for this reason that an anonymous Registrar of a British University has expressed the view:

"Individually they (the Universities) find themselves without the apparatus for that efficient and effective deployment and management of scarce resources which is going to be increasingly important as these resources become scarcer, and hung up still on the medieval and almost superstitious fear of "management" within "universities which leaves the resource allocation processes in many of them hardly able to stand comparison with an unsophisticated game of bingo."

(Times Higher Education Supplement)

This Registrar's view of the resource allocation processes in British universities gives rise to the question: Do those seeking to reduce higher education cost per student by improved use of resources without reducing the quality of educational provision, know sufficient about the processes by which resources are allocated within institutions to be sure that they will result in the improved use of resources and the resource mobility necessary for longer term effectiveness? Do the decision makers within institutions ask themselves whether their resource allocation formulae are compatible with their long term objectives and strategies? Could their resource allocation processes be dysfunctional in this respect? Do the committees that take decisions about "frozen posts" take account of long-term strategies for resource mobility or simply concentrate on current and forecast staff/student ratios?

Over-emphasis on *process performance indicators* that measure short-term effectiveness and efficiency at the expense of *progress measures* might result in incentive situations which are not consistent with the institution's long-term goals and objectives, towards which the managers of change are striving. This is not to say that short-term cost efficiency is not important and process performance indicators are not relevant. It is a question of balancing short-term cost efficiency with long-term effectiveness. Certainly resource allocation processes compatible with the institution's goals and objectives may be inconsistent with the achievement of improved short-term cost efficiency. For example, the Loughborough/Lanchester project (Birch, Calvert and Sizer, 1977) would suggest that the class sizes might be increased, but the internal resource allocation processes may favour small group teaching and tutorials because it is consistent with the institution's objectives for students' academic development.

If the resource allocation processes in many universities are comparable with an *unsophisticated* game of bingo, should academic accountants, particularly those specialising in management accounting, take a greater interest in the planning, resource allocation, and performance assessment within their institutions? Should they endeavour to ensure that at least a *sophisticated* game of bingo is played?

Summary and Conclusions

The changing needs of society, particularly during periods of contraction and under conditions of financial stringency, necessarily involve the development of a strategy for *resource mobility*. During such periods high quality managers of change of appropriate academic standing should be motivating their institutions to strive to become effective in the long-term through attempts

- to evaluate the institution's current subject area portfolio and critical resources;
- to examine systematically the future environment in which it will be operating and to identify threats and opportunities;
- to understand and communicate the implications of this future environment to institutions' constituencies;
- to agree through consensus building techniques the goals and objectives for the institution and its constituent parts, and the *measures for monitoring progress* towards achieving these goals and objectives;
- to develop
 - a) a set of alternative long-term strategies and operating plans including a strategy for long-term resource mobility;
 - b) a strategy for medium-term financial mobility and short-term emergencies;
 - c) resource allocation procedures consistent with the institution's long-term objectives; and
 - d) a short-term planning and control system based on measurable information and performance indicators, backed up by a nationally organised scheme for inter-institutional comparisons (Sizer, 1979a).

Within this framework it has been recognised that while institutions of higher education, like other non-profit organisations, are increasingly having to account for their efficiency and effectiveness to external bodies, these are elusive concepts in higher education. The problems of agreeing objectives, identifying and measuring the component parts of the institutions, and of evaluating performance and effectiveness, suggest that only “partial” measures of performance are possible, and that a proper balance has to be struck between qualitative and quantitative aspects. Tests of appropriateness which should be applied to those partial performance indicators have been proposed. These “partial” performance indicators provide a starting point for managerial judgements, and there is likely to remain, in the foreseeable future, a considerable gap that has to be bridged by such judgements. Nevertheless, as in other governmental and non-governmental non profit making organisations, the wind of change is blowing through institutions of higher education. They are having to critically examine their information systems to ensure they are producing the right information, to the right people, in the right way, at the right time. To achieve positive motivation institutions of higher education are having to recognise that managers at all levels must participate in all aspects of performance assessment, hence the growing interest in institutional self-evaluation.

Thus, the greatest challenge to the managers of change is to create an environment in which members of faculty and administration, heads of departments, and senior academics and administrators, and the hierarchy of committees strive to achieve goal congruence between their objectives and actions and the long-term objectives and strategies of the institution. The performance indicators developed and employed should be consistent with these objectives and strategies. However, people not performance indicators make and implement decisions. No matter how appropriate and relevant the performance indicators, they will only be effective if the decision makers’ responses and actions are positive. The “managers of change” have to create an environment which will lead to positive responses. The provision of relevant financial and quantitative information for planning, decision making and control purposes is an essential prerequisite to creating such an environment under conditions of financial stringency, possible contraction and changing needs.

