

Annual Report 1998

Contents

Section

1.	Director's Introduction and Executive Summary of Progress	2
2.	Aims and Objectives of the Research Programme	4
3.	Research Programmes, Selected Highlights and Progress	6
3.1	CRIC Selected Research Highlights	7
3.2	Research Projects	16
3.3	CRIC International Workshops	36
4.	User Engagement	44
5.	Working Paper, Discussion Paper & Briefing Paper Series	46
6.	Seminars	48
7.	CRIC Staff	49
8.	CRIC Associates	54
9.	Honorary Associate Fellows	55
10.	International Scientific Panel	57
11.	Advisory Committee	58
12.	Training	61
13.	PhD Programme	62
14.	CRIC Staff Contact Details	63
Appendix 1.	Performance Indicators	64

1

Director's Introduction & Executive Summary of Progress

The past year has been a busy and productive one for CRIC; we have consolidated much of the work outlined in our initial research programme and also devoted a considerable amount of time to thinking through how this work can be developed over the future. In last year's report I devoted much of the space to reporting on the many practical matters which have to be attended to when establishing a new research centre. I am very happy to announce that the University of Manchester has this year provided us with a substantial increase in our accommodation which provides space to develop the Centre over its future life.

Among the highlights of the year, discussed in more detail in the report, are three very successful workshops on different aspects of our programme and work with the CBI on new innovation indicators. We are beginning to attract an increasing number of external grants and research contracts including a substantial involvement in the last round of the Fourth Framework Programme. Our policy of user engagement continues to develop and I am particularly pleased with our work with the Institute of Grocery Distribution and the CBI. We have set in train a series of books which will engage directly with the practical needs of managers engaged in the process of innovation. We are attracting an increasing stream of distinguished international visitors and we continue to add to our associate fellows who are playing an important part in contributing to our programme. Our theoretical and conceptual work continues to develop and we are beginning to find our niche at the interface of economics, sociology and management studies. A distinctive CRIC style is emerging to shape the ongoing development of the programme. This style is comparative and historical, it combines qualitative and quantitative data and deliberately sets out to develop a distinctively interdisciplinary approach. Much of our work is empirical but we are actively exploring and applying new concepts such as distributed innovation processes. Our web site is now fully operational and we have admitted our first PhD students to work on aspects of our programme.

I am very pleased to welcome two new members to the CRIC team. Dr Jason Rutter who is working on web based research tools, and Dr Claudia Werker from the University of Freiberg who is working on innovation systems.

Our International Scientific Panel met for the first time in October and this meeting is reported on more fully below. The panel members are important assessors of our ongoing research activity. We appreciate the effort they take to help us develop the programme and we look forward to their continued involvement in the future.

I am particularly appreciative of the efforts of all my colleagues in CRIC. No one should underestimate the effort entailed in setting up a new research centre with its own challenging research programme. That we are making progress is very much due to their sustained effort.

The Advisory Committee continues to play an important part in the work of CRIC providing us with valuable direction on the programme and engagement with users. I am particularly grateful to the Chairman Sir Robin Nicholson for his wise support.

In January I will hand over the Executive Directorship to my colleague Professor Rod Coombs. I wish him every success during his tenure and I look forward with all of my CRIC colleagues to a constructive and productive year's research.

2

Aims and Objectives of the Research Programme – An Overview

The following diagram provides a schematic overview of the research programme for the first two years of CRIC's activity (1997 and 1998)

Conceptual Strands

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
<u>Project</u>				
1	X		x	x
2	X		x	
3		X	x	
4	X			
5			x	
6		X	x	x
7	X	X	x	x

The four conceptual strands are:

- A. New models of competition and their relationship to innovation and public policy
- B. Innovation in services

C. New forms of organisation and their relation to innovation and competition

D. The comparative context of innovation and competition

The projects are:

1. Innovation Systems and Innovation Policy
2. Foresight
3. Technology Flows and the Service Sector
4. Trajectories of Demand as Influences on Patterns of Innovation
5. New Organisational Structures in Business Firms and their Effect on Innovation Performance
6. Measurement of Innovative Performance
7. The Systemic Context of Innovation and Competitiveness.

At this stage in our work there has been no major change to either aims or objectives although we do expect them to evolve as our work develops.

These broad aims were summarised in CRIC's (1996) contract with ESRC. The relevant section is reproduced below:

The Scientific Programme

Major advances are expected in these areas:

- ⇒ the study of innovation as a social, economic and managerial process;
- ⇒ the contribution of innovation to the national competitiveness of firms and sectors;
- ⇒ the comparative understanding of national innovation systems and their relationship to processes of globalisation.

It is also expected that in making these advances, the Research Centre will make significant contributions to the following areas:

1. The organisation of economic enterprises;
2. The institutional context of innovative activity; understood through a comparative framework analysis
3. Workplace behaviour, its relation to patterns of organisation and the process of innovation and to the following subject areas:
 - ◆ economics
 - ◆ management science
 - ◆ economic sociology
 - ◆ science and technology policy

3

Research Programmes and Progress

One of the main characteristics of the CRIC research programme is that it is located at the interface between research in management and the social sciences. This requires further comment.

The disciplines associated with the study of management and organisation have provided many important advances in our understanding of the behaviour of firms and other institutions. However, it is the social sciences which are uniquely positioned to comprehend the wider consequences of these individual behaviours, and to judge how they fit together to produce unintended as well as intended outcomes. Consequently, the interface between economics, sociology and management science can provide many fruitful insights into our principal research themes. We do not underestimate the magnitude of this task. In relation to the study of innovation and its relationship with competition we are faced with phenomena which must be understood qualitatively as well as quantitatively, which deal with many different patterns of change and yet which are of fundamental importance to the increase in the wealth of individuals, regions and nations. The fundamental issues we are dealing with relate to the creativity of individuals and organisations, and the consequences of that creativity for economic and social affairs.

As an ESRC Centre, we have a primary responsibility to focus our efforts upon longer term fundamental and strategic research; research which may provide the underpinning for new insights of practical benefit to a diverse range of users. In developing its own contribution, CRIC draws upon and develops different theoretical and quantitative approaches, and it will develop databases appropriate to these tasks. We are uniquely positioned to undertake collaborative work with scholars in other countries and we have already devoted a good deal of effort to forging these links with Brazil, China and Japan, as well as with colleagues in Europe and the United States.

In the following pages we outline the current state and achievements of the research programme, drawing explicit attention to some highlights of our ongoing work. It should be noted carefully that resources have not been allocated equally to the programmes and that since there are strong overlaps between various programmes, it is a matter of judgement as to where some of our output is recorded.

The remainder of this section is organised as follows:

- 3.1 CRIC Selected Research Highlights
- 3.2 Research Projects
- 3.3 CRIC International Workshops

3.1 CRIC Selected Research Highlights

CRIC's ongoing work covers a range of approaches to different aspects of the innovation process. We highlight here four different contributions resulting from our work in order to illustrate the range of approaches and methods that we are applying to our empirical and conceptual work. These research highlights cover statistical investigation of the comparative innovative performance of UK and foreign firms; the idea of markets as instituted economic processes; the role of knowledge-intensive business services in the modern economies and our research into the "tomato" as an example of food chain innovation.

Research Highlight 1

- **CRIC RESEARCH DERIVES NEW INSIGHTS FROM CBI INNOVATION TRENDS SURVEY**
- **'FOREIGN' FIRMS IN THE UK ARE MORE RADICAL INNOVATORS THAN UK FIRMS**

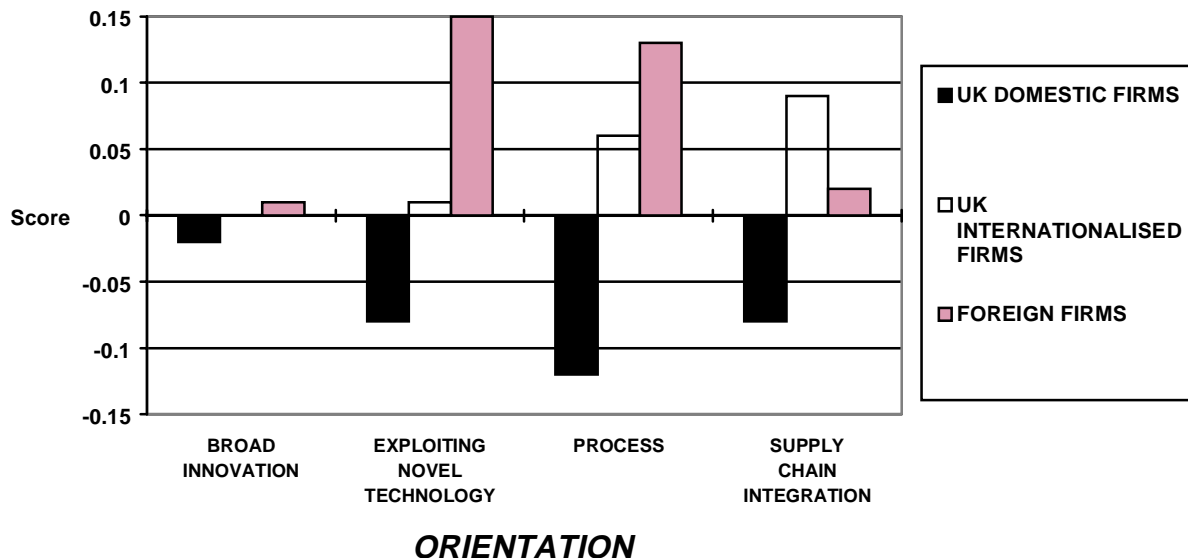
During 1998 Mark Tomlinson and Rod Coombs have collaborated with the CBI in their annual Innovation Trends Survey. This survey is answered by about 700 firms from both manufacturing and service industries, and provides a considerable amount of information about the objectives

and the qualitative features of the innovative activities which the firms are engaged in.

CRIC used factor analysis and regression modelling to interrogate the data, starting with the 1997 data. Many interesting results emerged, confirming for example the significance of competitive pressure as a spur to innovation; the importance of inter-firm collaboration amongst the more innovative firms; and showing that the service sector was equally as innovative as the manufacturing sector. Most interesting however, was the finding that there were distinctive 'styles' of innovation present amongst the firms, and that these focused either on radical innovation, or incremental innovation, or on process and organisational innovation. *Furthermore, the data showed that the foreign firms operating in the UK exhibited the radical innovation style more than the UK firms did.*

However, it was not possible to see this as a definitive result, because the UK firms in the 97 data-set could not be divided into 'purely' UK firms, and those UK firms which are internationalised to some degree. Only this latter group are an appropriate point of comparison for the foreign firms operating in the UK. Consequently the CRIC team collaborated with the CBI in modifying the survey instrument for the 1998 survey. Several changes were made, including the introduction of questions to identify those UK firms with significant overseas operations.

AVERAGE ORIENTATION SCORES BY FIRM TYPE



In the analysis of the 1998 data the picture clarifies. The foreign firms are *still* the most likely to use a more radical innovation style, and furthermore this style is associated with the exploitation of *new or external technology*. The internationalised UK firms do indeed now demonstrate a higher association with this radical innovation style than the purely domestic firms, *but it still falls short of the level of the foreign firms by a considerable margin*.

This is an interesting and potentially important result. Much discussion of science and technology policy in the UK since the 1993 White Paper has centred on the quality of the exploitation links between industry and the science base. Much emphasis has been put on improving the situation on the science base side of that linkage. But this result suggests that perhaps the problem lies with the industry side, and specifically with the UK firms. If the foreign firms operating in the UK are succeeding in exploiting

the local science base, then it ought to be possible for the UK firms to succeed at least as well. But the data suggest that they do not. This issue will be pursued in more detail by CRIC in next years' research programme, using new data sets in addition to that of the CBI.

