Towards the estimation of the economic value of the outputs of Scottish Higher Education Institutions

*An Overview of the Content of the Main Report**

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*The main report *Towards the estimation of the economic value of the outputs of Scottish higher education institutions* is available from:
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The report was written completely objectively. The views expressed are those of the report authors and do not necessarily reflect the views of the Scottish Funding Council*, the joint Funding Council and Universities Scotland Knowledge Transfer Taskforce, those of the Nuffield Foundation, nor those of the University of Strathclyde.

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1. Introduction

" A serious assessment is important. To be serious one finds that this normally requires a quantitative look. Otherwise one just gets poetry. This is not to say that everything can be reduced to numbers, certainly not. But one can do a lot with numbers, including getting a sense of what the critical trade-offs are, where additionality may lie and a sense of what is and is not important…."
Frank Lysy , 2002 [1]

"Thinking about how to finance universities, like financing the arts, has been distorted by a certain kind of high mindedness. Where truth and beauty are concerned it is easy to pull off a rhetorical trick that casts concern with money in a rather Philistine light…it is correct to say that truth, understanding and learning cannot be given numerical values. It does not follow however that their value cannot be assessed, or that the assessment of this value cannot be conducted along the ordinary lines of what is and is not worth spending money on….." Gordon Graham 2002[2]

1.1 This is an overview and discussion of the key issues and findings from the project *Towards the estimation of the economic value of the outputs of Scottish HEIs*, which was undertaken in Spring 2005 by Ursula Kelly, Iain McNicoll and Donald McLellan for the Scottish Higher Education Funding Council (SHEFC) and Universities Scotland (US) Knowledge Transfer Taskforce.

1.2 The project aimed to assess the feasibility of developing an economically meaningful approach to measuring the outputs of Scottish higher education institutions in monetary terms. The project was essentially a three month scoping study to determine:

- how far an economically valid approach could be developed to cover all of the work of Scottish higher education institutions
- whether it would be feasible in practice for the approach to be used for a full-scale assessment of the economic value of the outputs of Scottish HEIs.

[1] From: *What drives investment within Countries?* F.J. Lysy 2002
[2] From: *Universities – The Recovery Of An Idea* Gordon Graham 2002

- whether such a full-scale assessment would yield additional insights to assist the SHEFC in resource allocation issues, particularly in relation to knowledge transfer.

2. Background to the study

2.1 One of the key challenges for the SHEFC / US Knowledge Transfer Taskforce has been how to assess the contribution made to the Scottish economy by Scotland's higher education sector. Current government policy – in the rest of the UK as well as in Scotland – is strongly focussed on encouraging universities and colleges to engage with their host regions and seeks to maximise the benefits to the economy that may be gained from HE activities. SHEFC has explicitly stated "Knowledge transfer is an important issue for HE in Scotland over the next five to 10 years, as Government looks to it as a means to support, stimulate and develop the economy." [3]

2.2 Higher education institutions are of immediate and visible importance to the Scottish economy through their role as major businesses, generating jobs and output throughout Scotland. Scottish higher education is one of Scotland's largest service sector export earners, attracting over £300 million in foreign exchange into Scotland every year. Higher education's business impact on the economy can be reliably estimated in terms of jobs and output generated, both directly and in terms of 'knock-on' multiplier effects. Indeed the current report authors have undertaken many such studies of higher education at both sectoral and institutional level. Known as 'economic multiplier' studies, these analyses continue to prove useful to both HEIs and policy makers in that they give a quantitative handle on the expenditure impact of an HEI on the host economy. However in measuring the economic impact of a university or college in this way, no specific value is placed on the actual activity or work carried out by the HEIs. HEI expenditure generates economic activity through a complex network of purchasing linkages, and it is this economic activity that is measured, rather than the economic value of the work undertaken.

2.3 While there is widespread belief that higher education institutions are of pivotal importance to economic development, and that the educational nature of their work must create considerable value for the economy as a whole, higher education policy development and effective public resource allocation have remained bedevilled by

[3] From: *Higher Education in Scotland: A Baseline Report 2004*

the apparent impossibility of placing a 'hard' economic value on all of the outputs of higher education. The Scottish Funding Council has invested considerable effort into identifying aspects of higher education institutional work which could be defined as being primarily concerned with 'knowledge transfer' and have sought to encourage and support such activity. However there has been no practical, methodologically valid, way to analyse the actual economic value of the activity supported, nor to compare the 'value' thus created with that generated by other aspects of higher education work, or indeed with other activities in the economy generally.

