

QUALITY OF LIFE AS A CRITERION FOR THE SELECTION OF RESEARCH

Richard J. Brook

(Engineering and Physical Sciences Research Council)

INTRODUCTION

The growing cost of scientific experimentation and the widening impact of scientific development on all aspects of modern life have made it inevitable that governments become enmeshed in the selection and conduct of research. The need for freedom on the part of the researcher if work of genuine imagination and originality is to be done has made governments reluctant to interfere with the details of selection; peer review is still seen as the surest method. The overall motivation for investing in research has, however, been seen as a legitimate issue for governments which are, after all, often called upon to act as paymaster.

Among government statements about research investment, one of the more recent is the UK White Paper 'Realising Our Potential'.¹ In this document, two reasons are advanced as justification for the funding of research by a research council such as the EPSRC namely the enhancing of the nation's industrial competitiveness and the enhancing of the nation's quality of life. This explicit recognition of quality of life as a legitimate target for research expenditure makes it important to explore the concept and to identify procedures whereby it can be given full recognition in the selection of research programmes.

In the following sections, some initial comments are made on the identification of quality of life; early experience is then reported with an attempt to introduce 'quality of life' criteria into the establishing of priorities between research disciplines. Some provisional conclusions are drawn.

QUALITY OF LIFE

The concept can be viewed from a number of vantage points depending on the interests and expertise of the viewer. It is helpful to consider three such viewpoints namely that of government, that of the sociologist and that of the layman.

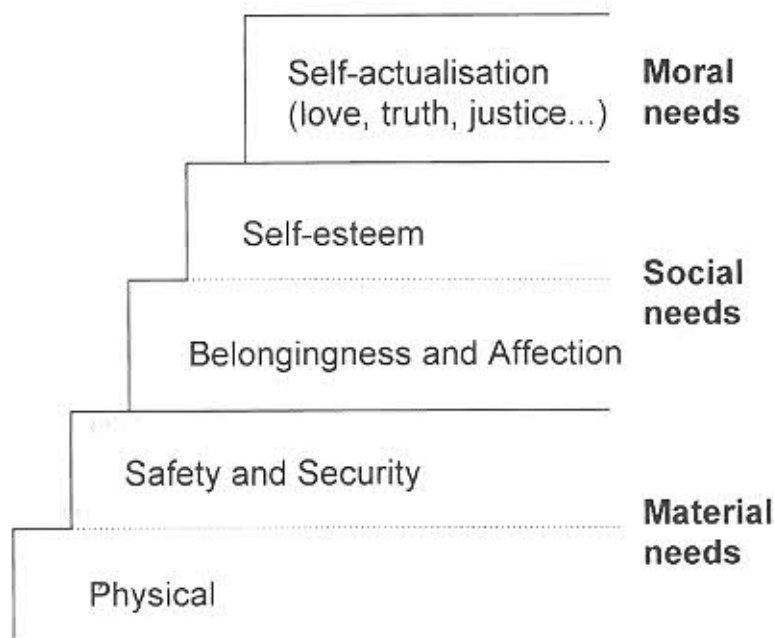
Individual governments will have individual concepts of quality of life. These individual concepts are, in democracies, among the factors taken into account by the voter at the time of an election. There is, however, the general tendency to see financial resource as one of the more persuasive mechanisms whereby a given political vision can be realised. A consequence is that recourse is made to the connection

science → financial resource → measure to enhance quality of life

The links in this chain are recognised to be extremely complex. The abandoning of the 'linear model' in which science necessarily results in technology which then necessarily results in industrial enterprise, jobs and wealth creation acknowledges that many factors play a role in linking science and wealth creation. Similarly the use of financial resource to bring about

quality of life involves a panoply of political considerations and viewpoints. As is often the case, the argument is more readily appreciated in its negative form namely that without financial resource, the opportunities to enhance quality of life are greatly inhibited.