Research Highlight 2

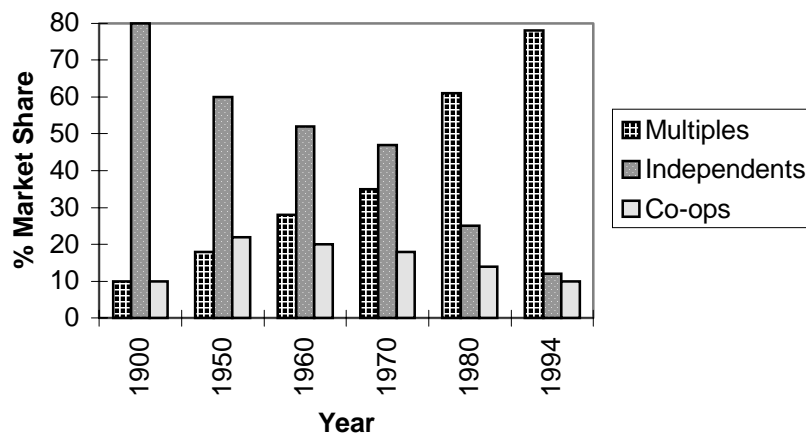
- CRIC RESEARCH ON DISTRIBUTED SYSTEMS FOR SHAPING INNOVATION
- MARKETS AS INSTITUTED ECONOMIC PROCESSES

A major focus of our empirical and theoretical work in CRIC has been on how competition might be analysed from an economic sociology perspective, in order to inform our understanding of innovation processes. One of the theoretical strands that have contributed to this research has been the Polanyian concept of 'instituted economic process' as applied to markets. We

have chosen to address these issues by examining the evolution of the food markets from growers to final consumption, within both the UK and a broader comparative perspective. By exploring how different market structures may be related to different innovation trajectories we are seeking new ways of conceptualising the relation between competition and innovation.

From a historical perspective, the UK final consumption market has undergone a secular change in structure. The multiple retailers now occupy the dominant position, compared to the independent outlets, a concentration further reinforced by the leading position occupied by four or five food retailers.

Market share of food retailing by retail outlet. UK 1900 - 1994



Adapted from Woolven J, Harris J and Marshal D, (1996), 'Food Industry Forces for Change', Institute of Grocery Distribution, Watford

From the perspective of 'instituted economic process', two related consequences can be seen to flow

from this market restructuring. Firstly, multiple stores, especially in recent years are able to *aggregate final demand* within the catchment areas where they are sited. This has enabled them, especially through the use of loyalty and Eftpos data, to attune product range to income dispersion. Secondly, the increase in

the relative power of retailers with respect to both intermediate and primary markets and their respective agents has provided a context within which *product differentiation and development* is stimulated. Whether in sandwiches, chilled prepared foods or exotic fruits, a new range of differentiated products has developed, supported by widespread innovation distributed across the production and logistical process. These innovations can hence be seen as embedded in particular market structures.¹

This research is therefore beginning to map the shifting locus of innovative impulses amongst complex supply chains and networks of collaborating companies. Additionally, it aims to bring together a supply-side analysis of innovation with a demand-side analysis of markets. It has considerable relevance for our understanding of innovation in general, as well as the food sector in particular.

¹ Related CRIC papers. 1998. M. Harvey. 'UK Supermarkets. New Product and Labour Market Segmentation and the restructuring of the supply-demand matrix.' And 'Orchestrating co-operation, enhancing competitiveness. The role of the Institute of Grocery Distribution in UK Food Retailing.'

Research Highlight 3

- **THE ROLE OF KNOWLEDGE-INTENSIVE BUSINESS SERVICES IN MODERN ECONOMIES**
- **CRIC RESEARCH HAS SHOWN THAT KIBS CONTRIBUTE POSITIVELY TO THE PERFORMANCE OF THEIR CLIENTS – BUT TO DIFFERENT EXTENTS IN JAPAN AND THE UK**

Knowledge-Intensive Business Services (KIBS) have become a hot topic for investigation, as these branches of the service sector have shown dramatic growth over recent years. These services range from professional services (like accountancy) to technology-based services (like IT support), and from services that actually generate new knowledge (like R&D services) to those who are more involved in training and implementing technical solutions.

CRIC research has included studies on the definition and classification of KIBS, and examining the dynamics of specific KIBS like contract R&D and computer services. These studies show that KIBS can play a wide range of roles in producing and distributing knowledge resources. In case study work, their clients often report benefits from the use of KIBS. But what does the growth of KIBS mean for the economy as a whole? Are these services enhancing the flows of intelligence in the national innovation system, or are they really just being used as convenient ways to downsize

companies at the risk of losing core technical capacities?

One way of addressing these questions is to use input-output statistics, which enable us to examine the flows of goods and services between different sectors of the economy. In the study we now focus on, we have employed comparable data for two periods of time (1980 and 1990) for Japan and the UK. To the input-output data we have added data on productivity, so that we can not only see which sectors use KIBS, but also compare the performance of sectors with more or less use of KIBS. (Because of data problems in the comparative data set, we have to use a rather crude classification of KIBS in this study, though in other work we have been able to use more refined approaches.)

The results of this study are dramatic:

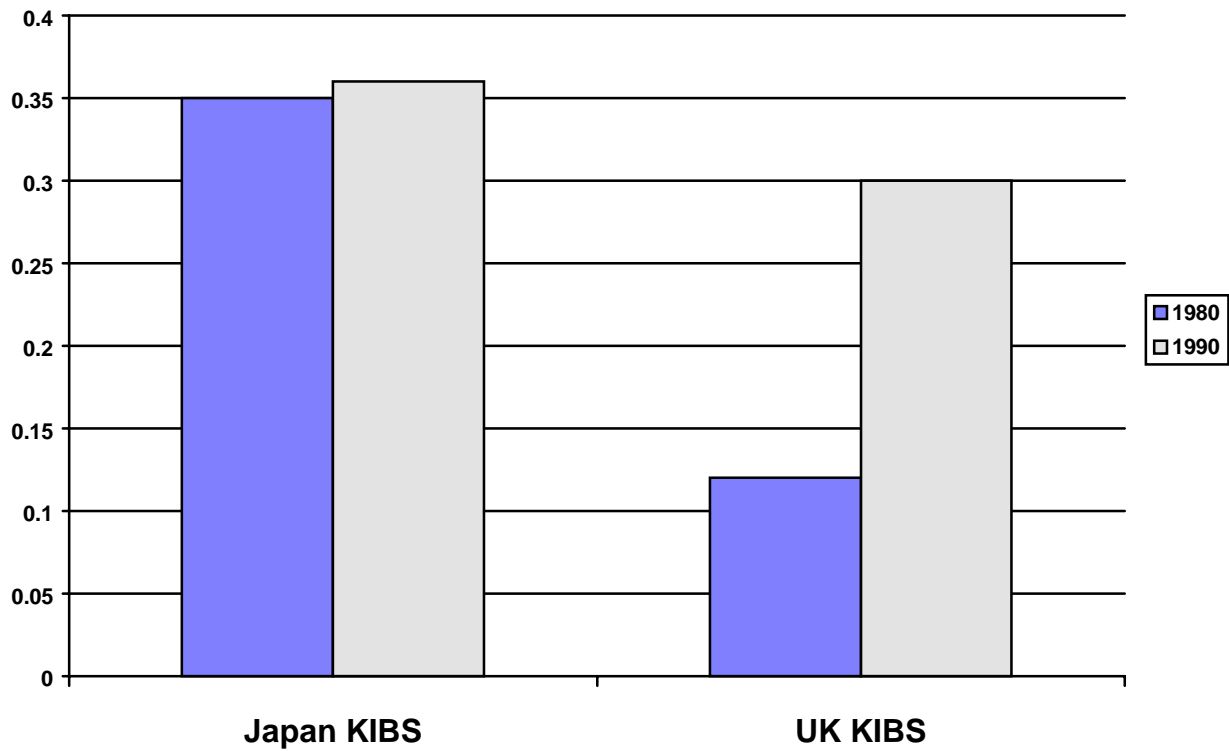
- First, there is clear evidence that KIBS can be treated as an input to production, like material goods and labour. KIBS inputs have a (statistically significant) positive impact on both productivity and output.
- Second, there appear to be substantial differences between the UK and Japan. Although the KIBS sector in the UK is a larger share of the economy, the positive impact of KIBS use appears to be greater in Japan.
- In both countries KIBS use is growing (as a proportion of intermediate inputs), but at a more rapid rate in the UK.
- There is evidence that the UK is catching up with Japan in the positive impacts attained from KIBS

use, in that there is much less difference in the impact in 1990 than in 1980. (see illustration)

We plan to elaborate the data being used in analyses of these sorts, to encompass more countries and examine other features of the data.

This will be complemented by case study work seeking to understand the dynamics of knowledge production and co-production in KIBS in more depth.

IMPACT OF KIBS ON GROSS OUTPUT IN THE JAPANESE AND UK ECONOMIES



Note: The vertical axis represents the relative impact of KIBS inputs to gross output. These are derived from regression equations. Similar results can be obtained with different forms of the model.

Research Highlight 4

• THE "TOMATO" AS AN EXAMPLE OF FOOD CHAIN INNOVATION

In this project we are developing new insights into the innovation process, by identifying a commodity which could be used as a "probe"; something that could be examined in great detail, using a variety of techniques, illustrating the relationship between sequences of innovation and competition, and focussing upon the organisation of supply and demand relationships. *The tomato* was chosen to fulfil this task. And although it seemed like an unlikely contender, it has in fact proven to be an extremely good choice. We have learnt that simple things can give insights into greater ones. In the most unlikely of areas we find complex and intensive innovation processes at work.

We began by examining a common or garden object of daily life and ended up investigating the uses of bumble bees and computer technologies in production systems, the complex of relationships between different types of firms, and the ethical issues relating to genetic modification. It also led to a consideration of the more general changes taking place in daily life (patterns of shopping and food preparation) and of the ways in which people earn a living. Generally it proved an excellent device for emphasising the need to bring together consumption and production and the links between formal and informal (domestic) economies.

Our historical researches have:

- established the origins of the tomato in the fields of the Aztecs and traced its transition to Europe via the Mediterranean and into daily diet and cuisine.
- considered the variety of methods of tomato production through the domestic economy to the capitalist economy.
- examined early methods of preservation and storage and distribution within the formal economy - local markets; wholesale markets.

They have continued with the examination of changes in both the "natural" and the "local" which accompanied the mass production, packaging and distribution of food through:

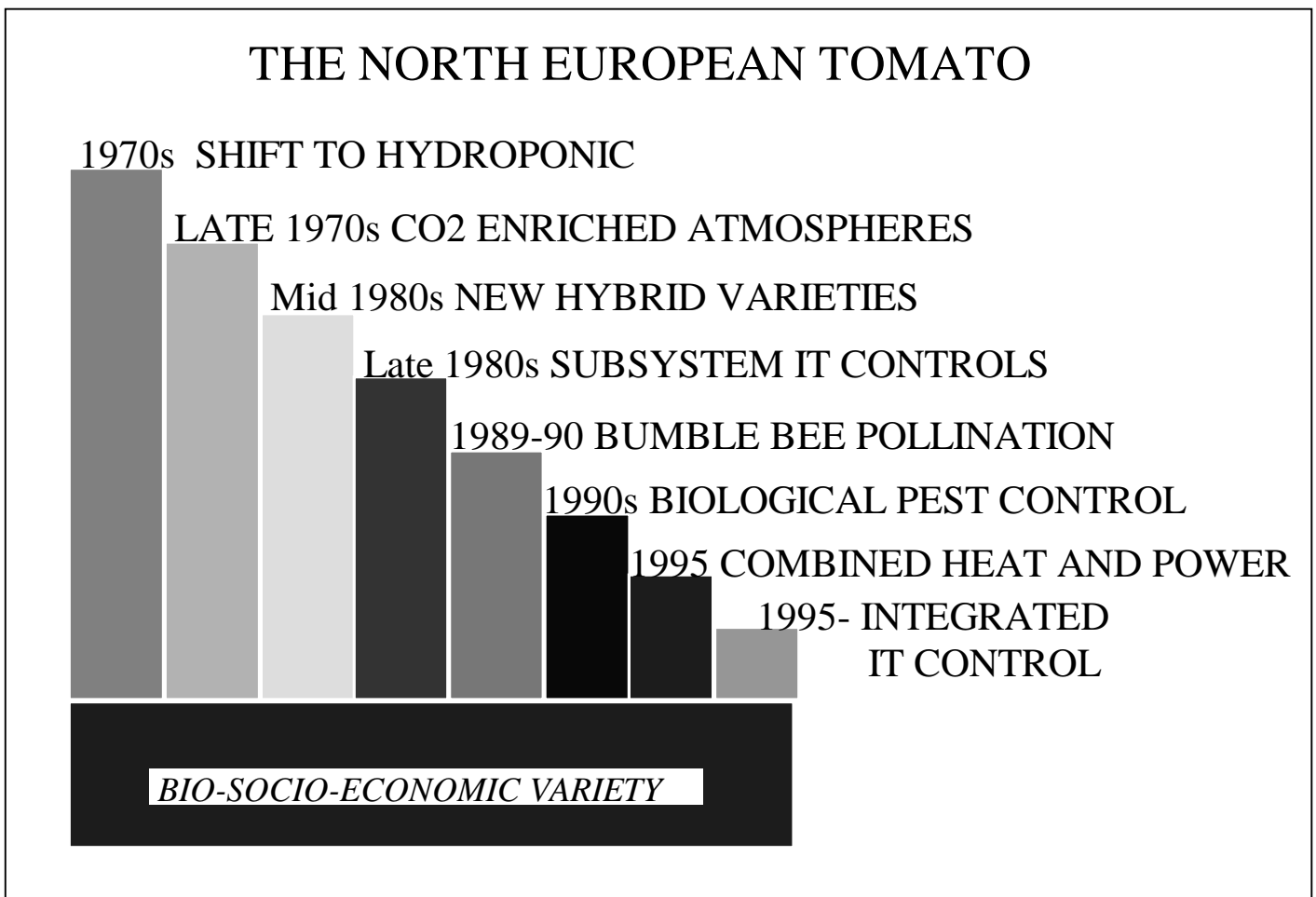
- the canning and bottling of tomatoes and the uses of tomato pulp as soups, ketchups and pastes, relating this to the factory production processes and changes in technology
- changes in the production of the crop and of the tomato itself - new variants; hybrids etc for specific market needs; the use of extensive glass houses and the rise of local economies - eg Lancashire and Guernsey in the UK
- selling and advertising
- changes in domestic activities; types of cooking and diet - the arrival of the "modern" kitchen

In the contemporary period the project has examined the technological and social organisation which is involved in the

production of the tomato in the 1990s. As such it has considered:

- genetic modification, the role of the bio-tech corporations and their links with universities and scientific research labs
- the production of variety with different types of tomatoes, picked in different ways for different markets and purposes
- in the glass house - artificial atmospheres, no earth, computer control; eco-system with biological control of pests; bumble bees for pollination; heat exchange systems etc.
- logistics and packaging; special plastics; satellite tracking; sensors etc.
- warehousing; lasers, bar-coding, cross-docking etc.
- supermarkets; size and market dominance; the technologies of retailing and shopping
- the "post-modern" kitchen and recipe book

The range of innovations is illustrated below



The passage of the tomato as a commodity can also be seen as a journey through different economic organisations: seed companies; bumble bee and bio-tech companies; agro-chemical companies; supermarkets. Our project has mapped the intra-firm, and inter-firm relationships through which the tomato travels. We argue that changes in these relationships are fundamental to the social and economic nature of the contemporary tomato. The analysis has revealed a highly complex "production chain" involving different kinds of work and labour with different and changing kinds of employment contracts for workers in different parts of Europe. In doing this it traces the passage of the tomato through many hands, endowed with different skills, and organised in different employment systems. As such, the tomato bears the imprint of a highly complex, scientific, and technical division of labour.

The researches, in tracking down the patterning of the network of relationships involved in the production of the modern tomato have reflected on the nature of "distributed innovation systems" and the theoretical and empirical issues involved in studying them. It has also been able to link issues of innovation with questions of competitiveness. Through statistical analysis of the European flows of processed and fresh tomatoes, the different patterns of their consumption, and the differences in social organisation of markets, it establishes differences between the North and Southern European tomato. This reflects upon how commodities like the tomato become 'embedded' in the social fabric of different European societies, and the ongoing and changing relationships between the "global" and the "local".

3.2 Research Projects

We turn now to a more detailed outline of progress made in our research projects in the twelve months to October 1998. We report on conferences where papers were presented and on the published output in relation to each individual project. Since there is a considerable degree of overlap between these projects it is a matter of judgement as to where we report our outputs. It should also be remembered that our resources are not allocated equally to our projects.

(* indicates CRIC staff)

Project One

Innovation Systems and Innovation Policy

Contributing Researchers:

Professor J S Metcalfe* (co-ordinator)

Dr Birgitte Andersen*

Dr Bruce Tether*

Dr Jeremy Howells*

Dr Vivien Walsh

Ms Kate Barker

Mr Andrew James

Mr Denis Loveridge

Dr Mo Yamin

Visiting Researchers

Nicola De Liso

Mario Calderini

Fabio Montobbio

Riccardo Leoncini

Claudia Werker

The central aim of this project is to examine the role of the science and technology structures as a stimulus to innovation in the UK. The research questions are directed at the identification of and modus operandi of the formal and informal institutions which individually and collectively shape the rate and direction of innovation in specific sectoral and national contexts. In so doing we address a central concern in the study of long run competitiveness, namely, the connection between national institutional structures, policies, and the generation of competitive advantage in UK located firms.

During the past year we have substantially developed our framework for investigation around the general Polanyian theme of innovation systems as 'instituted economic processes'. In particular, this has involved work on the relation between competition and innovation systems, on the characteristics of systems of innovation and on the various approaches to innovation systems in the

literature. Each of these strands is supporting an idea central to much of CRIC's work, namely that of distributed innovation processes. Our empirical work has formed around studies of innovation in chemicals and airports. The former has involved the use of extensive patent data to identify patterns of technological development since the inter-War period. In so doing it has investigated the ideas of competence blocs and technological development blocs as approaches to systems thinking. In particular, we are developing our ideas on the importance of systemic failures as a basis for policy in distributed innovation systems.

The work on airports has involved two stages. First the non trivial process of the measurement of the growth in aircraft handling capacity at London and a number of continental and American airports. Secondly, the relationship between the observed growth of capacity and a range of "innovations" in relation to the operating practice of airports, airlines and traffic control systems. In this way we are able to relate innovation in an important service activity to the growth of airport capacity. As this work develops we will move on to a new phase of work on the role of innovation in the development of the air cargo industry. Alongside this theoretical and empirical work we have continued to work on the implications of an innovation systems approach for the conduct and context of science, technology and innovation policy. A very successful international workshop was held in March 1998 around the theme 'Systems and Services', the proceedings of which will be published in a monograph.

Publications

Andersen, H B

'The Evolution of Technological Trajectories 1890-1990', Structural Change and Economic Dynamics, pp5-34, vol 9 no1, 1998

Howells, J, Breheny, M, Hart, D

'Industrie Pharmaceutique Brittanique et Recherche', in Cohen, J, Hart, D, Simmie, J (eds) Recherche et Developpement Regional: Travaux Franco-Britanniques Publications de la Sorbonne, Paris, pp85-99

James, A D, Georghiou, L, Metcalfe, J S

'Integrating Technology into Merger and Acquisition Decision Making' Technovation vol 18, pp563-574, 1998

Leoncini, R, Antonelli, G, Nosvelli, M

Sistema Formativo e Crescita Economica: Un'analisi Empirica del Sistema Italiano', Economia e Lavoro, vol 32 no 1, pp9-53, 1998

Leoncini, R, Montresor, S

Una Nozione Allargata di Sistema Tecnologico: Aspetti Teorici e Metodologici per un'Applicazione Empirica Comparata, Economia e Lavoro, vol 31 no 3-4, pp 225-242, 1997

Leoncini, R

'The Nature of Long Run Technological Change: Innovation, Evolution and Technological Systems', Research Policy, vol 27 no 1, pp 75-93, 1998

Leoncini, R

'A Model of Science and Technology Relationships', Science and Public Policy, vol 24 no 5, pp 337-346, 1997

Metcalf, J S & De Liso, N

'Innovation Capabilities and Knowledge: The Epistemic Connection', in Coombs, R, Green, K, Richards, A & Walsh, V, Technological Change and Organisation, Elgar, 1998

Metcalf, J S

'Technology Systems and Technological Policy in an Evolutionary Framework', in Archibugi, D and Michie, J, Technology, Globalisation and Economic Performance, CUP, 1997

Metcalf, J S

'Economic Evolution and Technology Strategy', in Antonelli, G and De Liso, N, Economics of Structural and Technological Change, Routledge, 1997

Metcalf, J S

'Selezione, Scelta, Crescita Endogena e Mutamento Economico Strutturale, in D Schiliro Coordinamento Della Politica Macroeconomica Internazionale e Occupazione', Intilla Editore, 1998

Conference Papers

Andersen, H B

'The Hunt for S -Shaped Growth Paths in Technological Development: A Patent Study'. 2nd Conference on Complexity in Economics: Cycles and Chaos in Economics. ISEG, Lisbon, May 1998

Andersen, H B & Walsh, V

'Co-Evolution of Technological Systems, Blurring of Industry Boundaries and Broadening of Competencies in the Chemical Industry'. DRUID Summer Conference on Competence, Governance and Entrepreneurship. Bornholm, June 1998

Andersen, H B, Metcalf, J S, Tether, B

'Systems of Innovation as Instituted Processes'. Veblen Conference on New Institutional Economics, Oslo, June 1998

Andersen, H B, Cantwell, J A

'Types of Technological Competencies and How It Matters', *The Economics of Science and Technology: Micro Foundations and Policy*, University of Urbino, Italy, June 1998

Andersen, B, Metcalfe, J S & Tether, B S

'Systems and Services: Overview and Questions'. CRIC Workshop on 'Systems and Services', CRIC, Manchester, March 1998

Howells, J

'Innovation Outsourcing and Externalisation: Implications for Conceptualising Innovation Systems', *Systems and Services Innovation Workshop*, CRIC, University of Manchester, March 1998

Howells, J

'Knowledge Intensive Services and the Dutch Economy', *The Hague, Netherlands*, March 1998

Howells, J

'Research and Technology Outsourcing and Innovation Systems', paper presented at the *Innovation systems and Industrial Performance Conference*, Wissenschaftszentrum Berlin für Sozialforschung gGmbH (WZB), Berlin, October 1998

Howells, J & Neveda, M

'New Trends in Industry-Academic Links in the UK', *The R&D Management Conference, 'Technology Strategy and Strategic Alliances'*, Avila, Spain September/October 1998

Metcalfe, J S, Calderini, M

'Chance, Necessity and the Economics of Selection in the Italian Steel Industry, Capitalism and Democracy in the 21st Century, Seventh Conference, the International Joseph A Schumpeter Society, Vienna, June 1998

Metcalfe, J S

'Innovation Systems and Endogenous Growth Theory', *Interfaces and National Systems of Innovation*, Villa Olmo, Como, October 1997

Miles, I

'Services, Systems & Innovation', *Systems and Services: Innovation Workshop*, CRIC, Manchester, March 1998

Tether, B S & Metcalfe, J S

'Productivity Growth and Procedural Knowledge - Analysing the Development of London's Airports from a 'Systems of Innovation Perspective'. 'Systems and Services: Innovation Workshop', CRIC, Manchester, March 1998

Project Two

Foresight

Contributing Researchers:

Professor Luke Georghiou (co-ordinator)

Professor Denis Loveridge

Professor Ian Miles*

Mr Andrew McMeekin*

Dr Stephen Quilley*

Mr Mark Tomlinson*

PhD Student:

Mr Michael Keenan

The main focus of this project is a study of foresight processes in firms, the aim of the work is to identify best practice and to develop new approaches. Research is concerned with:

- The extent to which firms' innovative activities are influenced by visions of the future in the foresight time frame;
- How and where in the organisation such visions are formulated;
- Whether systematic processes are involved;
- What external sources of knowledge or information are involved (concerning technical, scientific, economic, environmental, social change etc);
- And the relation of company foresight to national foresight (in both directions)

The pilot stages of this project are nearing completion following a programme of interviews with firms at senior management level and the organisation of a workshop on the industrial application of Foresight, Technology Assessment and Evaluation. We have worked closely with the OST on the future of the Foresight programme, particularly in relation to the practice and philosophy of Foresight in the UK and overseas.

