

### **Charles Cooper: Institution Builder**

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Charles Cooper passed away on Sunday 16 January 2005, after a long illness. Charles was an important development economist specialized in the study of issues related to technology and technical change in developing countries; he was also an institution builder. The United Nations University Institute for New Technologies (UNU-INTECH) at Maastricht in the Netherlands stands as eloquent testimony to this trait. I had the privilege of being, first, a silent admirer of his research writings and later a colleague — although my association with him in the latter capacity was rather short, from September 1998 through December 1999, when I joined the faculty of UNU-INTECH. During this short period, and despite his ill health, Charles impressed me as an efficient administrator and a wonderful colleague who treated all employees with great dignity. With interests ranging from cricket to South Indian delicacies and intricate theological discourses in Roman Catholicism, Charles was a multifaceted personality, although he was understood in this way by only a close band of friends and followers. In this appreciation of Charles, I will undertake a short survey of the contributions of this great friend of developing countries. After some inevitably brief background information on Charles' career, I will focus on two aspects: first the discipline of innovation studies, as it related to developing countries; and second, Charles' role as an institution builder in systematizing the study of innovation in developing countries.

After working at OECD in the 1960s, Charles moved to the University of Sussex in 1969, where he worked for more than a decade as joint fellow of the Institute of Development Studies (IDS) and the Science Policy Research Unit (SPRU). He joined the Institute of Social Studies (ISS) in the Hague in 1980. Here he played an instrumental role in establishing a new masters course in Economic Policy and Planning, and was appointed Professor of Development Economics. In 1990 he left the ISS for Maastricht, to help found UNU-INTECH, although he retained links with the ISS until he retired in 2000. Charles was actively and extensively involved with a number of well-respected journals: he was managing editor of the *Journal of Development Studies* from 1981 to 1989; he helped the European Association of Development Institutes (EADI) to establish its own journal,

the *European Journal of Development Research*, co-editing the first edition in 1989; and he sat on the International Advisory Board of *Development and Change* from January 1995 until his death in January 2005.

### **Innovation Studies**

In an obituary on Charles on the website of the SPRU at the University of Sussex, Martin Bell, a colleague and distinguished development economist himself, noted that some of the important contributions Charles made were during his time as a joint fellow of IDS and SPRU (Bell, 2005). In my view, of his edited books and papers, two stand out. The first is a collection of nine essays which he edited into a book entitled *Science, Technology and Development* (Cooper, 1973). The book had important contributions by such distinguished scholars as Amilcar Herrera, John Roberts, Peter Kilby, Constantine Vaitsos, Frances Stewart, Clive Bell, Shigeru Ishikawa and Genevieve Dean. Their essays present a refreshingly different approach to the problems associated with science and technology in developing countries. The papers were primarily concerned with the role which existing scientific institutions actually play, and the effect that the concentration of innovative activities in a few developed countries has had on developing countries. The authors looked at such matters as the alienation of indigenous scientific activities from the productive system, the under-utilization of certain categories of technical skills such as engineering, and the problems that arise as a result of developing countries' dependence on developed countries for technology. It is really remarkable that, after three decades and the tremendous progress achieved in some developing countries, the majority still suffer from the same problems identified by Charles and his colleagues. The findings of this collection of essays thus provide important ingredients to innovation policy-makers in developing countries.

In his excellent introduction to the collection, Charles made some important points about the technological dependence of developing countries on developed countries. For instance, according to him, scientific activities in developing countries tend to be a form of consumption rather than investment; the reasons for this lie in dependence on external sources of technology and in the structure of underdevelopment itself. Yet dependence on proprietary technology from the advanced countries raises its own problems. Some of these arise because production technology is often in private ownership, as the property of large multinational corporations. Others arise because western technology is inappropriate to the resource endowments and usage patterns in developing countries. An obvious counter to this problem of technological dependence is to develop local innovative capacity including local R&D. But Charles argues, quite rightly, that this is easier said than done. Again, in the context of recent changes in international

governance rules with respect to intellectual property rights and technology transfer, the arguments made by Charles and his colleagues three decades ago are remarkably relevant even now. The ability to identify issues for research related to technology in developing countries, and the skill for making bold statements that were firmly rooted in empirical reality, were two hallmarks of Charles' writings. The collection of essays concludes with two papers on China, one by Shigeru Ishikawa on 'Choice of Techniques' and the second by Genevieve Dean on 'Sources of Innovation'. While the development economics community nowadays is intensely interested in the remarkable economic and technological progress of China, Charles proved himself a real visionary in identifying the importance of China's development experience long before it had become a fad.

A second contribution of Charles that has immense current relevance is a paper that he wrote in 1980 entitled 'Policy Interventions for Technological Innovation in Developing Countries' (Cooper, 1980). This paper explored the problem of how to determine priorities for investment in science and technology related to industrial production in developing countries. The approach in the paper was to isolate factors that influence the comparative costs of building up local innovative skills and of importing technology from abroad. Many developing countries continue to grapple with this question. In this paper, Charles tried to draw attention to differences between formal and informal sectors in their organizational requirements for innovation, and to the need for being selective in importing technology from abroad.

