

Research Proposal

Technical Assistance and Technology Cooperation

Technical assistance (TA) comprises all efforts by multi-national and governmental development agencies, NGOs and industry associations to enhance technological capability in the developing countries. The international relations context of TA has often inhibited learning and participation. In the industrial sector, reforms of TA lag behind the livelihood focused reforms in rural development. My objective is to fill this gap, illuminating social and inter-cultural processes shaping project implementation. In industry, knowledge and communication are more interactionist forms of risk, capital and income. Therefore, the book is addressed to development practitioners, reviews patterns of cultural distance and technical knowledge in current operations and derives new management tools.

You might find this preview helpful to identify new research opportunities. My case studies have been confined to TA by a French NGO and a US consulting company, both funded by the World Bank. Ideally, new opportunities might arise in development agencies, GEF or EBRD programmes, in the parastatal sector (i.e., Electricité de France, Telefónica, RWE), multi-national companies, and industry associations. The following aspects of my research approach might coincide with your efforts.

♦ Potential research goals

Monitoring of project implementation, especially in urban or industrial contexts

Identification of the project dynamics related to discursive exchanges and knowledge transfer, also specifically between different organizations, technologies and countries

Modifications and/or combination of technological knowledge from/through expert co-operation

Conflict and power from knowledge versus social and cultural constituents

Context adequacy of know-how from foreign and local experts, transferability of knowledge

Role of local knowledge and local expertise in development practice

Sociocultural and technological specificity of expertise in a professional field

Progress of the ethnographic approach to TA implementation and of TA sociology

Typology of management tools for cultural, political or technological differences, for particular countries, organizations, economic sectors, or development agencies

Technological capacity building in firms, professional disciplines and economic sectors

Expressing tacit knowledge in international teams to enhance opportunities for innovation

♦ Possible contexts

Multi-national or bilateral development agencies	Development banks
Volunteer agencies	NGOs
International joint ventures	Sector investment programmes
Public companies and administrations	Comparison of economic sectors
Technology Assessment	Cross-country comparison
Comparison of different technologies or production systems	
Industrial co-operation such as “bootstrapping” and other forms of industrial networking, through professional or production associations, and industrial districts or clusters	

♦ Results feasible

Improvement of project organization and management tools, adaptation to policy	
Incentive and performance indicators for project participants	
Team composition, expert profiles, local expert requirements	
Feedback mechanisms for project participants, reporting and documentation formats	
Definition of new project outcomes for future impact assessments	
Identification of social processes shaping technology transfer and expert co-operation	
Identification of modes of communication, on explicit, implicit and unperceived exchange levels	
Up-scaling or down-scaling of TA projects and programmes	
Pedagogic approach towards professional groups, professional education needs assessment	
Definition of the differences in tacit rules between involved institutions, corporations and firms	
Matching institutions, twining arrangements	
Knowledge audit	Project monographs
Definition of R&D requirements of technology	Risk analysis of technology context

Current State of Research (History, Efforts, Conceptual situation, Way forward)

♦ History

The political terrain of technical assistance (TA) has prevented the social sciences from producing insights into its social realities. According to the bias of the writer, TA was seen either liberating or oppressive, while there are only small islands of analysis on TA. Albert Hirschman (1967) used evidence from aircraft and road maintenance to argue for a hiding hand and latitude in TA but his research has not been taken further[1]. The Brookings Institute re-presented these arguments again in 1995 and even a third time with the voices of leading development researchers[2]. Robert Picciotto, vice-president and general director of the Operations Evaluation

department of the World Bank, agrees with them and argues that while Hirschman's concepts remain central to the Bank's operation, they have not been built on^[3]. Arguably, Hirschman's insights were ignored because his concern for local conditions was not accepted by economic theorists. TA also operates on a hit-or-miss basis^[4] because, for the economic orthodoxy, technology remains a 'black box'^[5]. How can one see the colours ?