A workshop was organised as part of the consultation exercise on the second UK Foresight Programme. Presentations were made by OST personnel and CRIC members and an organised discussion held, with regional government and industry representatives. On the basis of the workshop, inputs were made to the design of the programme.

In our industry studies we have found that substantial foresight activity was taking place prior to the UK national programme even though it is not always called by that name. Companies we have interviewed use foresight to augment their internal strategy formula processes in order to give technology projects added credibility at main board level. It is used primarily as part of internal selection procedures and to monitor developments outside a firm's core expertise. In chemicals, materials and energy sectors it is clear that foresight activity is a

valuable way of conducting analysis of environmental concerns. In all foresight activity the major difficulty is in accumulating "advanced marketing" knowledge i.e., forming reliable conjectures about markets which do not yet exist.

We are in the process of developing the work to cover international companies and the development of enhanced foresight methodologies.

Publications

Metcalfe, J S & Georghiou, L

'Evolutionary and Equilibrium Foundations of Technology Policy'.
Science Technology Industry Review no 22, pp75-100 June 1998

Conference Papers

Georghiou L

'The UK Technology Foresight Programme', American Association for the Advancement of Science, Philadelphia, February 1998

Miles, I

'Foresight and Beyond', Austrian Science Policy Society Workshop, Vienna, September 1998

Miles, I

'Foresight: Beyond the Tech Fix', EASST Conference, Lisbon, October 1998

Project Three

Technology Flows and the Service Sector

Contributing Researchers:

Professor Ian Miles *(co-ordinator)

Dr Birgitte Andersen*

Dr Jeremy Howells*

Mr Richard Hull*

Dr Jason Rutter*

Dr Bruce Tether*

Dr Claudia Werker

Visiting Researchers:

Christiane Hipp- ISI Karlsruhe Germany

Professor Jon Sundbo

Professor Lars Fuglsang

The principle aims of this project are to develop concepts and data which increase our understanding of the role of services in national systems of innovation, intellectual property rights in relation to service innovation, and the role of service in the externalisation of firms' innovative activities.

Work under this project has increasingly been concerned with the issues of *knowledge* and *expertise*. The reason for this is that one of the main foci for analysis of the role of services in innovation systems is *Knowledge-Intensive Business Services* (KIBS). We often find a considerable level of activity in KIBS, involved with transferring, sharing, and in some cases developing, technological and other professional knowledge resources with their clients. Research highlight three is drawn from this work.

The particular patterns of innovation and innovation management displayed by other kinds of services are also often tied to the sorts of knowledge deployed in these industries. Particularly important are types of knowledge to do with intangibles, and with the process of interacting with clients. The same point can be made with respect to the innovation that is taking place around the *service functions* that are required by organisations in practically all economic sectors. Functions such as IT support, marketing, financial transactions, delivery, aftersales, and so on may be carried out by specialised KIBS, or may be conducted in-house by internal staff. The specific features of services innovation frequently apply to these in-house activities, and so the study of innovation in service firms carries messages for the whole economy.

The work under this project overlaps with that on innovation measurement (project 6) and innovation systems (project 1). We have held two international workshops within these research themes and these are reported in more detail below. We

have also begun work on the use of the internet and web as means of communication between the research community and research users.

Publications

Clegg, C, Axtell, C, Damodaran, L, Farbey, B, **Hull, R** , Lloyd-Jones, R, Nicholls, J, Sell, R, Tomlinson, C

'Information Technology: A Study of Performance and the Role of Human and Organisational Factors'. Ergonomics vol 40 no 9 pp 851-871, 1997

Howells, J

'International Innovation and Technology Transfer Within Multinational Firms' in Grieve Smith, J & Michie, J (eds), Globalisation, Growth and Governance, Oxford University Press, pp50-70, 1998

Miles, I

'Home Informatics' and 'ICT Innovations in Services', in Dutton, W (ed) Society on the Line: The information and Communication Revolution, London, Oxford University Press, 1998

Miles, I

'Cyberspace as Product Space', Futures vol 29 no 9 pp 769-790, November 1997

Conference Papers

Andersen, H B & Howells, J

'Intellectual Property Rights as Indicators of Service Innovation: A Prospective Analysis'. Conceptualising and Measuring Services Innovation Workshop, CRIC, May 1998

Andersen, B, Howells, J, Miles, I

'Intellectual Property Rights, Innovation and Services', TSER SI4S Project 'Services in Innovation & Innovation in Services', Berlin workshop, March 1998

Green, K, Hull, R, McMeekin, A, Walsh, V

'The Construction of the Techno-Economic: Networks Vs Paradigms'. 'The Future Location of Research in a Triple Helix of University-Industry-Government Relations', New York, January 1998

Howells, J

'Research and Technological Development in South East Britain', 'Mobilising an Innovation Strategy for the South West', Du Pont Bristol Centre, University of the West of England, Bristol, March 1998

Howells, J

'Research and Technological Development: Networking Hertfordshire and Bedfordshire', R&T Workshop, Fielder Centre, University of Hertfordshire, Hatfield, December 1997

Howells, J

'Research and Technological Development in Southern Britain', 'Research and Technological Development in the South East' Conference, South East Economic Development Strategy (SEEDS), London, December 1997

Howells, J

'Intellectual Property Rights, the Firm and Service Innovations: Shaping Systems of Innovation', The Seventh International Forum for Technology Management, Kyoto, Japan, November 1997

Howells, J

'New Perspectives on Research and Technology, R&D Management Conference 'Technology Strategy and Strategic Alliances', Avila, Spain, September/October 1998

Hull, R, Leese, B, Bailey, J

'Experiments in the Organisation of Primary Health Care', Using Bodies: Humans in the Service of Medicine in the 20th Century Conference, Wellcome Centre for the History of Medicine, Imperial College, London, September 1998

Hull, R

'Re-thinking the Conduct of Scientific Expertise', the 1998 Annual Conference of the European Association for the Study of Science & Technology, Portugal, September 1998

Miles, I

'Environmental Services and European Regulations', at 'Europeanisation and the Regulation of Risk', SPSG Conference, LSE, London, March 1998

Miles, I

'Employment, Exclusion, Expertise', conference on Unemployment and Low Activity in Italy, CNR, Rome, March 1998

Tomlinson, M

'Knowledge & Technology Flows in the Service Sector and Manufacturing Sector: An Anglo-Japanese Comparison', STS Conference, Tokyo, March 1998

Tomlinson, M & Windrum, P

'The Impact of Knowledge-Intensive Services on International Competitiveness: A UK, Netherlands, German and Japanese Comparison', Technology Analysis and Strategic Management Conference, Bristol, September 1998

Project Four

Trajectories of Demand as Influences on Patterns of Innovation

Contributing Researchers:

Dr Ken Green (co-ordinator)
Professor Peter Swann
Dr Vivien Walsh
Mr Mark Tomlinson*
Mr Andrew McMeekin*
Professor Ian Miles*

Associates:

Dr Robin Cowan

This project is focused upon two of the major under-investigated areas in the study of innovation, namely the role of demand factors in the innovation process for highly novel products and the relation between innovation and the emergence of new markets. Work on the project has involved theoretical advances and empirical studies of the consumption of new commodities including how the development of the demand for household durables develops differently over time for different social groups.

The project has developed theoretical and empirical work around two principal themes, the evolution of consumption and consumer behaviour, and the strategies followed by firms in relation to the creation of markets. We are seeking to combine the insights of sociological and economic theories to throw light on innovation-demand relationships. Our initial results have related to the identification and explanation of differential rates of adoption of consumer durables, to the relationship between lifestyles and social classes, to sociological understandings of the changing nature of consumption and to the links between evolutionary and sociological explanations of the development of demand. We have also continued our work on dynamic models of consumption behaviour and what is entailed by treating the consumer as an innovator. Related work continues on how companies identify user needs and incorporate them in the demand process and on the emergence of markets for environmentally sustainable new products. We are planning a major academic workshop in January 1999 and a dissemination day in Spring 1999, in which researchers and users will make presentations.

Publications

Tomlinson, M

Changes in Tastes in Britain, 1985-1992, British Food Journal, vol 100 no 6 pp295-301, 1998

Conference Papers

McMeekin, A , Tomlinson, M

'Diffusion and Sociological Theories of Consumption', 'Escaping Satiation' Conference, Max-Planck Institute, Jena, Germany, December 1997

McMeekin, A, Tomlinson, M

'Patterns of Consumption and Taste', Institute of Grocery Distribution & CRIC joint seminar, Watford, July 1998

Metcalfe, J S

'Consumption, Preferences and Evolutionary Agenda', 'Escaping Satiation' Conference, Max-Planck Institute, Jena, Germany, December 1997

Tomlinson, M & McMeekin, A

'Consumption and Bourdieu: Some Recent Empirical Findings', BSA Consumption Group Workshop, Keele, January 1998

Tomlinson , M, Warde, A, & McMeekin, A

'Tracking the British Omnivore: Conceptualisation and Operationalisation', 'The Legacy of Frankfurt School in Cultural Studies' Conference, Salford University, April 1998

Project Five

Innovation and New Forms of Organisation

Contributing Researchers:

Professor Rod Coombs* (co-ordinator)
Professor Huw Beynon *
Dr Mark Harvey*
Mr Richard Hull*

Visiting Researcher:

Mr Paolo Battaglia, University of Bologna

This project covers one of the key areas of CRIC research. Its guiding framework has been developed around four themes: the interpretation of "new forms of organisation" as relating to connections between firms and between firms and other agencies in the innovation process; the concept of distributed innovation processes as a specific way of unveiling significant developments in innovation systems; the analysis of forms of governance for external knowledge generation; and the relation of these themes to the emerging capabilities theory of the firm.

As its empirical focus we have made a major investment in understanding the complete food products chain, and have carried out a series of interviews with major players. We have been particularly fortunate to enjoy the support of the Institute of Grocery Distribution which is the key body in regulating relations between retailers and producers. A very successful one day seminar was jointly organised with the Institute of Grocery Distribution in July 1998. We are also beginning some comparative work in Italy.

We have also linked our ideas on distributed innovation systems to the emerging capabilities theory of the firm in which we place particular emphasis in the new economy of knowledge production for innovation and the link with the governance of external relationships.

The project has proved to be remarkably rich in content and there remains a substantial amount of empirical work to be done to identify networks, the different circumstances which give rise to them, and the interpretation between innovation networks and markets. Research highlight 2 is based on this project.