2.4 During 2004, with support from the Nuffield Foundation, the current team had begun to examine new and different ways of approaching the problem of assessing the economic value of higher education institutions. This had been undertaken essentially as a small pilot project, with a single higher education institution as a case study. The aim had been to examine whether it was possible to identify all of the outputs of an HEI (including the 'intangibles' such as cultural engagement), to quantify these in natural units and to examine the feasibility of applying monetary value to these outputs. The pilot study showed that the development of volume and value output measures for this particular HEI was possible and the team were able to make preliminary suggestions on ways of deriving these. In seeking ways to quantify the economic value of HEIs this pilot project also drew on the extensive previous experience of the senior members of the team. Evaluation of economic evidence relating to higher education had been a key aspect of their work in advising Sir John Arbuthnott as a lead member of the UK Dearing and Scottish Garrick Committees, including the Economics Working Group of the Dearing Committee. Provision of robust quantitative evidence by the team had proved crucial in assisting the Committee to recognise higher education's contribution to the economy.

2.5 The team were commissioned by the SHEFC Executive on behalf of the SHEFC / US Taskforce on Knowledge Transfer to build on the initial pilot research and to explore the approach further in the context of all higher education institutions in Scotland. The commission took the form of the current project – i.e. to conduct a study of the feasibility of measuring the outputs of all Scottish HEIs in monetary terms, whether this is realistically possible and whether such an approach could yield meaningful insights into the economic appraisal of all Scottish higher education activity, with a view to providing policy-relevant information. The project was undertaken in spring 2005 and produced a substantive, complex and in-depth report. This overview outlines some of the key issues and findings of the project with the

intention of giving ‘a flavour’ of this new approach to estimating the economic value of the work of Scottish higher education institutions.

3. Key points regarding the range and scope of the study

3.1 The study is primarily focussed on the issues relating to the 20 higher education institutions in receipt of direct public funding from the Scottish Funding Council. It is concerned with the identification and measurement of the value of the *outputs* of the higher education *institutions*. That is, the study aims to identify all of the outputs of HEIs and to put a monetary value on these.

3.2 The approach adopted in the study towards estimating the economic value of Scottish higher education institutions is new. However the principles on which it is based are entirely rooted in the fundamental theory of welfare economics and the approach adopted is consistent with national and international best practice as outlined by the UK Treasury, the Office of National Statistics, Eurostat and the World Bank. The innovation of the study lies in the application of welfare economic principles, for possibly the first time in the UK (and certainly in Scotland), to assessment of higher education institution outputs.

3.3 While the identification and measurement of the outputs of higher education institutions is still a new concept, it is likely to become an important issue (possibly even a requirement) in the relatively near future. New international statistical standards and requirements for productivity measurements within the National Accounts are driving national and international moves towards the identification and measurement of the outputs of non-marketed services, including those provided by the public sector (such as the UK health service, the justice system, schools and social services) as well as by non-profit-making bodies such as UK universities and colleges. The UK Office of National Statistics has recently (2005) published a substantive report, known as the Atkinson Review, on the issues involved and the government statistical services have already begun the development of measures of output that will conform with the new standards. The current study therefore places Scottish higher education institutions at the forefront of these developments.

3.4 The full project report contains a comprehensive exposition of the complex economic principles involved and how these would apply to Scottish higher education institutions. It highlights the economic implications arising from key aspects of the

constitutional and organisational culture of higher education institutions as non-profit-making bodies as well as the market structure of higher education in Scotland. Drawing on and elaborating case study work, the report exemplifies the applied methodology to be used to identify, quantify and value the outputs of Scottish HEIs in ways that are economically valid and policy meaningful. The report provides a 'route map' for how this evaluation can be undertaken.