References

- Allen, Michael G. (1978) "Corporate Strategy and the New Environment" in McKinsey and Company, *Strategic Leadership: The Challenge to Chairmen*, London, pp. 23-30.
- American Accounting Association (1966) *Statement of Basic Accounting Theory*, Evanston, Illinois, p. 10.
- American Accounting Association (1969) "Report of the Committee on Managerial Decision Models", *The Accounting Review*, Supplement to Vol. XLIV, p. 52.
- Argyris, C. (1970) "Resistance to Rational Management Systems", *Innovation*, No. 10, p. 29.
- Balderston, Frederick E. (1974) *Managing Today's University*, Jossey-Bass, San Francisco.
- Balderston, Frederick E. (1979) "Note on Professor Sizer's Paper", *International Journal of Institutional Management in Higher Education*, May, Vol. 3, No. 1.
- Birch, D. W., Calvert, J. R. and Sizer, J. (1977) "A Case Study of Some Performance Indicators in Higher Education in the United Kingdom", *International Journal of Institutional Management in Higher Education*, Vol. 1, No. 2, October, pp. 133-142.
- Carlson, D. E. (1972) *The Production and Cost Behaviour of Higher Education Institutions*, Ford Foundation Program for Research in University Administration, Berkeley, University of California.
- Carlson, D. E. (1975) "Examining Efficient Joint Production Processes", *New Directions for Institutional Research*, No. 2, San Francisco, Jossey-Bass.
- Calvert, J. R. and Birch, D. W. (1978) "Tracing the "Efficient" Frontier in British Universities", Department of Management Studies, Loughborough University of Technology.
- Calvert, J. R. (1978) "A Feasibility Study: Tracing the Efficient Frontier in Higher Education", Social Science Research Council, Research Grant HR 5976/1.
- Chan, James L. (1978) "Organisational Consensus Regarding the Relative Importance of Research Output Indicators", *The Accounting Review*, Vol. LIII, No. 2, April, pp. 309-323.
- Cossu, Claude (1978) "Costs: Tools for University Planning", *International Journal of Institutional Management in Higher Education*, September, Vol. 2, No. 2, pp. 207-220.
- Cuenin, Serge (1978) "Les Moyens Accordés à la Recherche Universitaire en France", a paper presented to O.E.C.D./C.E.R.I. I.M.H.E. Programme Fifth Special Topic Workshop, Paris, 5th-6th June.
- Cuthbert, R. E. and Birch, D. W. (1979) "Resource Utilisation Performance Indicators in the Public Sector of Higher Education", a paper presented to the Annual Conference of the Society for Research into Higher Education, Brighton Polytechnic, 19th-20th December.
- Cyert, Richard M. (1977) "Academic Progress and Stable Resources", a lecture given at NCHEMS, Denver, Colorado, November 7, p. 17.
- Cyert, Richard M. (1978) "The Management of Universities of Constant or Decreasing Size", *Public Administration Review*, July/August.
- Delany, V. J. (1978) "Budgetary Control and Monitoring Effectiveness", *Management Accounting*, October, p. 388.
- Dennison, W. F. (1979) "Management Developments in Government Resource Allocation: The Example of the Rise and Fall of PPBS", *Journal of Management Studies*, October.
- Department of Education and Science (1978) *Higher Education in the 1990s*, London.
- Department of Education and Science (1979) *Future Trends in Higher Education*, London.
- Dickmeyer, H., Hopkins, D. S. P. and Massey, W. F. (1978) "TRADES: A Model for Interactive Financial Planning", *Business Officer*, March, pp. 22-27.
- Donaldson, Gordon (1969) "Strategy for Financial Mobility", Harvard University, Boston.
- Donaldson, Gordon (1970) "Strategy for Financial Emergencies", *Harvard Business Review*, January, pp. 67-79.
- Fardeau, Michèle (1978) "Indicateurs de performance pour la fonction „recherche" dans les établissements d'enseignement supérieur", a paper presented to the O.E.C.D./C.E.R.I. I.M.H.E. Programme Fifth Special Topic Workshop, Paris, 5th-6th June.
- Farmer, James (1976) "Why Planning, Programming, Budgeting Systems for Higher Education?", in Hussain, K. M. (Ed.) *Institutional Resource Allocation Models in Higher Education*, O.E.C.D./C.E.R.I., Paris, pp. 127-146.
- Farrell, M. J. (1957) "The Measurement of Productive Efficiency", *Journal of the Royal Statistical Society*, Series A, Vol. 120, Part III.
- Grinold, R., Hopkins, D. S. P. and Massey, W. F. (1978) "A model for Long Range University Budget Planning under Uncertainty", *Bell Journal of Economics*, Autumn, Vol. 9, No. 2, pp. 396-420.
- Gross, F. M. (1979) "Formula Budgeting and the Financing of Public Higher Education: Panacea or Nemesis for the 1980s?", *The AIR Professional File*, The Association for Institutional Research, Florida State University, Tallahassee, No. 3, Fall.
- Hills, F. S. and Mahoney, T. A. (1978) "University Budgets and Organisational Decision Making", *Administrative Science Quarterly*, September, Vol. 23, pp. 454-65.
- Hopkins, D. S. P. and Massey, W. F. (1977) "A Model for Planning the Transition to Equilibrium of a University Budget", *Management Science*, Vol. 23, No. 11, July, pp. 1161-8.
- Houghton, K. N., Mackie, D. and Pietrowski, C. (1979) "The University of Aston in Birmingham", a case study presented to the Seventh Professional Seminar of the O.E.C.D./C.E.R.I. I.M.H.E. Programme, September, Zurich.
- Jochimsen, R. (1979) "Managing Universities in the Eighties: Introductory Remarks", *International Journal of Institutional Management in Higher Education*, May, Vol. 3, No. 1, pp. 5-20.