It is worth summarizing the main conclusions of the paper. First, depending on the type of specialization in question, the social costs of building up innovative skills will differ. Costs and risks of local R&D are likely to be relatively high, as are those of acquiring advanced design and construction-engineering skills. Acquiring simpler design and machine-fabrication skills is likely to involve lower social costs in the process of learning-by-doing. Second, the extent to which the first conclusion can be taken as a guideline for policy depends on the initial skill endowment in the country. Some larger economies (like Brazil and India) already have substantial capabilities in scientific research and engineering. As a result, they have fewer constraints on the development of local innovative capability. The main policy problem is often to find means of more selective importing of technology so as to encourage the use of available scientific and local skills by local firms. Developing countries are exhorted these days to tap into world markets for disembodied technologies and purchase their requirements as if they are buying a consumer durable. The imperfections in the market for this technology are rarely discussed or understood. Charles correctly pointed out that the terms of access to foreign technology vary considerably. At one end of the spectrum, technology is transferred to developing countries by highly monopolistic transactions. At the other, markets are more or less 'competitive' for comparatively simple, widely-known production techniques. The

monopolistic transactions always involve high social costs, and sometimes inappropriate technology; they also restrict opportunities for learning-by-doing. This issue has once again become very topical in the current discussions on technology transfer within the context of WTO.

Charles was thus a pioneer in raising policy interventions for technological innovation in developing countries while most economists who were working in this area (of course with notable exceptions) were content to interpret this intervention very narrowly in terms of having a policy regime that is open to trade in commodities and capital. This latter approach argued that all that developing countries needed to do was to have an FDI-friendly policy, which would lead to MNCs siting their local manufacturing facilities in developing countries, so that technology spillovers would then occur automatically to the host firms from the operations of these MNCs. Charles, of course, never believed in these naïve prescriptions which did not have any empirical validity at that time or, importantly, even now. Charles' research into innovation policy interventions spawned a small but growing literature that focuses more specifically on the instruments and institutions that may support innovation-generating efforts in developing countries. Thus his contributions to the systematic study and understanding of innovation and its stimulation in developing country environments is much more fundamental and deep-seated than is widely understood.

### **Institution Builder**

The study of innovation in developing countries was made much more systematic with the founding of UNU-INTECH in 1990. According to Martin Bell (2005), UNU-INTECH is 'the only large organisation in the world that is fully committed to policy-oriented research and teaching about science and technology in the developing world'. Charles was commissioned by the Dutch Ministry of Foreign Affairs to study the feasibility of establishing an exclusive research centre focusing on innovation in developing countries. Not only did he carry out the feasibility report, but he also became its first Director. It was his desire that researchers from the developing world should staff the Institute, leading to a unique form of capacity building for these researchers who themselves learn by doing research in a western setting with western measurements of work done and reward systems. This should lead to systematic capacity building for not just the researchers but also for the Institute. However, in the interim period he staffed or associated the Institute with very well-known scholars specializing in the study of innovation in developing countries. Important names such as Jeffrey James, Martin Fransman, Sanjaya Lall, Larry Westphal, Raphael Kaplinsky and Edward Steinmueller were all associated with and did contract research for the Institute up to the mid-1990s, when the newly recruited resident faculty from the developing world were able to make their own

contributions to the fledgling Institute's research. In this way Charles ensured that UNU-INTECH had very high visibility even its initial period.

Thereafter he set out to design the research themes and to position the Institute as a worthy counterpart on developing country issues to the large and prestigious Maastricht Research Institute on Innovation and Technology (MERIT) of the University of Maastricht: MERIT had a growing reputation in studies leading to technology in developed countries. Interestingly, UNU-INTECH and MERIT are currently undergoing a merger process which will result in one large research centre under the leadership of Charles' former student, Luc Soete.

Charles' idea of capacity building did not stop with recruiting and assembling a faculty team from the developing world. He also conceived and put in place two other capacity-building programmes targeted entirely at graduate students from developing countries. The first was a joint PhD Programme in the Economics and Policy Studies of Technical Changes with MERIT. Since the United Nations University (of which INTECH was one of the Research and Training Centres) did not have degree-granting rights, this teaming up was very strategic. It also enabled INTECH to take advantage of the excellent teaching and research supervision skills available at MERIT. The programme has admitted about five students every alternate year since 1995. This is one of the few programmes, anywhere in the world, exclusively devoted to a doctoral degree in technological issues in developing countries. Having myself been associated with this unique programme for over five years, I recognize the far-sightedness of Professor Cooper in initiating it; he saw the potential to create a succession of well-trained policy analysts who could then return to their home countries and enrich policy design and evaluation there.

Given funding and other constraints, it was not possible to target a large number of developing country researchers through the PhD programme. In order to overcome this, Charles founded a second programme known as the PhD internship programme. This enables developing country doctoral scholars specializing in the area of Science and Technology (broadly defined) to come to UNU-INTECH at Maastricht for periods ranging from three to six months. During this time, the scholars are provided with all the necessary facilities so that they prepare one or two chapters of their dissertations or in some cases an entire draft of their thesis, and can present seminars and obtain good quality comments for further improvements. In short the programme enables developing country scholars to take advantage of the varied resources and skills available in a developed country institute. In my view, relatively speaking, this programme has been more successful; since its inception it has attracted more than fifty scholars from over twenty developing countries. Most of these scholars have subsequently successfully defended their doctoral dissertations and many have managed to publish articles in well-known peer-reviewed journals, based on the work done at Maastricht.

Charles' contribution to research and capacity building in innovation studies as it applies to developing countries was both far-sighted and deep. I am glad that I knew him and was privileged to work with him in his quest towards the systematic study and understanding of innovation in developing countries. He will continue to inspire generations of developed and developing country scholars working on innovation related themes through his writings and through the students and close colleagues who share his ideal of a just world.

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