Publications

Coombs, R & Hull, R

'The Politics of IT Strategy and Development in Organisations', in Information & Communication Technologies: Visions and Realities, Japanese Translation, vol 2 pp53-73 (1998) published by Fujitsu Books, Tokyo

Coombs, R, Green, K, Richards, A, Walsh, V

Introduction to book Technological Change and Organisation, Edward Elgar, 1998

Coombs, R & Fontes, M

'The Coincidence of Technology and Market Objectives in the Internationalisation of New-Technology-Based Firms', International Small Business Journal, vol 15 no 4 pp 14-35, 1997

Coombs, R & Battaglia P,

'Outsourcing of Business Services and the Boundaries of the Firm', CRIC Working Paper No 5, June 1998

Coombs, R & Hull, R

'Knowledge Management Practices and Path-Dependency in Innovation'. Research Policy, vol 27 no 3 pp239-255, 1998

Hull, R

'Governing the Conduct of Computing: Computer Science, the Social Sciences and Frameworks of Computing', Accounting, Management and Information Technologies, vol 7(4) pp1-28, November 1997

Hull, R

'Conduct: Computing and Knowledge', in 'Understanding Information Technology, Globalisation and Changes in the Nature of Work: Proceedings of the 1997 International Workshop', ed Barrett, M, Cooper, D, Hinings, B, Lowe, G, Krahn, H, Hughes, K; pp 213-222, published by the Faculty of Business, University of Alberta, Edmonton, Canada (1998)

Conference Papers

Coombs, R & Metcalfe, S

'Distributed Capabilities and the Governance of the Firm'. DRUID Conference, Denmark, June 1998

Coombs, R, Hull, R, Peltu, M

'Knowledge Management Practices for Innovation: An Audit Tool', The Innovative Management of Innovation, workshop organised jointly by the ESRC Innovation Programme, Japanese-European Technology Studies, CRIC, Asia-Pacific Technology Seminars and the UK-Japan High Technology Industry Forum, London, June 1998

Hull, R

'The Conduct of Expert Labour: Knowledge Management Practices in R&D', 16th Annual International Labour Process Conference, Manchester, April 1998

Hull, R

'Knowledge Management as a Business Process', workshop organised by ESRC Innovation Programme and the Business Resource Centre, Warwick University, May 1998

McMeekin, A & Coombs, R

'Human Resource Management and the Motivation of Technical Professionals', International Science, Technology and Society Conference, Tokyo, Japan, March 1998

Project Six

Measurement of Innovation

Contributing Researchers:

Professor Rod Coombs* (co-ordinator)

Professor Ian Miles*

Dr Bruce Tether*

Mr Mark Tomlinson*

Professor Luke Georghiou

Visiting Researcher:

Christiane Hipp, ISI - Karlsruhe, Germany

In this project we are investigating one of the major issues in innovation research, the generation of new qualitative indicators of innovation activity with particular application to service activities. Our guiding framework has developed to observe three principles, namely, the measurement of innovation outputs as well as inputs, the identification of innovation categories which transcend the service/manufacturing divide, and the development of measures which treat the scale of importance of innovation. Over the longer term we will give very serious attention to the development of new kinds of innovation survey which reflect more closely new systems of knowledge production and innovation.

Our principal results to date are focused around work carried out for the CBI in relation to their innovation survey. We have been able to use this data to demonstrate a serious under performance of UK firms in innovation when compared with foreign firms operating in the UK. Research highlight 1 is based on the work of this project.

We have also begun a programme of collaborative work with the DTI analysing data from the Community Innovation Survey in which we are exploring innovative measures in relation to services. The work jointly carried out by Christiane Hipp and Bruce Tether and Ian Miles on a German data set is close to a successful conclusion.

In May this year we hosted a very successful international workshop on "Measuring Service Innovation" which attracted leading scholars and statisticians from the OECD and North America .

Publications

Coombs, R, McMeekin, A, Pybus, R

'Towards the Development of Benchmarking Tools for R&D Project Management', R&D Management vol 28 no 3 pp175-186, 1998

Coombs, R & Tomlinson, M

'Patterns in UK Company Innovation Styles: New Evidence from the CBI Innovation Trends Survey', Technology Analysis and Strategic Management, vol 10 no 3, pp295-310, 1998

Miles, I

'R&D Statistics in the UK', in Dorling, D & Simpson, L (eds), Statistics in Society, Arnold, London 1998

Tether, B S & Storey, D J,

'Smaller Firms and the Development of Europe's High Technology Sectors: A Framework for Analysis and Some Statistical Evidence'. Research Policy vol 26(9), pp 947-971, April 1998

Tether, B S

'Small and Large Firms: Sources of Unequal Innovations?', in Research Policy vol 27, pp 725-745, July 1998

Tether, B S & Storey, D J

'New Technology Based Firms in Europe: An Introduction'. Research Policy, vol 26(9), pp 933-946, April 1998

Tether, B S & Storey, D J

'Public Policy Measures to Support New Technology-Based Firms in the European Union'. Research Policy vol 26 pp 1037-1057, 1998

Conference Papers

Coombs, R, Miles, I

'Radical Approaches to Innovation Surveys', workshop on 'Measuring Service Innovation', CRIC, University of Manchester, May 1998

Coombs, R, Tomlinson, M

'Firms' Self-Perception of Innovativeness: A New Indicator', workshop on 'Measuring Service Innovation', CRIC, University of Manchester, May 1998

Project Seven

The Systemic Context of Innovation and Competitiveness

Contributing Researchers:

Professor Huw Beynon* (co-ordinator)

Professor J Stan Metcalfe*

Dr Mark Harvey*

Dr Steve Quilley*

The project has continued with the broad remit outlined in the last *Annual Report*. This involved three main objectives:

- to provide and support a collective data resource for CRIC
- to develop an analysis of the relationship between innovation and competition in a comparative context
- to organise and undertake an original comparative research project

During the year, and as the empirical research got under way, the emphasis shifted as time was increasingly taken up with data collection.

The project has kept a "watching brief" on the kinds of data used in each of the seven projects and considered ways in which different kinds of data (quantitative and qualitative; large data sets and case studies) can be brought together in an analysis of a problem. It has strengthened CRICs links with the Essex Data Archive and R-Cade and NOMIS, and entered into joint discussions over the shaping of social and economic electronic data in Europe.

Theoretical work has developed around the idea of *instituted economic processes*, developing the work of Karl Polanyi. Contacts have been made with the Karl Polanyi Institute of Political Economy in Montreal. Two successful workshops were organised - *Comparative Cultures of Innovation* and *Rescheduling Time*. The latter received support from the ESRC. A further international symposium is being planned for 1999 with a strongly comparative and theoretical focus.

An empirical project has been successfully organised. The project team were concerned to arrive at a project which satisfied three main considerations:

- to examine a small empirical object and explore it in considerable detail, using a variety of different data sources.

- to use the object as “a probe” through which to integrate (horizontally) the main themes of the other six projects: hence it should combine a study of innovation and competition; production and markets; it should take account of services and involve a certain degree of Foresight etc.
- to allow for the development of a comparative framework.

The Tomato was chosen as the object of study and this has proven to be extremely effective. It has allowed the team to examine the technical and genetic innovations which have transformed the tomato; the distributed innovation system which has produced particular kinds of North European variety; the comparison of markets in North Europe (UK and Holland) and the differences between the North and the South. The focus has also allowed for a detailed examination of the key role played by the supermarkets in the UK; in turn this has facilitated co-operation with researchers involved in a parallel project on large organisations funded by the Leverhulme Trust. A presentation of the project was given to the CRIC International Scientific Panel. A book and a series of articles are being prepared. This project forms the basis of research highlight 4.

As part of the project's aim to develop comparative research through collaborative links with other researchers, Huw Beynon and Mark Harvey made separate visits to Brazil. These visits were funded by the British Council and involved discussions on the study of innovation processes with researchers at the Instituto de Geociencias at the Department of Science and Technology Policy at the University of Campinas in Sao Paulo and others at the Institute of Philosophy and Social Science at the Federal University of Rio de Janeiro.

Publications

Harvey, M

'Economies of Time: A Framework for Analysing the Restructuring of Employment Relations', paper to the International Labour Process Conference. In Felstead, A and Jewson, N Globalisation and Employment, Macmillan, pp21-42, 1998

Harvey, M

"Systemic Competition Between High and Low 'Social Cost' Labour. A Case Study of the UK Construction Industry", in Dynamics of Wage Relations in the New Europe, eds Clarke, De Gijssel, Szell, Janssen, Kluwert, 1998

Harvey, M

'Varieties of Continuity and Discontinuity. Employment Relations in Construction Industry in Britain and France'. Translated in Tijdschrift voor Arbeid en Participatie as 'Vormen van Continuïteit en Discontinuïteit', pp42-59, 1998

Metcalfe, J S

'Labour Markets and Competition as an Evolutionary Process', Markets, Unemployment and Economic Policy: Essays in Honour of Geoff Harcourt, vol 2, M Sawyer (ed), Routledge, London, 1997

Metcalfe, J S

'Introduction to Howells, J, Archibugi, D & Michie, J (eds) Innovation Systems in a Global Economy, Cambridge University Press, 1998

Metcalfe S, Birchenhall C, Kastrinos, N

'Genetic Algorithms in Evolutionary Modelling', Journal of Evolutionary Economics, vol 7 no 4 pp 375-393, 1997

Metcalfe, J S

'The Evolutionary Explanation of Total Factor Productivity Growth: Macro Measurement and Micro Process', Revue D'Economie Industrielle

Conference Papers

Beynon, H & Hudson, R

'Innovation and the Reconstruction of British Harbour Cities' , Harbour Cities in Europe , University of Bremen, Germany, May 1998

Beynon, H

'Regeneration from Decline? British Coalfields and Regional Policies with Special Reference to the WDA', 'Disoccupazione e Basso Livello di Attivata in Italia: Cause Specificiche e Rimedi Adeguati', National Research Council, Rome, March 1998

Beynon, H

'From Culture Subsidies to Redundancy Payments: Public Policy and Qualified Economics' , Learning in the Coalfields, Northern College, February 1998

Beynon, H

'States, Markets and Technical Change: The Strange Case of the British Opencast Industry' *Instituto de Geosciencias*, September 1998

Beynon, H

'New Jobs and New Workers: Changing Times in the Manchester Economy', University of Campinas, September 1998

Beynon, H

'The Third Way: A New Approach to Politics?' Institute of Philosophy and Social Sciences, Federal University of Rio De Janeiro, September 1998

Harvey, M

'UK Supermarkets. New Product and Labour Market and the Restructuring of the Supply-Demand Matrix', International Labour Market Segmentation Working Party, Trento, Italy, July 1998

Harvey, M

'National Labour Markets in a Globally Competitive Context', Labour Studies Research Group, University of Campinas, Brazil, April 1998

Harvey, M

'Supermarkets UK: The Transformation of the Food Commodity', Department of Science and Technology Policy, University of Campinas, Brazil, April 1998

Harvey, M

'Irreversibly Blair: Varieties of Social Democracy', NEDIC, University of Sao Paolo and Instituto de Filosofia e Ciencias Humanas, University of Campinas, Brazil, April 1998

Harvey, M

'Orchestrating Co-operation, Enhancing Competitvity'. Institute of Grocery Distribution and CRIC Joint Seminar, July 1998

Harvey, M

'UK Supermarkets. New Product and Labour Market Segmentation and the Restructuring of the Supply-Demand Matrix'. University of Melbourne, Centre for Applied Social Research, Australia, June 1998

Harvey, M

'Deregulation Labour Markets: The Rise of Subcontract Labour and Erosion of Employment Rights in UK Construction, 1980-1998, The Economic Research Network, Centre for the Protection of Workers' Rights, Washington, October 1998

Quilley, S

'Entrepreneurial Manchester: The Genesis of Elite Consensus', 'Manchester Revolutions' , University of Manchester, February 1998

3.3 CRIC International Workshops

As part of its research programme CRIC places great importance on international workshops, relatively small meetings of leading researchers which are organised to generate intensive discussion. In this reporting period CRIC organised three substantial workshops of two days duration with the titles shown below. The details of attendees and their papers are shown in the following sections. Abstracts of all the papers are on the web.

November 1997

A Symposium on the Use of Concepts of Time and Temporality for the Analysis of Work and Employment

Organised by Dr Mark Harvey and the ESRC Centre for Micro Social Change, University of Essex.

March 1998

Systems and Services Workshop

Organised by Professor Stan Metcalfe

May 1998

Conceptualising and Measuring Service Innovation

Organised by Professors Ian Miles and Rod Coombs

3.3.1 RESCHEDULING TIME

AN ESRC SYMPOSIUM ON THE USE OF CONCEPTS OF TIME AND TEMPORALITY FOR THE ANALYSIS OF WORK AND EMPLOYMENT

November 6-7 1997

CRIC & ESRC Centre for Micro-Social Change, University of Essex

Time is being re-scheduled, and this is the time of rescheduling. The boundaries between work and leisure, between leisure voluntary and constrained inactivity, between informal unpaid economic activity and paid economic activity; are created in and through temporal ordering. In exploring the rescheduling of different temporal orders, fundamental issues about the nature of changes currently taking place are raised in new and exciting ways. The temporal orders of our lives are being scrambled. Now, in the 1990s, as never before, is when this rescheduling of time is happening.