An advantage of assigning an enabling function to financial resource is that it is not then necessary to define quality of life at the outset. All steps taken in the direction of wealth creation are to be seen as positive in that they provide the basis on which subsequent attention to quality of life can be effectively given.



1. The hierarchy of human needs (Maslow²).

When the wish is nonetheless present to attempt a definition, then the work of sociologists becomes pertinent. Two approaches to the problem can be mentioned. In the thinking of Maslov², attention is given to a hierarchy of needs, the more elemental of which require satisfaction before an individual can give consideration to the more elevated (Fig. 1). Quality of life is then associated with the ability to satisfy these needs progressively up the hierarchy. In a second approach, Max-Neef³ distinguishes between needs and satisfiers, i.e., between needs and the means of satisfying them. The argument is made that two types of needs are universal and apply to all individuals throughout history. The types are axiological (a set of abstract requirements: Subsistence, Protection, Affection, Understanding, Participation, Identify, Idleness, Creativity, Freedom) and existential (a set of answering actions: being, doing, having, interacting). The matrix formed by these two types is filled by specific 'satisfiers' which will be matters of individual choice and which will therefore involve a strongly subjective element.

Eating food satisfies the subsistence requirement but the detailed character of the procedure followed in satisfying this universal need has an infinite variety.

Although as Hofstede⁴ has noted, dangers exist in applying such models across the full span of world cultures, the two approaches do offer stimulating insights; they both emphasise the very great variation which can occur in the individual response and the consequent weight of subjective factors. Such subjective aspects lie very much at the core of the lay viewpoint where a major dynamic is that of comparison. Quality of life is judged by reference either to the condition of others or to a future or past condition of the single individual. The concepts of *Schadenfreude* or of the grass being greener in the neighbouring garden reflect the weight of such comparisons. Dostoevsky's⁵ remark that 'man is an animal which can get used to anything; indeed I think that that is the best definition of him' points to the absence of absolutes in relation to 'quality of life' judgements.

The recognition that subjective considerations play the vital role in determining, perception of 'quality of life' indicates the difficulties associated with reaching consensus on required initiatives. The theme is properly recognised as being pertinent to the political arena where agreement in the presence of multiple and often conflicting viewpoints is the objective of the exercise.

AN EXPERIMENT

The direct weight to be attached to quality of life criteria, i.e., where the first objective of the proposed research is to address a 'quality of life' issue rather than to meet other considerations, has been tested in assigning priority to research disciplines within the EPSRC.

The fourteen EPSRC Programme areas

Built Environment
 Chemistry
 Clean Technology
 Control & Instrumentation
 Design and Integrated Production
 Electrical Engineering
 IT & Computer Science
 Innovative Manufacturing Initiative
 Marine Technology
 Materials
 Mathematics
 Mechanical Engineering
 Physics
 Process Engineering

2. The fourteen EPSRC programme areas.

The seventeen EPSRC criteria for programme priority

POTENTIAL SOCIO-ECONOMIC BENEFITS

1. Economic Competitiveness
2. Provision of Basic Needs
3. Physical Security and Safety
4. Health Improvement
5. Skills Requirements