♦ Current efforts

Institutional development, sustainable development and participation are expanding and interrelated policy areas^[6]. Applied research on TA in rural areas has produced results with implicit conclusions which, together with the attention to livelihood strategies, bring development agencies such as DFID back to integrated rural development, for example. Farrington, Mosse and Rew show that sociological insights enable TA practitioners in agriculture to innovate and to manage TA as a process^[7]. GTZ's process management approach has led to a combination of organizational advice and TA content advice^[8], again mainly for rural projects. Project Cycle Management is used for EU aid to bridge the user and the provider perspectives. However, technological capacity remains an elusive goal for GTZ and for DFID. The specific results of these approaches can not be traced to the form of technology advice, in embedded form such as in computer software or explicit as training, the impact is uncertain. Organizational competence and know-how are more effective and remain elusive. My assumption is that reforms in planning will not succeed and new implementation tools are required. Announcing organizational culture advice in TA is almost self-defeating. However, the limits of TA policy should not let development agencies fall back to the delivery mode of engineering projects -- assuming physical conditions to be universal and unambiguous, while unable to take social and cultural factors into consideration.

♦ Conceptual situation

Clearly, research into development projects should explore approaches linking physical and cultural realms. Even a classic engineering project has cultural dimensions and technology can contribute to institutional development. In the 1970s, researchers such as Johan Galtung or Denis Goulet argued that "a" culture can be a "fertile soil" for certain technologies and not for others. What makes a technology culturally appropriate has never been resolved however. Ismail

Serageldin, another World Bank vice-president, assumes that appropriateness is an ‘ad hoc’ conclusion^[9]. Quite to the contrary, appropriateness can be created by linking technical knowledge into the cultural universe of a society or firm. Agencies sometimes integrate cultural factors and technology for political concerns. Further, what Latour et al. call the ‘seamless web’ between culture and technology, or the symmetric analysis of nature and society, makes such an integration a conceptual necessity^[10]. Addressing either one in isolation destroys the social and organizational web in which technical knowledge is embedded. Local and foreign experts should address cultural differences together, and change features of technical knowledge without separating physical and cultural dimensions. I start from this premise and identify the implications for their co-operation.

♦ Way forward

It is a fundamental requirement that project teams comprise different foreign and local technical experts. Their interaction is the key dimension of TA, not a single source of expertise. Just like TA in agriculture, TA in industry is shaped by the relations between experts and knowledge. Since the seminal contributions of Latour and Hughes, the sociology of knowledge, Science and Technology Studies (STS), evolutionary economics and other constructive approaches have revolutionized our understanding of technology (and discredited determinist theories). So far, development agencies have not realized the potential of informing their operations with STS-type results, while they start to appear in the economics literature^[11]. Current TA planning, management and evaluation still contain vestiges from the 1960s, when engineers and finance specialists dominated development agencies. To promote a sociology of TA, the field as such has to be opened, and this is the main attempt of the forthcoming book. I establish that every TA implementation is idiosyncratic since the results are hybrid objects combining traits from the different experts’ technical and human socialization. The empirical material treated in the book, generated within the industrial heartland of energy engineering and manufacturing, permits to define and address specific social processes in TA implementation.

TABLE 1: Juxtaposition of the Contexts and Actors of the Case Studies Investigated so far

Project title	Appui Technique (Chad)	Autogeneración (Mexico)
GDP per capita [US\$]	150	1,830
Avr. life expectancy [years]	46	69
Project budget [US\$]	1,000,000	600,000
Implementation [years]	5	2
Actors	artisans in the informal sector, welders and metal-workers	engineers in industrial plants with more than 5 MW _{el} energy consumption
Institutions	French NGO / Ministère des Travaux Publique et du Travail	US consulting company / Consejo Nacional de Ahorro de Energía
Knowledge	low-tech: manufacturing of agricultural machinery	high-tech: engineering design of cogeneration power plants(CHP)

Extending the results from sociology and from management studies on technology in developed countries to development co-operation and to TA in particular is overdue. Concepts and methods can be adapted and their demonstration in TA invites operational innovations.