4. How to value the work of higher education institutions – summarising the approach adopted

4.1 Fundamentally the Scottish HEI sector is an industry, comprising individual *enterprises* using *economic resources* to produce *economic outputs.* As with elements of government production, such as the health service, people are sometimes reluctant to think about higher education in this way. Issues relating to 'society', 'culture', 'equity' and so on enter discussions about higher education quickly and often emotionally. This may partly result from anxiety that outputs of cultural activities or other 'socially valuable' work which do not appear to be *commercial* will be overlooked or treated as unimportant. However reluctance to consider higher education in economic terms is misplaced. The essential point is that if society wishes or requires higher education institutions to undertake activities of a societal nature, these activities *have an economic value even if they do not have an observable price.*

4.2 The study proposes that, in principle, the economic value of higher education institutions can be assessed through:

a) The identification of all Scottish HEI outputs

b) Finding appropriate volume measures of these outputs

c) Identifying the prices that should be applied for each volume unit

Success in achieving a) through c) above allows the value of Scottish HEI outputs to be quantified through the formula:

Value = quantity of output produced x price per unit of output

Identification and volume measurement of Scottish HEI outputs

Figure 1: Key issue: outputs vs outcomes

Key issue : outputs vs outcomes

In order to analyse Scottish HEI outputs, a vitally important distinction must be made between outputs and outcomes. Discussion regarding the contribution of higher education to the economy is frequently couched in language that relates to 'desired outcomes' rather than outputs. For example, phrases such as 'an educated workforce' or 'competitive advantage in the global knowledge economy' are sometimes used when describing the impact of higher education. However these are not outputs of the HEIs, but rather an overall desired outcome to which the HEIs may in part contribute through their outputs. By delivering teaching an HEI may contribute to the development of 'an educated workforce' and through its teaching, research and other activities it may contribute to Scotland's economic competitiveness, but it cannot be said that the outcome is solely reliant on the HEI. Many other factors, beyond the control of the HEI, may come into play, such as the ability of the workforce to learn, or the financial and legal factors governing economic interactions. To put it as straightforwardly as possible: ***Outputs*** *relate to the things an HEI actually produces.* ***Outcomes*** *tend to relate to more generic societal results that may be causally derived at least in part from the consumption of the HEI outputs.*

EXAMPLE

HEI Input	**HEI Activity**	**HEI Output**	***Societal Outcome***
No. of Lecturers	Teaching	Number of hours teaching delivered to Z number of students	A more highly educated and productive population

4.3 The team's case study work on a single Scottish HEI had shown that it was possible to identify all of the actual outputs (as defined) of the case study HEI. Over 220 separate outputs were identified. These outputs were allocated to one or more of the following groups, with the designated groups judged as fulfilling statistical validity and policy interest requirements:

- Teaching
- Research

- Consultancy/Advisory work
- Cultural Outreach
- Community Outreach
- Other

As discussed in the report, it is perfectly possible to aggregate individual outputs into alternatively defined groups such as 'knowledge transfer'.

4.4 The study showed that it is possible to identify outputs for the vast majority of HEI activities. It was also demonstrated that it is possible to identify volume measures for those outputs. The full listing of identified outputs and possible volume measurements is included in an appendix to the full report. Some *examples* are given in figure 2 below:

Figure 2 Identifying HEI outputs

Output Type	**Measurable**	**Possible natural unit measurement**	**Possible Data Sources**
Teaching: PG Diploma Construction Law	Yes	No. FTE students	Planning Office/Registry
Research: Articles published	Yes	Number produced	Dept Sampling/Institutional Repositories/ RAE preparation records
Consultancy /Advisory work e.g. serving on UK Gov committees	Yes	No. of staff hours involved	Sampling or data harvesting from institutional records
Cultural Outreach e.g. Chamber Choir performance	Yes	Number of Performances x attendees	Events Listings and organiser records
Community Outreach e.g. public lectures	Yes	Number of events x no. of attendees	Events listings and organiser records
Other e.g. Careers advice to alumni	Yes	No. of enquiries answered	Careers Office record system

Identifying the prices to be applied to HEI outputs

4.5 As noted previously, the project found that it is possible to quantify the outputs of Scottish HEIs in physical or natural volume units. In order to identify the value of those outputs it is necessary to identify the appropriate prices and this was the next stage of work undertaken.