- Lawrence, B., Weathersby, G. and Patterson, V. W. (Eds.) (1970) *Outputs of Higher Education: Their Identification, Measurement and Evaluation*, Western Interstate Commission on Higher Education, U.S.A.
- Massey, W. F. (1976) "A Dynamic Equilibrium Model for University Budget Planning", *Management Science*, Vol. 23, No. 3, November, pp. 248-56.
- Micek, S. S. and Arney, W. R. (1974) *The Higher Education Outcome Measures Identification Study: A Descriptive Summary*, N.C.H.E.M.S.
- Micek, S. S. and Wallhaus, R. A. (1973) *An Introduction to the Identification and Uses of Higher Education Outcome Measures*, N.C.H.E.M.S.
- Norris, Graeme (1978) *The Effective University: A Management by Objectives Approach*, Saxon House, Farnborough.
- Östergren, Bertil (1977) "Project Concerning Activity Analysis in Higher Education", *R and D for Higher Education*, The National Swedish Board of Universities and Colleges, 1, pp. 5-9.
- Östergren, Bertil (1978) "Activity Evaluation in Higher Education", *R and D for Higher Education*, The National Swedish Board of Universities and Colleges, 2, pp. 1-7.
- Porter, Douglas (1978) "Developing Performance Indicators for the Teaching Function", a paper presented to the O.E.C.D./C.E.R.I. I.M.H.E. Programme Fifth Special Topic Workshop, Paris, 5th-6th June.
- Robinson, S. J. Q., Hichens, R. E. and Wade, D. P. (1978) "The Directional Policy Matrix - Tool for Strategic Planning", *Long Range Planning*, Vol. 11, June, pp. 8-15.
- Romney, L. C. (1978) *Measures of Institutional Goal Achievement*, National Center for Higher Education Management Systems Research Report, Denver, Colorado.
- Romney, L. C., Bogen, C. and Micek, S. S. (1979) "Assessing Institutional Performance: The Importance of Being Careful", *International Journal of Institutional Management in Higher Education*, May, Vol. 3, No. 1, pp. 79-89.
- Romney, L. C., Gray, R. G. and Weldon, H. K. (1978) *Departmental Productivity: A Conceptual Framework*, NCHEMS, Denver, Colorado.
- Sizer, J. (1979a) "Performance Assessment and the Management of Universities for the 1990s", a paper presented to the Conference of University Administrators Annual Conference, Edinburgh, 5th-7th April.
- Sizer, J. (1979b) "Assessing Institutional Performance: An Overview", *International Journal of Institutional Management in Higher Education*, May, Vol. 3, No. 1, pp. 49-75.
- Sizer, J. (1979c) "Institutional Performance Assessment and Planning for the 1990s under conditions of contraction and financial stringency", an address given to a Seminar on "University Planning Techniques", University of Bath, 17th-18th September.
- Sizer, J. (1979d) "Performance Indicators for Institutions of Higher Education under Conditions of Financial Stringency, Contraction, and Changing Needs", a keynote address given to the Annual Conference of the Society for Research into Higher Education, Brighton Polytechnic, 19th-20th December.
- Somit, Albert (1979) "Management Information Systems: Neither Paradise Lost nor Paradise Gained", *International Journal of Institutional Management in Higher Education*, May, Vol. 3, No. 1, pp. 91-94.
- Sorenson, James R. and Grove, Hugh D. (1977) "Cost-Outcome and Cost-Effectiveness Analysis: Emerging Nonprofit Performance Evaluation Techniques", *The Accounting Review*, Vol. LII, No. 3, July, pp. 658-675.
- The Times Higher Education Supplement* (1979) The Registrar of a Northern University, "British Universities: What Next?", 28th December, p. 9.
- Truehart, W. E. and Weathersby, G. B. (1977) *Production Function Analysis in Higher Education - General Methodology and Applications to Four Year Black Colleges*, Cambridge, Massachusetts, Harvard University.
- Weathersby, G. B. and Balderston, F. E. (1972) *PPBS in Higher Education Planning and Management*, Report of the Ford Foundation Program for Research in University Administration, P-31, May, p. 55.