Future Research Opportunities Sought (Requirements, Policy context, Examples)

The present results are not specific to a development policy or context. Having opened the empirical field, future research can now be instrumental to particular TA policies or agencies. The potential results are pertinent to all applications of technology in a society (or firm) other than the society of origin, where the co-operation of different experts is necessary so that their accumulated know-how is applied as well. The monitoring and reorientation of on-going TA projects provide the most promising research opportunities. The methodology proposed captures the dynamics of the implementation of a particular TA project, identifies appropriate organizational and technological modifications, and optimizes it with respect to institutional development and capacity building objectives. The obvious policy elements and research objectives I wish to pursue are technology co-operation, organizational learning, sector investment programmes, industrial clusters

and other networks, adaptation of technology or the role of local knowledge. The reorientation of TA implementation can comprise the division of responsibilities and roles amongst experts, consultation and communication design, task structuration, team dynamics, benefits and benchmarks, R&D, administration and reporting systems, and all other managerial aspects.

♦ Key requirements

The exchange of know-how between local and foreign experts in its complexity contains all necessary elements to account for the economic, social and cultural dimensions of the TA context. This implies that participant observation constitutes the core method. The researcher needs to participate in the routine co-operation between the experts involved, for minimum two weeks and ideally on an intermittent basis over a longer period. The elaboration of the conclusions requires a similar period of time. This methodology is only feasible during the implementation of TA. When possible, the results should be presented to and agreed with the team members. The results can be used to reorganize the TA project observed and/or inform other aspects of similar TA.

♦ Development policy context

The present results can be specified -- both theoretically and empirically -- for economic and technological conditions. Different stages of import substitution and export policies correspond to differentials in technological capacities and the latent processes (their influence on TA is explored below) reflect these stages. This allows technology importing countries to articulate industrial policy for different organizations, firms, universities, industry associations and development assistance activities such as TA. The institutional side of TA is analysed together with the technological side. Increasingly, technological learning competence determines chances in global markets. With given technological capabilities, there are specific conditions, for example, in energy, telecommunications, pharmaceuticals, and so on. Comparative case studies such as those presented yield specific results, for example, for a company, a technology or a country context. Beyond a specific project, the first constant for TA is any combination between development agency / economic sector in a country. For example, UNDP-led efforts in banking in Thailand would be a pair where a specific subset of tools can be defined from observing implementation. These are not necessarily adequate for another agency or another economic sector.

♦ Example - energy

As the forthcoming book establishes, the fieldwork approach of French contemporary anthropology harnesses social aspects of technology transfer, for instance, for energy policy. Climate change mitigation is a central arena where technology acquires new social meaning. CO₂ emission rights have become a global commons and the UN-FCCC negotiations lead to policy regimes and institutionalisation. The sustainability paradigm contains highly productive contradictions between ethical principles of equity and resource management imperatives. Global ecological concerns increasingly challenge determinist theories of technology and, for example, “leapfrogging” from coal to solar technology has to be achieved. Sociocultural objects found in energy technology transfer can be taken up in the climate change arena, support policy development and, in return, become an object of TA. For example, cogeneration, load management (in the power grid) or Joint Implementation in Mexico, India or Southern Africa has been hampered by the role of foreign technology proposed. This is especially so because energy companies have been historically prominent in the industrialization in all countries.

♦ Example - industrial relations

The research approach is pertinent for all fields of industry and technology policy. Sabel argues that social learning is crucial in the setting up of developmental associations[12]. Japanese *Keiretsu*, Italian SME networks and German trade associations played a critical role in setting up negotiation frameworks that allowed unprecedented technology co-operation to harness economic growth in these countries. The World Bank, UNDP and the OECD’s DAC currently advocate Sector Investment Programmes to address systemic learning processes[13]. Sabel demonstrated the relations between firms and the state necessary for the discursive formation of interests in such associations. Incalculably valuable non-pecuniary externalities can be achieved by combining learning and monitoring in industrial relations through such associations. While such learning cannot be predicted, the proposed research contributes to its diagnosis once it occurs.