Figure 3 Key issue: finding the 'market' or 'economic efficiency' prices

Key issue: Finding the 'market' or 'economic efficiency' prices

The most important issue arising here is that the 'price' to be applied is *not necessarily equivalent to the money an HEI actually receives for doing something*. The price that should be applied is that known as the 'economic efficiency price' (or, broadly speaking, the 'free market price'). As the full project report elucidates, there are occasions where HEIs may receive a different amount from the 'free market price' for their services and indeed HEIs sometimes receive nothing at all for a range of outputs (for example for some community outreach activities).

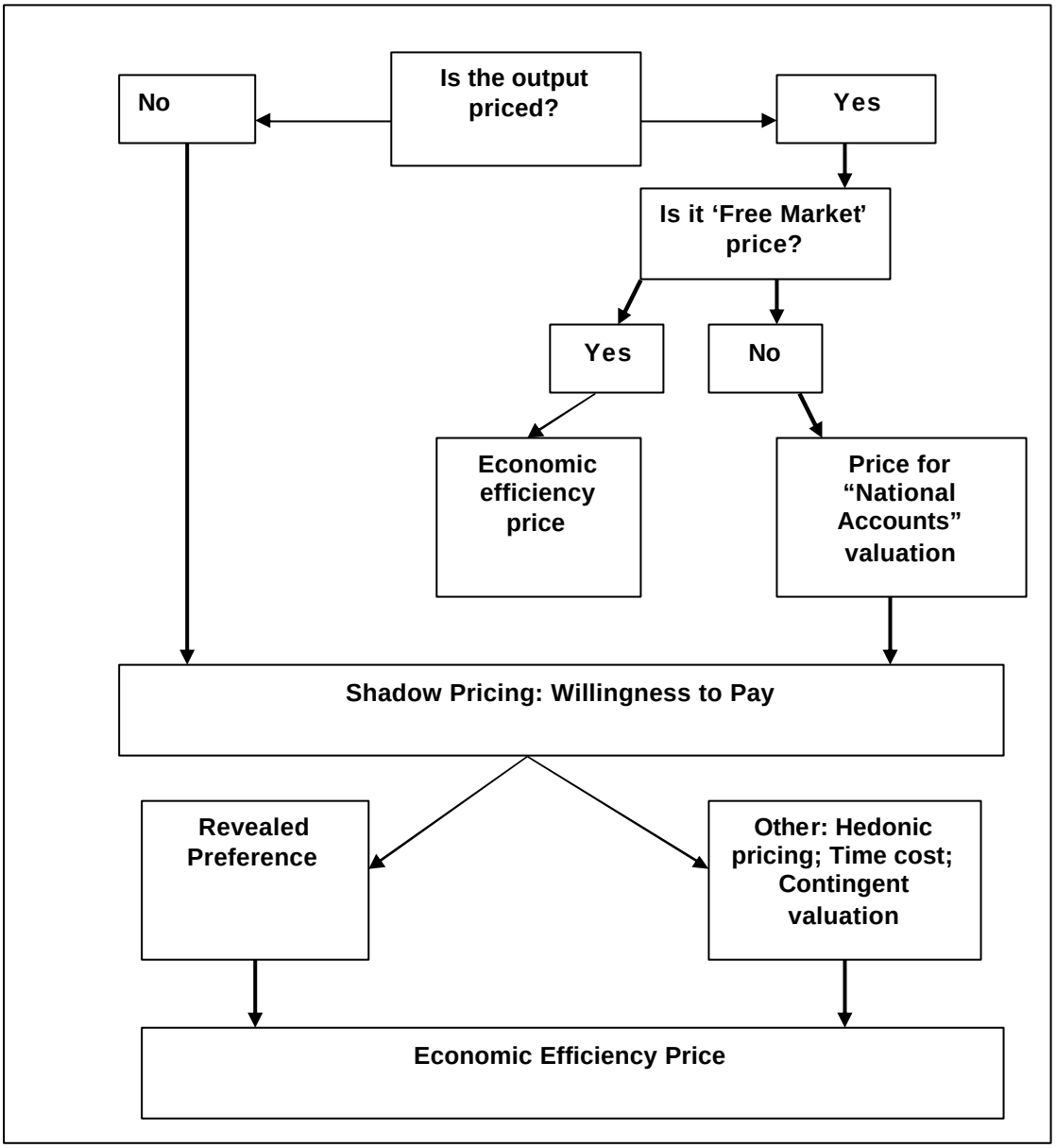
Therefore it is necessary to examine what revenue an HEI actually receives for producing each type of output (for example, the fee for providing a year's tuition in chemical engineering or the fee for a staff member serving on a government advisory board) and assess whether this can be regarded as equivalent to a 'free market price'. If it cannot be regarded as a free market price, a process of 'shadow-pricing' can be undertaken. In other words, what would the HEI have been paid if it had charged a 'free market rate' for the service? It is also important to note that where no equivalent 'free market price rate' can be identified there are economic techniques that can be used to deduce a price. In the current study of Scottish HEIs, the principles of shadow-pricing adopted are those used by the UK Treasury, the UNDP, the World Bank and other reputable national and international bodies in the evaluation of 'non-market price' rates.