A group of eminent international academic experts in the field of work and time from a range of disciplines were invited to write papers around the themes of temporality and work for a ESRC-funded symposium organised jointly by the Centre for Research in Innovation and Competition (Manchester University and UMIST), the Department of Sociology and the Centre for Micro-Social Change (University of Essex).

This workshop was designed to develop four main themes.

- New conceptual frameworks and perspectives on temporality and work.
- Paid employment and the various forms of non-paid work [household, subsistence activity, 'voluntary', reproduction of skills and knowledge].
- The societal organisation, allocation and redistribution of paid working time.
- The organisation of temporality in different employment relationships, contemporary and historical.

Principal Contributors

Professor Gary Cross

Pennsylvania State University. Historian
'Historical Origins of the 'Normal' Workday'

Professor Diane Elson

University of Manchester. Economist, development studies
'Market time, production time, reproduction time - the times are out of joint.'

Professor Jill Rubery

UMIST. Director European Labour Market Research Group
'National Working-Time Regimes and Equal Opportunities'

Professor Maria Floro

The American University. Development Economist
'Time as Numeraire: The Institutional and Social Dimensions of the Use of Time.'

Professor J. Gershuny

University of Essex. Director ESRC Centre for Micro-Social Change
'The Great Day in the Social Structure: Time-use Trends and Choices.'

Professor Miriam Glucksmann

University of Essex. Sociologist
'Changing Times, Combining Temporalities: a Perspective on (Mid) 20th Century Work'

Dr Mark Harvey

Centre for Research in Innovation and Competition, University of Manchester.
Political economist
'Innovating temporalities for the Next Century?'

Dr Steffen Lehndorff/ Professor Gerhard Bosch

Institut Arbeit und Technik, Gelsenkirchen. European labour market economists
'Has "Secular Working Time Reduction" Come to an End?'

Dr Oriel Sullivan

Ben-Gurion University, Israel and Essex University. Sociologist
'Cross-National Change in Time Use'

Professor Ray Pahl

University of Essex. Sociologist

Professor Karel Williams

University of Manchester. Accountancy and Political Economy

INVITED SYMPOSIUM PARTICIPANTS

Professor Stan Metcalfe

Director of CRIC, University of Manchester. Economist

Dr Alan Felstead

Director of Centre for Labour Market Studies, University of Leicester

Dr Nick Jewson

Department of Sociology. University of Leicester

Cecile Jackson

Department of Development Studies. University of East Anglia

Jean Gardiner

Department of Higher Education, Leeds University

Dr Damian Grimshaw

Centre for Research in European Labour Markets, UMIST

Dr Mark Smith

Centre for Research in European Labour Markets UMIST

Claire Faichnie

Centre for Research in European Labour Markets UMIST

Dr Steve Quilley

CRIC, University of Manchester

Mark Tomlinson

CRIC, University of Manchester

Dr Birgitte Andersen

CRIC, University of Manchester

Dr Bruce Tether

CRIC, University of Manchester

3.3.2 Systems and Services: Innovation Workshop 17th / 18th March 1998

The purpose of this workshop was to develop our understanding of innovation systems in relation to service activity. It is a common place to observe that almost 70% of employment in the OECD economies is linked to non manufacturing, non agricultural activities. It is therefore something of a paradox that the innovation systems perspective has not yet been applied to services however broadly or narrowly they are defined. The workshop addressed many issues including links between manufacturing and service innovation, innovation systems and services and appropriability issues in relation to services and innovation. The proceedings will be published by Kluwer in 1999.

Principal Contributors:

Professor Jon Sundbo	-Roskilde University
Dr Faiz Gallouj	-University of Lille
Dr Birgitte Preissl	-DIW, Berlin
Dr Geoff Mason	-NIESR, London
Professor Cristiano Antonelli	-University of Turin
Professor Bo Carlsson	-Case Western University
Dr Ken Ducatel	-IPTS, Seville
Dr Paul Nightingale	-CoPS, University of Brighton
Professor Richard Nelson	-Columbia University
Professor Leif Hommen	-Linkopings University, Sweden
Dr Rinaldo Evangelista	-CNR, Rome
Dr Joanne Roberts	-University of Newcastle
& the Staff of CRIC	

Titles of Papers Presented:

Ian Miles - CRIC

'Services, Systems and Innovation - Cinderella comes to the ball'

Birgitte Andersen, Stan Metcalfe, Bruce Tether - CRIC

'Systems and Services: Overview and Questions'

Jon Sundbo, and Faiz Gallouj

'Innovation Systems in Services'

Cristiano Antonelli

'The New Economics of Knowledge'

Brigitte Preissl

'What is different about productive activity in services'

Jeremy Howells - CRIC

'Innovation Outsourcing and Externalisation'

Bruce Tether/Stan Metcalfe - CRIC

'Productivity Growth and Procedural Knowledge: The Development of London's Airports 1975-2015: An Innovation Systems Perspective'

Geoff Mason

'High Level Skills and Knowledge Transfer in Britain and Germany: Electronics and System Integration'

Paul Nightingale

'Control Systems and the Information Economy - Innovation in Investment Banking'

Bo Carlsson

'The Biomedical Technology Systems in Ohio and Sweden'

Ken Ducatel

'Information Technologies and Employment in Non-Informational Services: Innovations round the Edge?'

Giorgio Sirilli and Rinaldo Evangelista

'Technological Innovation in Services and Manufacturing: Results from Italian Surveys'

3.3.3 Conceptualising and Measuring Service Innovation Workshop - 20/21 May 1998

The purpose of this workshop was to examine the problems and opportunities in measurement of services innovation. Some papers were commissioned to appraise the issue from a theoretical perspective. Other papers re-examined the experiences of existing measurement systems.

Principal Contributors:

Professor Alan Hughes Cambridge	- CBR,
Dr Eric Wood Cambridge	- CBR,
Professor Alfred Kleinknecht University	-Delft
Ms Christiane Hipp Karlsruhe	-ISI,
Dr Daood Hamdani Statistics Canada	-
Dr Dominique Guellec	-OECD
Professor Georg Licht Mannheim	-ZEW
Professor Gilberto Antonelli University of Bologna/IDSE Milan	-
Dr Giulio Cainelli University of Bologna/IDSE Milan	-
Dr Christian Notari University of Bologna/IDSE Milan	-
Dr Johan Hauknes Group, Norway	-STEP
Professor Morris Teubal Hebrew University of Jerusalem	-
Dr Pari Patel SPRU/Cops	-
Professor Peter Wood University College London	-

Dr Rinaldo Evangelista -CNR,
Rome
& the Staff of CRIC

Titles of Papers Presented:

Ian Miles, Rod Coombs, CRIC

'Radical Approaches to Innovation Surveys'

Alfred Kleinknecht, Delft University of Technology

'Measuring and analyzing innovation in services and manufacturing'

Christiane HIPP, Fraunhofer Institute for Systems and Innovation Research, Karlsruhe

'The Knowledge Flow in Knowledge-intensive Business Services Scheme for a Conceptualization'

Christiane Hipp*, Norbert Janz and Georg Licht . *Fraunhofer Institute for Systems and Innovation Research, Karlsruhe **Centre for European Economic Research, Mannheim**

'Measuring Innovation in Services - Results based on an Innovation Survey in Germany'

Peter Wood, Department of Geography, University College London

'Services and Innovation: The case of business consultancy'

Rinaldo Evangelista. ISRDS - CNR Rome

'Technological Innovation in Services and Manufacturing: Evidence from the Italian Surveys'

Rod Coombs /Mark Tomlinson, CRIC

'Firms Self-Perception of 'Innovativeness' As a New Innovation Indicator: The Example of the CBI Innovation Trends Survey'

**A. Cosh, A Hughes, E Wood, ESRC
Centre for Business Research,
Cambridge**

*'Conceptualizing and Measuring
Service Innovation: The Experience of
SME Surveys in the UK'*

Dominique Guellec, OECD

*'New Indicators for Innovation in the
Services- An OECD Project'*

**Jeremy Howells / Birgitte Andersen,
CRIC**

*'Intellectual Property Rights as
Indicators of Service Innovation: A
Prospective Analysis'*

Daood Hamdani, Statistics Canada

*'Innovation and Labour Skills:
Evidence from the Consulting
Engineering Industry'*

Johan Hauknes, STEP Group

'KIBS and Academic Labour Mobility'

**Gilberto Antonelli, Giulio Cainelli &
Cristian Notari, IDSE Milan**

*'Externalities, Structural Change and
Service Sector in Italy. Some Empirical
Evidence'*

4 User Engagement

An important part of CRIC's overall strategy is the development of policies to disseminate its work to a widespread user community, and to interact with that community in whatever way supports the development of the research programme through dialogue and collaboration.

Because of the diversity of potential users of CRIC research there is no single route to effective dissemination and dialogue. We are following a number of routes to achieve effective engagement with different communities of users. On the one hand we develop broad communication strategies which do not seek to target any particular audience, while on the other hand more focused strategies are used to have maximal impact on specific audiences. In some cases the latter involve interaction with an audience over an extended time period.

There are four major non academic audiences with whom CRIC interacts:

- Public and private companies
- Other private sector agencies including trade unions, professional organisations and pressure groups
- Government agencies
- Media, both general and specialist.

The principal mechanisms through which we engage with these groups are listed below:

Web Site -
<http://les.man.ac.uk/cric>

CRIC has established a web page which covers the principal activities and staff profile of the Centre together with information about workshops, seminars and publications. The working and discussion papers of the Centre are also on the site and can be downloaded. We have developed the web site so that potential users may express any interest they may have in contributing to or in becoming actively engaged in CRIC research activities. The current web master is Dr Jason Rutter.

Dissemination Clubs

As and when appropriate, CRIC has developed dissemination clubs, groups of users interested in a particular theme, as a vehicle to communicate CRIC research and to develop research collaboratively within the club. As one example, senior CRIC researchers are closely involved with the Technology Strategy Forum which is attended by over thirty UK companies. CRIC uses the Forum as a platform for disseminating some of its results.

Workshops and Seminars

To target particular groups of users on a non-continuous basis CRIC provides workshops and seminars in relation to its research. In particular, companies and agencies which have participated in research are offered presentations for their internal purposes, both as the research proceeds and when its conclusions have been reached. In the past year we have organised seminars with the Institute of Grocery Distribution and the Office of Science and Technology.

Collaborative Research Groups

CRIC considers that there are strong grounds for developing ESRC and other Research Council submissions in partnership with companies and other users along the lines of the successful CASE award scheme.

Briefing Papers

CRIC publishes its principal research results in briefing papers as appropriate. These are written in a non academic form, published as a series by the Centre and disseminated to different user audiences.

New Monographs

As part of our dissemination strategy we have begun work on a series of monographs edited by CRIC with the contributions provided by practising managers in UK firms. The first of these will be published by Edward Elgar in 1999.

5 Working Paper, Discussion Paper & Briefing Paper Series

The working, discussion and briefing paper series is an important vehicle for CRIC to present its preliminary research results. Discussion Papers are used by the Centre to communicate quickly work in progress to our audiences. Typically these papers are submitted for publication to academic journals after revision. Working Papers are more finalised pieces of work. They often relate quite closely to published work but may contain more detail or data than would be appropriate for an academic journal. Some of these papers may be the basis for future monographs. They have an ISBN number. Briefing Papers are prepared for specific, usually non-academic audiences. They provide a concise account of the main conclusions arising from a piece of CRIC research.

The working, discussion and briefing paper series are edited by Professor Coombs. All working and discussion papers are refereed outside of CRIC.

We list below only those papers below which have appeared since the last annual report. A full listing is available on the web site from which they may be downloaded.