The co-operation of experts in TA rests even more on emerging discursive means to translate their know-how from the foreign to the local perspective. Language becomes so ambiguous in TA that meaning can be produced only co-operatively, through joint elaboration of a common framework of understanding in discursive conversation. Sabel also shows that the difference between strategic and communicative exchanges points to co-operative solutions. Policy lessons learned in the Japanese case can improve technological capabilities in developing countries[14]. Understanding the sociocultural specificity of TA outcomes enhances the role of TA in supporting local developmental associations identified by Sabel. New and context-specific

definitions of the roles of experts, their mutual responsibilities, affiliations, information channels and products, address the learning and monitoring stakes of the industrial organizations involved.

♦ Example – institutions

The proposed TA ethnology explains, for example, that the content process (first of three latent TA processes presented below) is driven by experts' claims that sociocultural ends be part of the instrumental core of a technology. The experts' habits lead to an overdetermination of the parameters of a particular technology, often affecting the impact negatively. The content process changes when a TA project is shifted from an NGO to a governmental institution or from a bilateral to a UN programme, for example. Such organizational modifications alter the discursive formations available to experts and therefore alter the three latent processes. A research opportunity can lead to a higher accuracy of such modifications and an adaptation to technological capacity.

♦ Example - industrial safety

In particular in the chemicals and the nuclear industry, behavioural routines interact with complex technical systems and constitute operational know-how each firm has to follow and guide, also in relations between firms and between firms and technology institutions.

♦ Other objectives

Project preparation and evaluation, e.g. before and after project implementation, offer further research opportunities. Frequently, a TA design combines the direct impact with structural and dynamic impacts. The latter should enable local experts to learn from the event, apply the know-how to other contexts and raise local professional standards. This dynamic impact is the core objective of TA. What the case studies highlight is that the dynamic impact is unrelated to present TA designs. Since participant observation allows to separate structural from individual causes of TA outcomes, an improved monitoring of on-going TA projects can attain the dynamic impact. It is additive to classic impact analysis and cost-benefit evaluations of TA. On-going TA efforts are assessed and the effectiveness of TA for specific industrial conditions improved. TA practice is a research gateway to enhance the potential of technical knowledge for development and economic growth.

Research Methodology

The methodology is based on the premise that project implementation shapes the combination of technical knowledge more than intrinsic aspects of technology. In other words, planning is overtaken by the hazards of expert co-operation. Experts' and other participants' efforts for understanding TA projects are similar to those of an ethnologist-observer, in particular for social and cultural factors. What distinguishes an observer is the privileged position of providing an interpretation. Experts reflect on TA just like observers, and utilize or manipulate this privileged observer's presence to change the course of events. The methodology starts with this manipulation. This epistemological approach for urban and industrial phenomena has been developed since the 1970s at the Centre d'Anthropologie des Mondes Contemporains at the EHESS, Paris[15].

This epistemological approach can be compared to a pressure cooker. A project is an ideological pressure cooker and the observer presence functions like a little hole in that cooker, where some vapour escapes. Being small in relation to the cooker, the hole does not alter the pressure inside, but allows to measure the pressure. Similarly, the observer does not alter the project but allows to read the ideological stakes involved. These stakes include professional careers, reputations, pride, salaries, profits, market share and so on. Fieldwork for this approach fails if it does not address the impact of the observation or does not define how the analysis exceeds actors' efforts. Finally, the reactions of the actors and the organizations to the research results are integrated by analysing their documents on such TA projects.