NATURE OF RESEARCH

6. Alignment to Foresight
7. Research Potential
8. Pervasiveness
9. Interdisciplinarity

ABILITY TO CAPTURE BENEFITS

10. Strength of User Community
11. Uptake Capacity of User Community
12. Potential for Rapid Technology Transfer

PROVIDER CAPABILITY

13. Strength of Provider Base
14. State of Provider Base

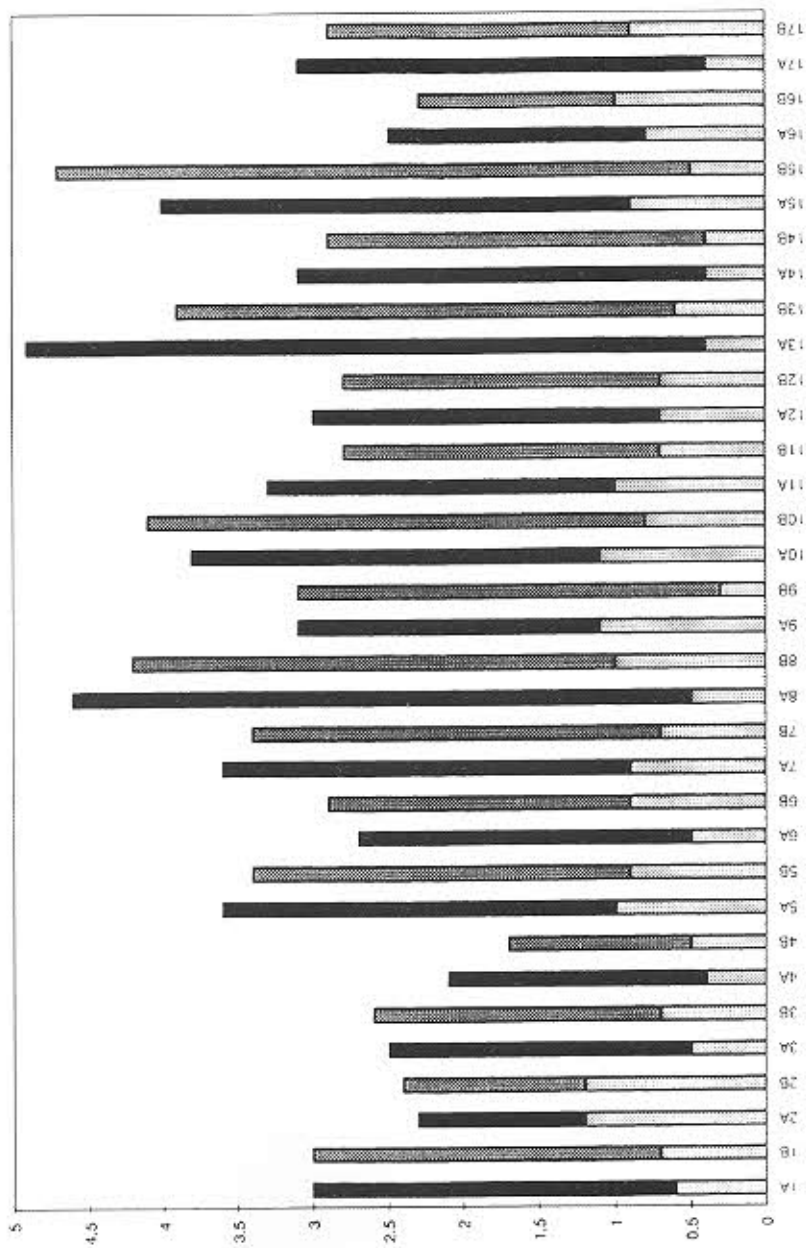
FUNDING CONSIDERATIONS

15. Importance of EPSRC Funding
16. Funding Leverage Potential
17. Capacity to Absorb Increase in Funding

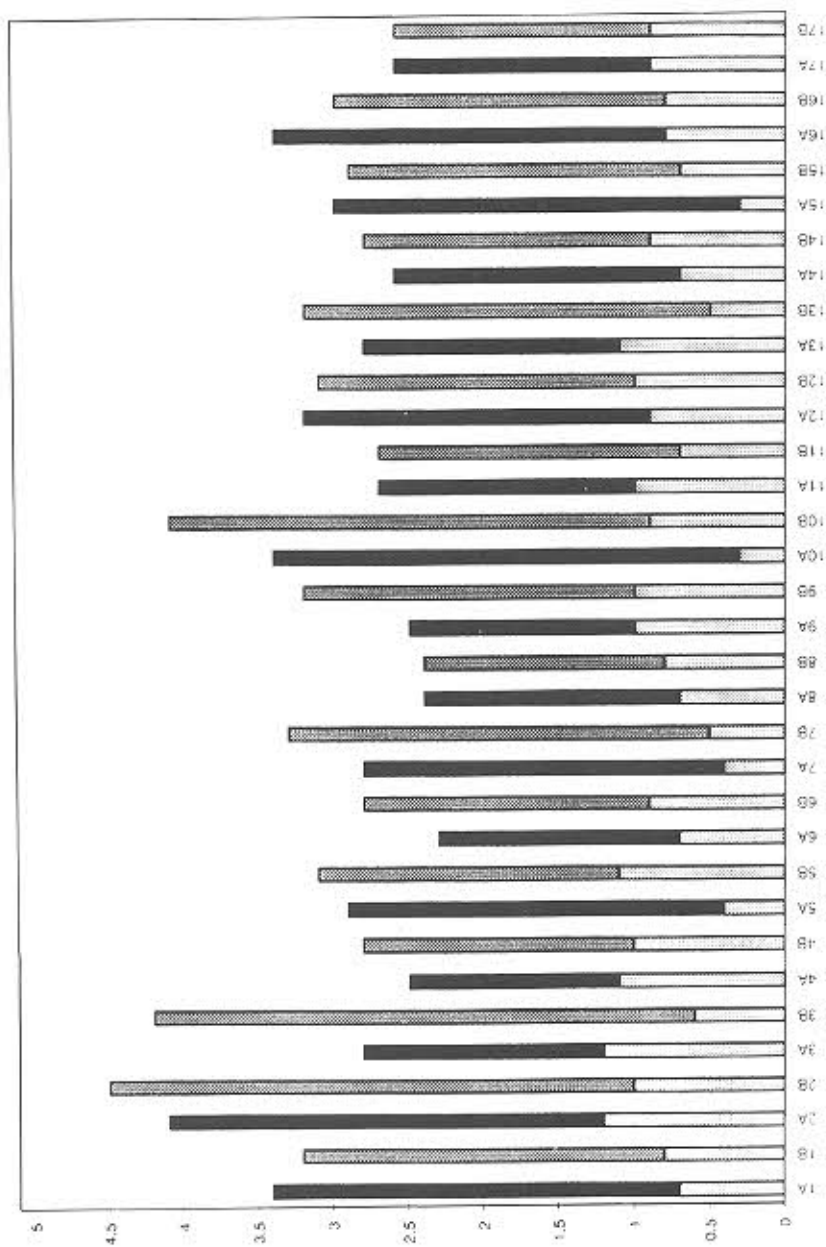
3. The seventeen EPSRC criteria for programme priority.

The two panels which advise the Council on priorities are drawn predominantly from the academic sector (Technical Opportunities Panel) and from the industrial sector (User Panel) respectively. The fourteen programme areas (Fig. 2) are judged against 17 criteria (Fig. 3) by panel members prior to the taking of decisions on the relative levels of appropriate funding support. Among the criteria are three (2, 3, 4) which are unambiguously related to quality of life considerations (basic needs, safety and security, health).

The results for two of the programmes, mathematics and the built environment, are shown in Figures 4 and 5. Mathematics scored lower on the quality of life criteria than for any other among the 17 criteria (the highest was the academic panel's view of the strengths of the academic community in that subject). The highest score in built environment was in relation to the 'basic needs' criterion; a second quality of life parameter namely 'safety and security' was also rated highly by the industrial group. When it came to recommendations for the funding of



4. The evaluation of the mathematics programme. The columns show the success (5 = high) of the programme when judged by the seventeen criteria (A = academic; B = industrialist). Thus the programme scored 3 when judged according to criterion 1 by both the academic (1A) and industrial (1B) panels. The standard deviation of opinions is shown in the lower part of the columns.