Working Papers

Metcalfe, J S
'Evolutionary Concepts in Relation to Evolutionary Economics', CRIC Working Paper No 4, January 1998

Coombs, R & Battaglia, P
'Outsourcing of Business Services and the Boundaries of the Firm', CRIC Working Paper No 5, June 1998

Coombs, R, Hull, R, Peltu, M
'Knowledge Management Practices for Innovation: An Audit Tool for Improvement, CRIC Working Paper No 6, June 1998

Discussion Papers

Tomlinson, M

'The Contribution of Services to Manufacturing Industry: Beyond the Deindustrialisation Debate', CRIC Discussion Paper No 5, September 1997

Howells, J

'Research & Technology Outsourcing', CRIC Discussion Paper No 6, November 1997

Tomlinson, M & Coombs, R

'Patterns in UK Company Innovation Styles: New Evidence from the CBI Innovation Trends Survey', CRIC Discussion Paper No 7, January 1998

Andersen, B & Howells, J

'Innovation Dynamics in Services: Intellectual Property Rights as Indicators and Shaping Systems in Innovation', CRIC Discussion Paper No 8, February 1998

Tomlinson, M

'Lifestyles and Social Classes', CRIC Discussion Paper No 9, February 1998

Tether, B & Massini, S

'Employment Creation in Small Technological and Design Innovators in the UK During the 1980's', CRIC Discussion Paper No 10, February 1998

Tether, B

'Small and Large Firms: Sources of Unequal Innovations?', CRIC Discussion Paper No 11, March 1998

Andersen, B

'The Hunt for S-Shaped Growth Paths in Technological Innovation: A Patent

Study', CRIC Discussion Paper No 12, May 1998

Yamin, M

'An Analysis of Subsidiary Innovation and 'Reverse' Transfer in Multinational Companies', CRIC Discussion Paper No 13, June 1998

Tomlinson, M & McMeekin, A

'Does the 'Social' Have a Role in the Evolution of Consumption', CRIC Discussion Paper No 14, June 1998

Teubal, M

'Enterprise Restructuring and Embeddedness - An Innovation Systems and Policy Perspective', CRIC Discussion Paper No 15, July 1998

Coombs, R & Metcalfe, J S

'Distributed Capabilities and the Governance of the Firm', CRIC Discussion Paper No 16, July 1998

Green, K, Hull, R, McMeekin, A, Walsh, V

'The Construction of the Techno-Economic: Networks Vs Paradigms', CRIC Discussion Paper No 17, August 1998

Archibugi, D, Howells, J, Michie, J

'Innovation Systems in a Global Economy', CRIC Discussion Paper No 18, August 1998

Michie, J, Driver, C

'Managerial Culture and the Capacity Stance of Firms', CRIC Discussion Paper No 19, August 1998

6 Seminars

Seminars Hosted at CRIC

- December 1997** 'An Epigenetic Framework for the Analysis of Knowledge, Innovation & Diffusion' & 'Complex Models for Innovation Dynamics: Master-Equations and Neural Network Applications' by Karl Mueller – Director of the Social Science Unit, Institute for Advanced Studies, Vienna. Organised by Richard Hull
- December 1997** Competitvity Seminar organised by Steve Quilley
- April 1998** 'The Poultry Industry: A Research Agenda' by Simon Miller & Martin Orbach – Department of Sociology, University of Manchester
- May 1998** 'Technological Capabilities and the Strategies of Small Manufacturing: The Case of Hong Kong', workshop by Professor Paul Robertson, University of New South Wales, Australia
- May 1998** Knowledge & Services ½ day workshop organised by Ian Miles
- May 1998** 'Lifestyles, Class and Identity: Reflexive and Structural Forms of Association', by Steve Quilley
- June 1998** 'Innovations in Corporate Risk Management', by William Cannell
- July 1998** 'Experiments in Primary Health Care' by Richard Hull , with Brenda Leese, NPCRDC, and Jackie Bailey, Department of Epidemiology, Newcastle Medical School
- September 1998** 'The Finnish Innovation System' by Gerd Schienstock, University of Tampere, Finland
- October 1998** 'Determinants of the Division of Labour in Innovation', by Prof Ashish Aurora, Carnegie Mellon University, USA

7

CRIC Staff

Directorate

Professor Huw Beynon - Director

Is Professor of Sociology and former Research Dean of the Graduate School in Economic, Social and Legal Studies at the University of Manchester. He has degrees in Economics and Sociology and is a leading expert on issues relating to work, employment and unemployment and he has published eight books in relation to his empirical research into the coal, steel, chemicals, engineering, car and food processing industries. In the 1970's he was a visiting research fellow at the Coal Research Centre at the University of Illinois. He returned to Britain in 1976 and set up the Work and Employment Research Unit at the University of Durham. He took up his Chair in Manchester in 1987. He was a member of the Sociology Panel of the HEFCE Research Assessment Exercise in 1996.

Professor Rod Coombs - Director

Is Professor of Technology Management at UMIST. After a physics degree at Kent, he worked in biophysics research at Oxford for two years. An MSc and PhD at Manchester in the economics of innovation converted him into a social scientist. Since then he has developed a broad portfolio of research, teaching and consultancy in the areas of innovation and

technology management. He is particularly interested in the organisation of business to achieve innovation, and in the integration of technology into strategy.

Professor J Stan Metcalfe CBE - Director

Stanley Jevons Professor of Political Economy and Cobden Lecturer at the University of Manchester. During his career he has lectured at the Universities of Manchester and Liverpool. He is an Honorary Professor of Economics at the University of Queensland. He has been actively involved in the development of science and technology policy in the UK, being a member first of ACARD and subsequently ACOST. He was, until October 1997, a member of the Monopolies and Mergers Commission. His research interests are currently focused upon evolutionary economics and the modelling of evolutionary processes in relation to innovation, competition and economic growth.

Professor Ian Miles - Director

Is Research Director of PREST (Policy Research in Engineering, Science and Technology), an Institute of the University of Manchester. Before coming to Manchester in 1990, he was for 18 years a researcher at the Science Policy Research Unit at the University of Sussex; and before then he received a first class honours BSc in Psychology at Manchester. His research interests include: innovation studies; foresight; indicators; service sectors. He has over a hundred publications spanning these areas.

Economic History from Manchester Polytechnic.

Sharon Dalton

Personal Secretary to Professor Metcalfe. She has Diploma in Secretarial Skills at Leigh and Wigan College. She is on secondment from the School of Economic Studies.

Administration

Sharon Hammond - Centre Administrator

Has an MA (Econ) in Development Studies, and a BA (Hons) degree in Combined Studies (History and Social Sciences) from the University of Manchester, and also read for an arts degree with the Open University. She has held a number of administrative posts in the University of Manchester, including Personal Assistant to the Head of the School of Epidemiology and Health Sciences in the University of Manchester Medical School.

CRIC Secretaries

Deborah Woodman

Centre Secretary at CRIC. She has a Diploma of Higher Education and a BA(Hons) in History with Social and

Research Fellows

Dr Birgitte Andersen - Research Fellow

She has a degree in Economics and an MA in Economics of Technological and Structural Change from the University of Aalborg, Denmark, an MSc in Economic Development and International Trade and a PhD in Economics from the University of Reading. Her research interests include evolutionary economics, technological paradigms and systems, industry dynamics including the variety of firms, innovation in services as well as innovation dynamics and diffusion. She is also interested in innovation policy including the economics of intellectual property rights. She has published in the area of technological change, the evolution of corporate innovation, as well as patent statistics. She was enrolled at the Danish Research Academy 1993-96 and was project funded from the Danish Social Science Research Council (SSF) 1994-97

Dr Mark Harvey - Senior Research Fellow

Studied History at Oxford University and obtained a PhD in Sociology at the LSE in 1969. From there he went to a research fellowship at the International Centre for Genetic Epistemology in Geneva. After he had been a lecturer at Brunel University, he spent many years in the construction industry where he was a senior shop steward. His research interests focus on the state and its significance for influencing competitive environments, and a

comparative approach towards varieties of capitalism.

Dr Jeremy Howells - Senior Research Fellow

Has a PhD from the University of Cambridge on R & D in innovation and he has worked at the Universities of Oxford and Newcastle upon Tyne before returning to the Judge Institute of Management Studies at Cambridge. In 1996 he moved to PREST where he is a senior research fellow, a post which he holds on a half time basis with his CRIC post. He has written and co-authored five books on research and innovation and is currently completing a book on the dynamics of technological change within the European Community.

Mr Richard Hull - Research Fellow

Has a degree in Liberal Studies in Science (Physics) at the University of Manchester which was followed by research on toxicology, at the Science Policy Research Unit, Sussex University 1978. After many years outside academia he gained an MSc in Computation from UMIST in 1993, and has since been a researcher in CROMTEC. Research interests include the history of computing; organisational and expert practices; and the government and conduct of experts.

Mr Andrew McMeekin - Research Fellow

Has a first degree in management and chemical sciences from UMIST and an MSc in Science policy from the Science Policy Research Unit at Sussex University. Since 1993 he has been a research associate at CROMTEC. His current research interests include environmental influences on innovation in UK companies and the influence of expectations about the future upon the innovation process.

Dr Stephen Quilley - Research Fellow

Read Social and Political Science at Cambridge before completing an MSc at Birmingham University and a PhD at the University of Manchester. He has held a temporary lecturing position at the Moscow School of Economic and Social Science and has worked on a number of projects on the Manchester economy. His current research interests focus upon globalisation and the social and institutional regulation of local and national economies.

Dr Bruce Tether - Research Fellow

Graduated in Geography from the University of Newcastle upon Tyne and has a PhD from the Science Policy Research Unit at the University of Sussex on the topic of smaller firms in the innovation process. In 1995 he joined Warwick Business School, working in the Centre for small and medium size enterprises. His research interests are both theoretical and empirical and include the links

between the science-base and industry, the role of small firms in innovation and the regional aspects of innovative activity.

Mr Mark Tomlinson - Research Fellow

Began his research career in the Faculty of Economic and Social Studies at Manchester University where he worked on econometric studies of social mobility in India and the sociology and economics of consumer demand. He subsequently spent four years at Nuffield College Oxford where he worked on new models and techniques for studying labour markets in Europe. His current interests include evolutionary economics; complexity theory; the "service sector" and its relationship with manufacturing; consumer demand and the construction of markets; and the measurement of innovation.

New CRIC Staff

Dr Jason Rutter studied Drama before completing his PhD, 'Stand-up as Interaction: Performance and Audience in Comedy Venues', in the Sociology Department at the University of Salford. He worked as a research fellow on the Manchester Airport funded project Computer-Mediated Interaction: Local Newsgroups and the Development of Sociability on the Net before taking up a post at CRIC. His research interests include interaction, humour research and use of web technologies

Dr Claudia Werker is Marie Curie Research Fellow at CRIC. She has a degree in Economics from the University of Konstanz, Germany, and was recently awarded her PhD thesis in Economics from the Technical University Bergakademie Freiberg, Germany. Her research interests include the analysis of innovation systems and innovation policy with special focus on the application of these theories to countries that transform from a socialist planned economy to a market economy. To explore these questions she uses simulation models.

8 **CRIC Associates**

CRIC Project Associates are members of the full-time teaching staff of the University of Manchester, UMIST and the Manchester Business School who are actively involved in CRIC projects, sometimes taking on the role of project leader.

Dr Suma Athreye - Manchester School of Management

Professor David Auckland - Campus Ventures, University of Manchester

Ms Kate Barker - PREST, University of Manchester

Professor David Coates - MICLS, University of Manchester

Professor Peter Dicken - Department of Geography, University of Manchester

Professor Luke Georghiou - PREST, University of Manchester

Dr Ken Green - Manchester School of Management, UMIST

Mr Andrew James - PREST, University of Manchester

Dr Keith Julian - PREST, University of Manchester

Professor Denis Loveridge - PREST, University of Manchester

Ms Silvia Massini - Visiting (La Sapienza University, Rome)

Dr Marcella Miozzo - Manchester School of Management

Professor Alan Pearson - Manchester Business School

Professor Peter Swann - Manchester Business School

Dr Vivien Walsh - Manchester School of Management, UMIST

Dr Mo Yamin - Manchester School of Management, UMIST

9

Honorary Associate Fellows

To further the development of the research programme CRIC has appointed Associate and Visiting Fellows who work closely with CRIC staff in the development of the research programme.