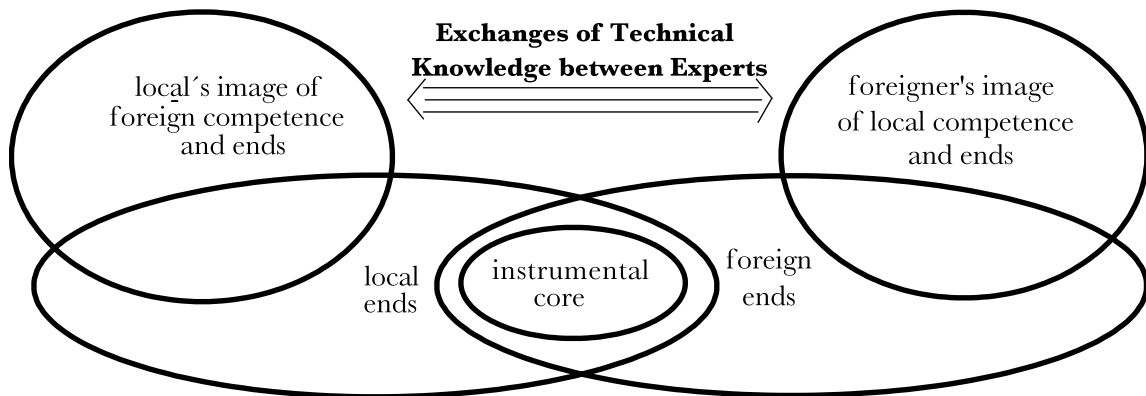
Research Findings Forthcoming (Objects, Current operations, Remedies)

♦ Analytical objects

Three latent processes, concerning the content, the exchanges and the interface between foreign and local experts, together conditioned their encounters. Each process dissolves a paradox currently appearing in TA, the first between the confrontation on technology and the agreement over its accuracy (content process), the second between the accuracy and the irrelevance of the experts' products (exchange process), and the third between the experts' intention and their effects (interface process). The paradoxes are due to the idiosyncrasy of TA implementation. The participants of a TA project cannot render their logic understandable to outsiders, planners and evaluators. All three processes are intrinsic to TA implementation, latently reproduced anew by the technical experts participating in each TA project.

The following schema is appropriate for the content process in both case studies and perhaps in most current TA. When the experts talked to each other, they could not find out whose knowledge is part of which ellipsis:

SCHEMA 1: Latent Process Due to the Technical Content



The experts intended to address the instrumental core of the knowledge but ended up responding to varying degrees to the other's image of sociocultural ends of that knowledge. Repeating this between them led to exchanges where they anticipated the necessity to make unjustifiable claims that ends be part of the instrumental core. This is an anticipation an expert would avoid in his/her original professional environment. This repetition became a process central to the implementation of TA. Declaring cultural images as context independent and instrumental became a vicious circle. This process resonates with Marcuse's and Feenberg's conclusion that the same technology can exist in different social spheres and serve conflicting ideological ends[16].

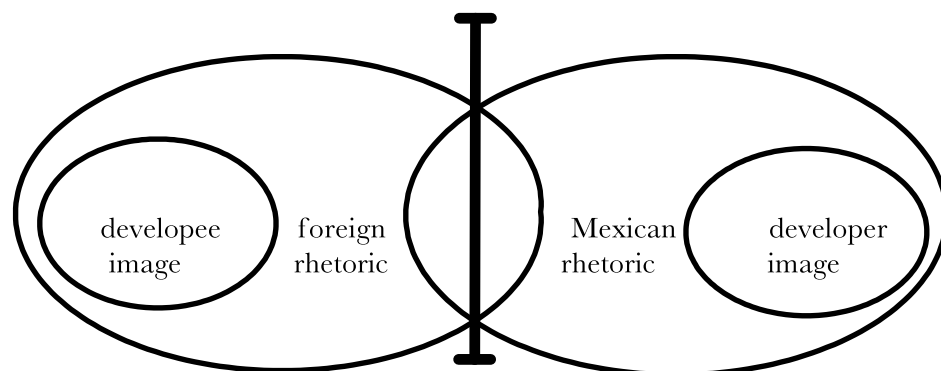
The second latent process reflected the identity politics of the local and foreign experts and created the exchange dynamics both for knowledge and identity[17]. In Chad, the co-operation was an exo-social process because the technical knowledge was used to act upon the cultural distance (alterity) of the experts and to diminish any sociocultural content that it may have accumulated. The foreign experts found themselves in agreement with the Chadian experts in their judgment of individual Chadian artisans, even though they always avoided discriminating among the artisans. In Mexico, on the other hand, the conditions of the co-operation were endo-social.