This is particularly important since, as the study report reveals, there are a wide range of HEI outputs for which shadow-pricing is necessary.

4.6 The study team conducted considerable investigation into possible ways to 'price' the full range of HEI outputs and the full report includes a number of appendices highlighting issues involved with shadow-pricing areas of activity such as research outputs. With some outputs it is relatively straightforward to identify the 'free market rate'. With 'Teaching', for example, the current 'overseas' full fee rate is likely to be the most appropriate ' free market rate' for a year's tuition, given that this is an area where HEIs operate in an open and competitive national and international market place and tend to pitch their fee rates at 'what the market will bear'. With government advisory work, an appropriate 'free market rate' could be the hourly consultancy rate charged by an equivalently qualified and experienced professional consultant. There are also a range of economic techniques such as 'willingness to pay' or 'willingness to spend time' which can be used to deduce prices where no 'free market rate' equivalent is easily identified. These are elaborated in the full project report.

4.7 The diagram in Figure 4 outlines the pricing strategy that could be applied for HEI outputs; this is based on internationally recognised applied work, which is in turn based on fundamental economic theory.

Figure 4 Price search strategy



4.8 By further developing the previous case study work of a single higher education institution, the study concluded that the application of the appropriate economic techniques will enable prices to be obtained for all of the identified higher education outputs. It was also found that all areas of higher education activity, including those such as knowledge transfer related activities which may not currently be priced, are amenable to such techniques.

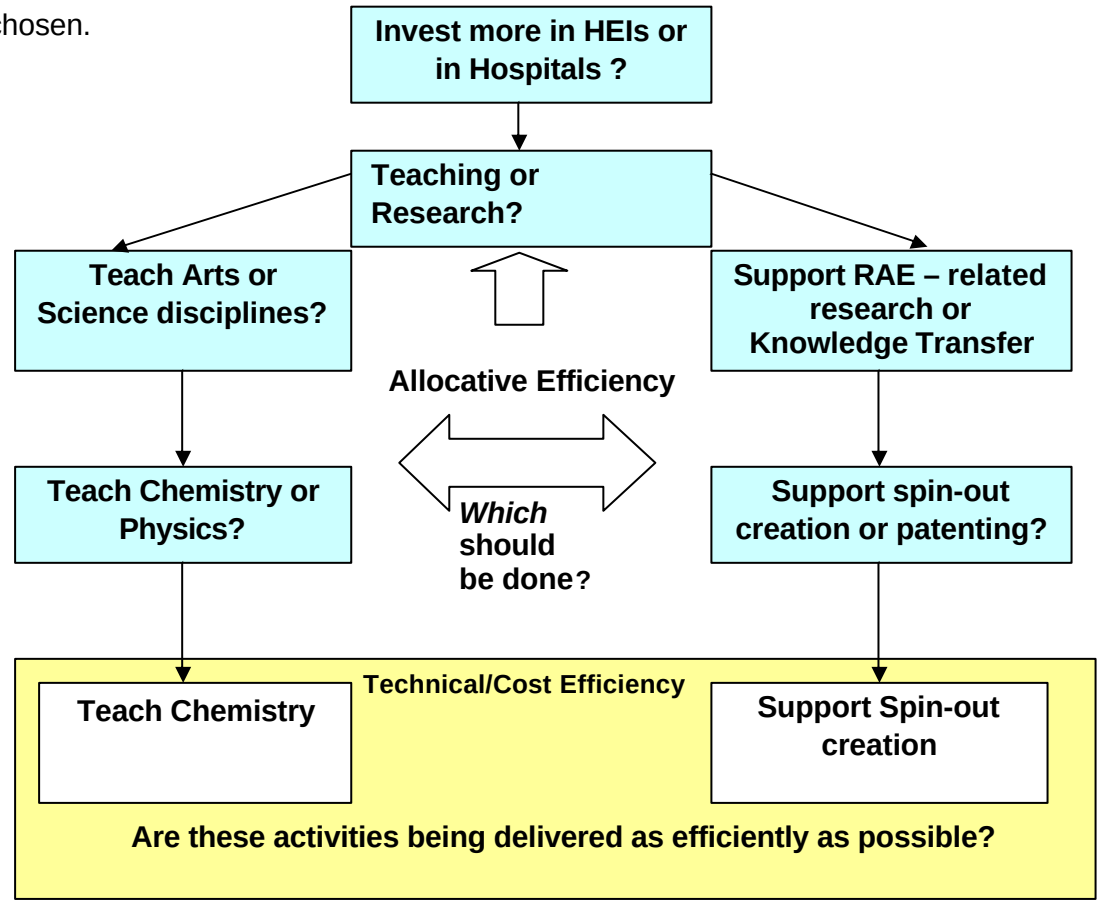
5. What could be learned from undertaking an assessment of the economic value of Scottish HEI outputs?