At the time of writing, the following scholars have been appointed honorary associate fellows with the Centre:

Professor Cristiano Antonelli

Professor of Economics, University of Torino Italy

Professor Gilberto Antonelli

Professor of Economics, University of Bologna, Italy

Dr William Cannell

Member of the European Commission DGXII (Science Research and Development)

Professor Robin Cowan

MERIT, University of Limburg, Maastricht, Holland

Professor Xavier Vence Deza

Department of Economics, Universidade de Santiago de Compostela, Spain

Professor Dominique Foray

Directeur de Recherche at the Centre National de la Recherche Scientifique, at the University of Paris-Dauphine, France

Professor John Foster

Professor of Economics, Head of Department, University of Queensland, Brisbane

Professor Peter Hall

Professor of Economics and Management, University College, University of New South Wales, ADFA, Canberra

Professor Steve Klepper

Professor of Economics and Social Sciences, Carnegie Mellon University, Pittsburgh, USA

Professor Morris Teubal

Professor of Economics, The Jerusalem Institute for Israel Studies

Professor Ulrich Witt

Professor of Economics and Director of Max Planck Institute, Jena, Germany

Professor Paul Geroski

London Business School, London

Roberto Simonetti

The Open University, Milton Keynes

Professor Jonathon Michie

Birbeck College, London

Dr Joanne Roberts

University of Northumberland at Newcastle

Professor Alan Warde

Lancaster University

Dr David Fishlock

Former Science Correspondent, Financial Times

Dr Robert Whelan

UK National Physical Laboratory/Smith Institute

Professor Mario Calderini

Politecnico di Torino, Italy

**Visitors Contributing to
Research Programme**

Jon Sundbo – Roskilde University

Francesca Sgobbi - University of Milan

Riccardo Leoncini - IDSE, Milan

Fabio Montobbio – Bocconi University,
Milan

Frederica Pinotti – University of
Bologna

Gerd Schienstock – University of
Tampere, Finland

Francesco Lissoni – University of
Brescia

Lars Fuglsang – Roskilde University

Michael Peneder – WIFO, Vienna

Susanna Pelizzari – University of
Bologna

Pavel Pelikan – The Research Institute
of Industrial Economics, Sweden

Ashish Arora – Carnegie Mellon
University

Paul Robertson – University of New
South Wales, Australia

Giovanni Toletti – Politecnico di
Milano

Other Visitors

Don Kash – George Mason University,
USA

Alessandra Lanza – University of Turin

Oscar Rodil Marzabal - Santiago de
Compostela, Spain

10 International Scientific Panel

A panel of internationally distinguished scholars has been appointed to advise on the future development of the research programme and to advise on the quality of the research plans and outputs. The members of the panel are ; Professor Robert Boyer of CEPREMAP, Paris; Professor Fumio Kodama of the University of Tokyo, Japan; Professor Bengt-Ake Lundvall of the IKE Group, Aalborg; Professor Richard Nelson of the Public Policy Research Centre, Columbia University, New York and Professor Jim Utterback of the Sloan School of Management, Cambridge Massachusetts.

The panel met in Manchester in October 1998 for a two day programme of seminars and presentations given by both the panel and CRIC research fellows.

The programme presentations were as follows:

The Tomato Project: CRIC's Research on Distributed Innovation Processes-
Professor Beynon, Dr Harvey, Dr Quilley

Analysis of New Sources of Innovation Survey Data: The CBI Project Professor Coombs, Mr Tomlinson

The DISKO Project Professor Lundvall

Competition Growth and the Innovation Connection Professor Metcalfe

Technology Lifecycles and Competition Professor Utterback

New Co-Production of Innovation Services Professor Miles

Idea Transfer and Knowledge Spillovers Professor Storper

A productive discussion followed each presentation and the meeting provided valuable input into our discussions on the future development of the programme. As a follow on from this meeting, plans are developing for collaborative workshops at MIT and in Japan.

The scientific panel will visit CRIC again next September and this meeting will coincide with the ASEAT conference organised by CROMTEC.

11

Advisory Committee

The Advisory Committee advises the Director on all matters to do with the operation and development of the Centre and on relations between the Centre and the ESRC. As of May 1997, it has the following distinguished members:

Sir Robin Nicholson (Chairman)

Fellow of the Royal Society and the Royal Academy of Engineering. He is Chairman of Pilkington Optronics Ltd and he was Director of Pilkington plc from 1986 until his retirement in 1996. A former chief scientist advising the UK Government, he is also a Non-Executive Director of the British Petroleum Company plc and Rolls-Royce plc, a member of the Government's Council for Science and Technology.

Professor John Bessant

Is Professor of Technology Management and Head of the Centre for Research in Innovation Management at the University of Brighton (and part-time Professor at the Science Research Policy Unit at the University of Sussex). Originally trained as a chemical engineer, he received his PhD in 1978 based on research on innovation management within the chemical industry. Following this he spent four years as a Research Fellow in the Technology Policy Unit at Aston University before moving to Brighton Business School.

Dr Alan Calder CBE

Graduated from Aberdeen University with a BSc and a PhD in Organic Chemistry in 1968 after which he joined ICI Nobel Division. He held a variety of positions within the company becoming Research Manager, Colours and Fine Chemical in 1987. Until 1996 he was General Manager, Research and Development, for Zeneca Specialities. In 1993 he was appointed Chairman of the SERC (EPSRC) Chemistry Committee and in April 1994 he became Chairman of the UK Chemical Industry Foresight Panel. His involvement with Foresight continues as a member of the new LINK Board.

Lord Garfield Davies

Was born and bred in South Wales and is General Secretary of USDAW - The Unions of Shop, Distributive and Allied Workers. He took over leadership of USDAW in January 1986 and became a member of the TUC General Council. He is now TUC Spokesperson on International Affairs. He became a full-time USDAW official in 1969, when he was appointed as Area Organiser at Ipswich. Three years later, he was promoted to Deputy Divisional Officer for the Eastern Division, with special responsibility for co-ordinating recruitment. In 1978, he moved to the Union's Head Office in Manchester on being appointed a National Officer. He holds a number of other positions including the vice-presidency of the Industrial Participation Association and he is a Trustee of the Museum of Labour History. He became Lord Davies of Coity in 1997.

Professor Ray Hudson

Is Professor of Geography at the University of Durham. An economic geographer, with particular interests in relationships between economic restructuring, labour market change and territorial development policies. He is Director of the Centre for European Studies of Territorial Development, of the ONS National On-Line Manpower Information System, and of the ESRC Resource Centre for Access to Data on Europe. He has a BA, PhD. and DSc from Bristol University and Honorary DSc from Roskilde University Denmark.

Dr Alan Hughes

Is Director of the ESRC Centre for Business Research at the University of Cambridge, and Fellow of Sidney Sussex College. His research interests include the financing, growth, innovative behaviour and survival of small firms; take-overs and corporate governance; manufacturing competitiveness, and competition and industrial policy. He has acted as a consultant in these and other areas to the Office of Fair Trading, the Department of Trade and Industry, the World Bank, the United Nations and the European Commission.

Dr Alistair Keddie

Is Head of DTI's Innovation Unit which he established in 1991. Prior to his current job he was Head of DTI's Single Market Unit. Before that he was Head of the international science and technology branch in DTI's Research and Technology Policy Division, a member of the Policy's Planning Unit; and before moving to DTI Headquarters in 1984 was head of the Air Pollution Division at the then Warren Spring Laboratory.

Professor William Walker

Was Director of Research at SPRU, University of Sussex and is now Professor in International Relations, University of St Andrews. His main research has been on issues relating to technology, industry and international security, especially in regard to nuclear energy and weaponry. He has also written on national systems of innovation, energy technology and defence industries.

12 Training

Training in presentation skills is provided by the ESRC and all CRIC staff will take advantage of the

courses available as and when appropriate. CRIC will also collaborate with other ESRC research centres to develop joint dissemination strategies.

Courses Attended

January 1998	ESRC Clear Communications Workshop	I Miles, R Coombs, S Hammond
April 1998	ESRC Centre Programme Directors Meeting	S Metcalfe, I Miles
April 1998	Reception skills, University of Manchester	D Woodman
June 1998	Emergency First Aid, University of Manchester	S Hammond
June 1998	Time Management, University of Manchester	B Andersen
June 1998	Internet Commerce: Realities and Opportunities, Manchester Town Hall	J Rutter
July 1998	Introduction to Microsoft FrontPage	S Hammond, D Woodman, B Tether
October 1998	Web Database Integration with Active Server Pages	J Rutter
October 1998	RAGNET Research Administrators Group Network	S Hammond
October 1998	Training in Equality and Diversity Issues	S Hammond

13

PhD Programme

CRIC places great importance on the establishment of a vigorous PhD programme around its central research themes.

We have established a PhD Programme in conjunction with the Graduate School of Legal Economic and Social Studies in the Faculty of Economic and Social Studies at the University of Manchester. Mode B recognition was granted from the ESRC in 1998.

As part of the refurbishment of CRICs accommodation a substantial area has been allocated for PhD students.

The Director responsible for the development of the PhD Programme is Professor Huw Beynon. All enquiries should be made to the Centre Administrator Sharon Hammond.

CRIC PhD Student

Ivan Hernandez - September 1998

14

CRIC Contact Details

All general enquiries to the Centre should be made via the Centre Administrator, Ms Sharon Hammond 0161 275 7368. Fax 0161 275 7361 Sharon.Hammond@man.ac.uk

Contact us through the CRIC web site on <http://les.man.ac.uk/cric>

Professor Huw Beynon	0161 275 7363	Huw.Beynon@man.ac.uk
Professor Rod Coombs	0161 275 7362	Rod.Coombs@Umist.ac.uk
Professor Ian Miles	0161 275 7360	Ian.Miles@man.ac.uk
Professor Stan Metcalfe	0161 275 7371	Stan.Metcalfe@man.ac.uk
Dr Birgitte Andersen	0161 275 7366	Birgitte.Andersen@man.ac.uk
Dr Mark Harvey	0161 275 7369	Mark.Harvey@man.ac.uk
Dr Jeremy Howells	0161 275 7374	Jeremy.Howells@man.ac.uk
Mr Richard Hull	0161 275 7364	Richard.Hull@Umist.ac.uk
Mr Andrew McMeekin	0161 275 7375	Andrew.McMeekin@Umist.ac.uk
Dr Stephen Quilley	0161 275 7378	Steve.Quilley@man.ac.uk
Dr Bruce Tether	0161 275 7376	Bruce.Tether@man.ac.uk
Mr Mark Tomlinson	0161 275 7372	Mark.Tomlinson@man.ac.uk
Dr Jason Rutter	0161 275 6859	Jason.Rutter@man.ac.uk
Dr Claudia Werker	0161 275 7800	werker@man.ac.uk

CRIC Secretaries

Mrs Deborah Woodman	0161 275 7365	Deborah.Woodman@man.ac.uk
Mrs Sharon Dalton	0161 275 4824	Sharon.Boardman@man.ac.uk

Appendix 1

PERFORMANCE INDICATOR TOTAL

1997

Group	A	B	C	D
1	5	7	1	12
2	14	1	3	11
3	8	7		6
4	1		4	
5	9	9		
6		43		
7		2		
8		1		
9		4		
10		7		
11		12		

- A1: Books
- A2: Book Chapters
- A3: Refereed Journal Papers
- A4: Non-refereed Journal Papers
- A5: Other Publications
- B1: Membership of Committees
- B2: Membership of Networks
- B3: Overseas Visitors
- B4: Overseas Visiting Fellows
- B5: Advice & Consultancy
- B6: Conference Papers
- B7: Newspapers
- B8: Media – Radio/TV

1998

Group	A	B	C	D
1	5	10	1	14
2	19	6	4	17
3	24	4	1	6
4		13	8	1
5	12	15		9
6		74		
7		1		
8		1		
9		13		
10		5		
11		7		

- B9: Seminars/Conferences/Workshops
- B10: International Collaborative Research Projects
- B11: Conferences Attended
- C1: Annual Grant
- C2: Other ESRC Funding
- C3: Other Funding from Host Institution
- C4: Other Funding
- D1: Research Staff
- D2: Associated Academic Staff
- D3: Support Staff
- D4: Research Students
- D5: Staff Development