The experts could not use the content of the knowledge to reinforce their differences as the technical discourse served as an effective bridge between the two sides of the interface. Whatever knowledge came from the outside could be incorporated into the local perspective and vice-versa. There was no possibility of attaching "local" and "foreign" labels to the knowledge. The foreigners were frustrated by their failure to reach individual Mexicans through communication. They never found a way of approaching individuals even on a professional level. In Chad, the experts believed they understood each other when they communicated but betrayed their lack of understanding in the silences that characterized their interaction. These exchanges could destroy knowledge when experts expressed themselves. Everything was spoken in Mexico, but the more they said, the less they understood about each other. The content of their exchanges (technical knowledge) was conditioned by their mutual recognition (identity), in a manner specific to each TA encounter.

The third latent process was created with the failures of the experts' interpretation of their behaviour. Each side developed a "folk theory" about the others and these folk theories adjusted and rehearsed certain errors so that a degree of misunderstanding could be stabilised after several months of interpretation failures. Afterwards, small shifts of the interface appeared saliently in the experts' discourses. Norman Long and co-workers at Wageningen University have established a large body of empirical evidence from rural development[18]. His interface analysis shows how the political macro conditions of the encounter translate into micro-obstacles to the co-operation between the experts.

SCHEMA 2: Latent Process Due to the Attempts to Act Upon the Encounter

Interface Created by Autogeneracion Experts (endo-social exchanges)



Regarding the exchange dynamics and the interface, the two case studies yield two possible process patterns, of a few such patterns susceptible. As such there is no practical way to stop any of these three latent processes and only attempts to modify them are feasible -- experts seizing the sociocultural relativity of technical ends, experts removing the historical context from their encounter, and experts' self-reflection on their communicative capacity.

♦ Expression in current operations

These latent processes have complex and far-reaching implications for every part of development agencies' operations. These are not discussed in "Technical Knowledge and Development", because it is more illustrative to present more evidence how agencies' current operations implicitly contain these processes. Especially as there is already much lip-service for a yet to be understood shift to "process management" in many agencies. Therefore, the book presents an extrapolation from the latent processes on current management and evaluation. Perhaps the best evaluation study of TA is Forss et al.[19], and these conclusions are congruent with the latent processes. The World Bank's evaluation department (OED) published several TA studies in the 1990s which implicitly contain the latent processes. TA management remains as tacit knowledge, which can not be expressed explicitly or become subject to negotiations with client organizations. While all projects studied were World Bank funded, the analysis is not specific to it. The Bank's TA has expanded from 1990-93 in volume by over 60% (one billion US\$ annually)[20], making it the biggest TA funder. However, the Bank's influence is also due to its policy leadership in TA.

♦ Remedies for latent processes in TA projects

The content process reflects professional biases. Different task definitions, choice of experts or other firms provide the means to overcome these biases. Understanding the dynamics of the exchange process allows to shift cultural interpretations of technology and see which tacit knowledge elements are combined. The research product is a *coherent and complete* set of management tools for the whole continuum of technological and sociocultural parameters of the particular operation:

Parameter:	exo-social	endo-social
task structuration	horizontal	vertical
local and foreign output	parallel	intermittent
technology output	function	object
budgeting	aggregated	specific
performance indicator	discretionary	public
role conflict	passively tolerated	acknowledged
reporting	integrated	individual

These sets of tools for exo-social and for endo-social TA implementation are indicative examples :

- to shift cultural distance away from the technology, and
- to improve the context specificity of know-how and to mark its local origin.

The book demonstrates the definition of such tools in all detail to allow practitioners to identify themselves tools for their tasks. The Bank's TA Handbook does not contain such tools and begs their consideration. The research opportunities sought should, besides serving specific TA policies and projects, provide more illustrative examples of management tools for practitioners in general.

Endnotes

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