5.1 It has to be said that without economic appraisal of the type envisaged in this study, it is impossible to make fully informed decisions about resource allocation within higher education or allocation of resources to higher education rather than to other potentially desirable activities (e.g. the health service or secondary education). Higher education institutions are frequently asked to demonstrate cost-efficiency and a number of 'performance indicators' currently exist for this purpose. However, little is known about allocative efficiency as it relates to inter-sectoral resource allocation (between HE and other activities), intra-sectoral resource allocation decisions (between HEIs), and even in terms of the allocation of resources within HEIs themselves.

Figure 5 Key issue:allocative efficiency

Key Issue: Allocative Efficiency

Allocative efficiency is primarily about decisions and choices about *what* to do, with **cost-efficiency** relating to the effective delivery of the activity or service that has been chosen.



Information about allocative efficiency (are the correct amounts of the correct things being provided?) is fundamental to resource allocation decision-making for higher education in Scotland and in the rest of the UK.

Performance and other business indicators

5.2 The full project report explains how a full scale evaluation of the physical and value outputs of HEIs will enable the derivation of a wide range of indicators which will not only subsume those currently in use but will enable other analyses giving policy-relevant information on allocative efficiency to assist resource allocation decision-making. These include:

- Business Ratios
- Cost Efficiency
- Technical Efficiency
- Cost Minimisation
- Cost Utility
- Net Financial Benefit
- Net Economic Benefit
- Net Social Benefit
- Cost-Benefit Accounting Ratios

5. 3 A full scale appraisal of the type proposed in this study would not only yield new insights into the allocative efficiency of HEIs, but would also:

- Provide previously unavailable 'hard' evidence of the extent to which HEIs contribute to the economy. The outcome of a full-scale assessment would strip away at least some elements of the 'black box' that currently exists, whereby investments are de facto made 'in hope' rather than in knowledgeable expectation.