5. The evaluation of the built environment programme.

	Academics	Industrialists
Priority		
↑	-	-
	Mathematics	-
	-	-
	-	-
	-	-
	-	Mathematics
	-	-
	-	-
	-	-
	Built Environment	-
	-	-
	-	Built Environment

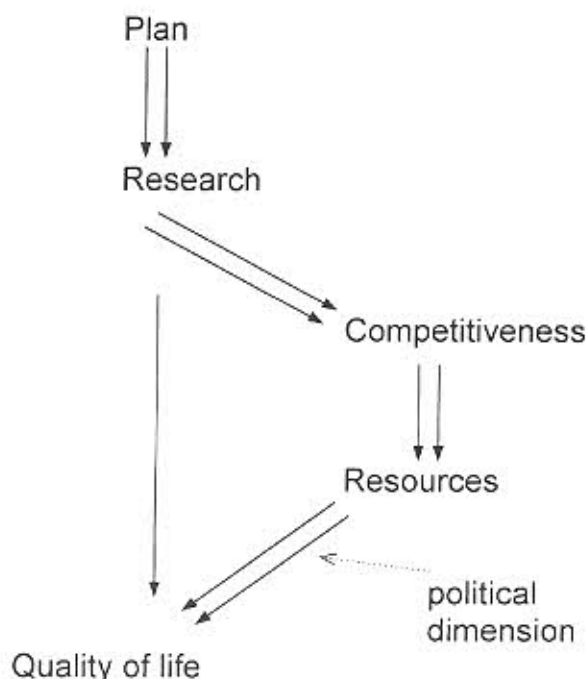
6. Priority of the two programmes for funding. High priority results in an increase in funding and low priority in a decrease. The dashes indicate the other programmes in addition to mathematics and built environment, i.e., fourteen in all.

programmes, both panels rated built environment as being suitable for reduced investment. The academic panel rated mathematics as deserving an increase while the industrial panel believed it should be held at level funding (Fig. 6).

The conclusion of the exercise was therefore that the two panels chose to move resources counter to the explicit quality of life criteria, giving greater weight to other factors in deciding on the allocations.

CONCLUDING REMARKS

The EPSRC supports many programmes which have clear 'quality of life' implications. Examples are energy efficiency, recovery of contaminated land, sustainable technologies, medical engineering and the use of information technology to enhance the creative content of work. These programmes, however, do not rely exclusively for their justification on quality of life criteria; they often have a substantial level of economic, market-driven, interest. Where the major contribution is seen as lying in a quality of life factor then the evidence from this admittedly small scale experiment is that such contributions are in themselves found to be insufficient to win preferential support.



7. A framework for the contribution of research to quality of life.

In seeking to interpret this finding, the framework shown in Figure 7 can be helpful. The argument is that planning can give rise to research which can in turn contribute, by however complex a pathway, to increased competitiveness. The latter then contributes to increased resource which, with input from the political dimension, can lead to an enhancement in quality of life. The positive contribution of research to quality of life commonly requires the reconciliation of subjective and potentially divergent viewpoints which is at the heart of the political process.

There is, however, a second path. As noted earlier and as seen in assessing such needs as freedom, an abstract concept is often more easily appreciated in its absence than in its presence. Is there is a correspondingly greater inclination to recognise instances where research can operate counter to quality of life (and then to prevent it) than to encourage research where the contribution is positive? A consensus in condemnation is often more readily formed than in approbation.

While this reaction can be seen as a symptom of a natural conservatism (better the status quo than an uncertain initiative), it nonetheless contributes to an overall scheme in which quality of life is enhanced by research using pathways legitimised by the political process; any reluctance to sanction work directly opposed to quality of life then plays a role by providing a ratchet to

prevent regression. Such a model is undoubtedly simplistic and it may indeed be utopian; it would be encouraging, however, if it were able to provide some reassurance to the many who see an ever-growing threat in the emphasis being placed by government on the role of research as a contributor to national wealth.

Acknowledgements

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References

1. UK Government White Paper Cm2250, 'Realising Our Potential', HMSO London (1993).
2. Abraham H. Maslow, 'Motivation and Personality', Harper and Rowe, New York (1970).
3. Manfred Max-Neef, 'Human Scale Development', Apex Press, New York (1991).
4. Geert Hofstede, 'Cultures and Organisations', McGraw-Hill, London (1991).
5. F. M. Dostoevsky, 'Prison Life in Siberia', (1860).