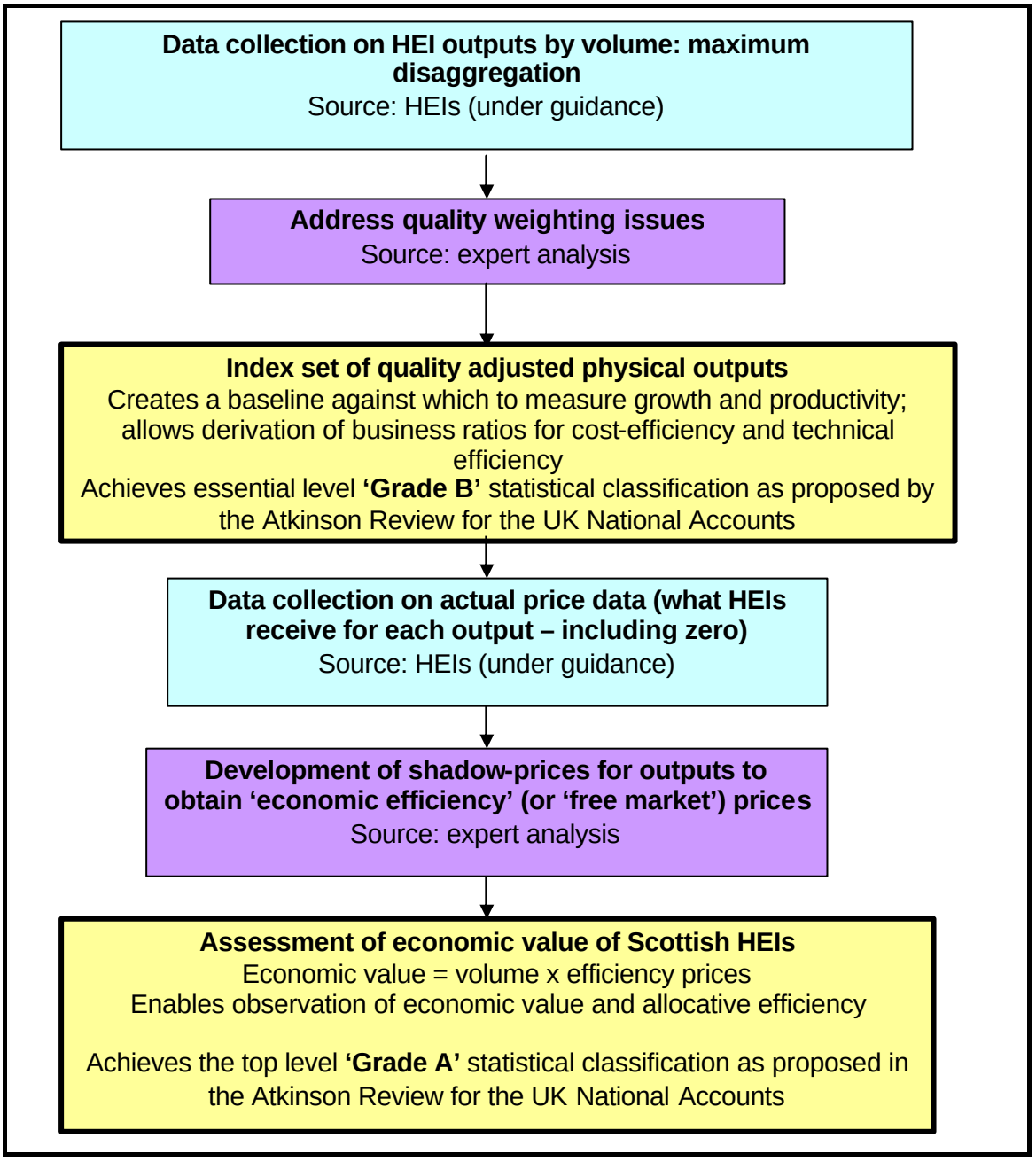
- By adopting an output measurement approach, Scottish HE would be at the forefront of new statistical developments for the measurement of non-profit-making organisational output. At a UK-wide level Government is currently working on the development of measures of output for government services (including non-tertiary education) for implementation within the National Accounts. It is highly likely that in due course an output measurement approach will also be required of non-profit-making bodies in order to ensure the value of non-profit-making organisational output can be included in the National Accounts.

6. Conclusions

6.1 This summary highlights some of the key issues and findings of the 3 month scoping study *Towards the estimation of the economic value of the outputs of Scottish HEIs*. The study outlines a comprehensive and methodologically valid approach to capturing the larger part of the economic value of Scottish HEI outputs. It concludes that it is both possible and feasible to identify variables and to obtain volume and value measures for outputs of the large majority of Scottish HEI activities. By further developing the previous case study work of a single higher education institution, it was found that all areas of higher education activity, including those related to knowledge transfer such as cultural engagement are amenable to the techniques employed.

6.2 The authors also concluded that the vast majority of the data required to develop physical volume measures of HEI outputs exists, although it is not all collated centrally or currently processed in the way required. Some additional effort would be needed from the HEIs to collect the necessary data; however it may only require a one-off refinement of some current annual surveys (the Higher Education Business and Community Interaction Survey, for example) to yield a large proportion of what is necessary. The overall data and analysis process is outlined in Figure 6.

Figure 6 Data and analysis process



6.3 The role of higher education in the economy is currently a matter of considerable policy interest and is likely to remain so. However there is currently limited hard quantitative evidence on which informed policy decisions may be based. In the authors' experience of many years of working on economic aspects of higher education, the crucial requirement to moving the discussion forward is evidence of the type outlined in this report. The report was written completely objectively and reflects best economic theory and practice. In the course of undertaking the study it

became clear to the authors themselves that there are a number of key issues involved, notably:

- the crucial importance of differentiating between output and outcomes – while difficult, this is at the heart of many policy-relevant issues affecting higher education institutions, as exemplified by the very real distinction between 'teaching' (output-related) and 'learning' (outcome-related.)
- the vital importance of signals that may enable allocative efficiency to be achieved in HEIs. HEIs are currently driven by cost-efficiency and the need to maximise deliverables within a given budget. However there are currently few, if any, signals that would enable HEIs to achieve allocative efficiency- i.e. to be sure they are delivering what society actually needs.
- Addressing 'equity' issues relating to Scottish higher education in ways which do not compromise the achievement of technical and allocative efficiency in the higher education institutions.

Figure 7 Other issues:externalities

Other issues: Externalities

Discussions about higher education can make reference to **externalities**. An externality may be defined as: "an effect of an activity on an individual who is not directly involved in undertaking that activity." In other words, it is suggested that there is a more general socio-cultural or economic benefit related to higher education, in that the provision of higher education to some individuals may also have a beneficial effect on other individuals who have not participated in higher education. This is an evolving area of research; the main difficulty is that at present, to the extent that there is a body of applied literature, the views expressed and conclusions reached as to the existence, significance or importance of higher education externalities tend to be conflicting and contradictory. Examples of possible externalities have been cited as:

- Improved appreciation of culture and cultural diversity
- Improved ability to participate in political processes
- Better functioning of members of society (ability to form-fill and so on)
- Improved health
- Reduced crime
- Greater congestion caused by HEIs and rowdy students (the latter are the only negative externalities generally mentioned in relation to HE.)

There is considerable discussion within the project report on the nature of externalities as they apply to HEIs and the difficulties of identifying and quantifying their relevance. Recommendations for further research in this challenging but potentially important aspect of higher education are made in the project report.

7. Possible Ways forward and future research

7.1 The full project report highlights key areas where aspects of higher education's economic role could benefit from further in-depth research, in particular:

a) with regard to the holistic valuation of HEI outputs
b) the importance of externalities in relation to higher education.

7.2 The report also explains the data collection and analysis process required for implementing the approach explored in this feasibility study. Implementation across the board to examine all HEI outputs would enable an assessment of the economic value of all HEI activity to be undertaken, with the ability to develop relevant performance indicators and provide additional insights into issues relating to allocative efficiency. This would yield considerable policy relevant information but would be a relatively extensive exercise possibly requiring investment over a 1 – 2 year period in the first instance, although subsequent updating of the information within the framework would be considerably less costly. However it would be possible within a shorter timescale to undertake selected thematic analysis to examine those areas of HEI work which are of most immediate policy interest.

Thematic Coverage

7.3 The project report highlights how maximum disaggregation of identified outputs can enable alternative groupings of HEI outputs to be defined according to the aspects of most policy interest. It would be possible to study one or more aspect of HEI activity in this way – for example 'community outreach' or 'cultural engagement'.

7.4 By studying a thematic aspect of HEI outputs, the economic value to Scotland of that particular activity could be analysed. Provided all Scottish HEIs are included in a thematic analysis it would also be possible to conduct comparative analysis of different subsets of institutions reflecting particular institutional characteristics– for example whether they are 'campus', or 'city' based, 'ancient', 'old' or 'new' institutions. This might be of particular interest in relation to specific types of knowledge transfer outputs, as analysis of different institutional characteristics may reveal the existence of locational or other factors influencing patterns of impact. This could highlight additional policy relevant information in relation to clustering activity or 'creative city' concept development.

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