



Impact of PAN Localization Project on Localization Policy in Partner Countries 2007 – 2010

Working Paper 01

Results of PAN L10n project evaluation research presented in
preliminary form for discussion and critical comments

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Acronyms

Acknowledgments

PAN Localization Project

Enabling local language computing is essential for access and generation of information, and also urgently required for development of Asian countries. PAN Localization project is regional initiative to develop local language computing capacity in Asia. It is partnership, sampling eight countries from South and South-East Asia, to research into the challenges and solutions for local language computing development. One of the basic principles of the project is to develop and enhance capacity of local institutions and resources to develop their own language solutions.

The PAN Localization Project has three broad objectives:

- To raise sustainable human resource capacity in the Asian region for R&D in local language computing
- To develop local language computing support for Asian languages
- To advance policy for local language content creation and access across Asia for development

Human resource development is being addressed through national and regional trainings and through a regional support network being established. The trainings are both short and long term to address the needs of relevant Asian community. In partner countries, resource and organizational development is also carried out by their involvement in development of local language computing solutions. This also caters to the second objective. The research being carried out by the partner countries is strategically located at different research entry points along the technology spectrum, with each country conducting research that is critical in terms of the applications that need to be delivered to the country's user market. Moreover, PAN Localizations project is playing an active role in raising awareness of the potential of local language computing for the development of Asian population. This will help focus the required attention and urgency to this important aspect of ICTs, and create the appropriate policy framework for its sustainable growth across Asia.

The scope of the PAN Localization project encompasses language computing in a broader sense, including linguistic standardization, computing applications, development platforms, content publishing and access, effective marketing and dissemination strategies and intellectual property right issues. As the Pan Localization project researches into problems and solutions for local language computing across Asia, it is designed to sample the cultural and linguistic diversity in the whole region. The project also builds an Asian network of researchers to share learning and knowledge and publishes research outputs, including a comprehensive review at the end of the project, documenting effective processes, results and recommendations.

Countries (and languages) directly involved in the project include Afghanistan (Pashto and Dari), Bangladesh (Bangla), Bhutan (Dzongkha), Cambodia (Khmer), Laos (Lao), Nepal (Nepali), Sri Lanka (Sinhala and Tamil) and Pakistan, which is the regional secretariat. The project started in January 2004 and will continue for three years, supporting a team of seventy five resources across these eight countries to research and develop local language computing solutions. Further details of the project, its partner organizations, activities and outputs are available from its website, www.PANL10n.net

Table of Contents

1	Introduction	2
2	Link between Policy and Research	2
3	Policy Evaluation Framework of PAN Localization.....	3
3.1	Framework for Discerning Policy Influence in Research.....	4
3.1.1	Expanding Policy Capacities.....	4
3.1.2	Broadening Policy Horizons.....	4
3.1.3	Affecting Policy Regimes.....	5
3.2	Context, Evidence and Links Framework	5
3.2.1	Context: Politics and Institutions.....	5
3.2.2	Evidence: Approach and Credibility.....	6
3.2.3	Links: Influence and Legitimacy	6
3.3	Methodology of Policy Evaluation	6
4	Findings.....	7
4.1	Overall Policy Influence of the Project.....	7
4.2	Country Partners: Case Studies.....	10
4.2.1	Bhutan	10
4.2.2	Cambodia.....	12
4.2.3	Laos.....	16
4.2.4	Mongolia.....	18
4.2.5	Nepal.....	20
4.2.6	Pakistan.....	22
4.2.7	Sri Lanka.....	27
	References.....	31
	Appendix A: Questionnaire – Policy Development	32

List of Tables

Table 1: Three Types of Policy Influence Lindquist (2001)	5
Table 2: Mediums Used to Raise Awareness of Decision Makers in Bhutan.....	12
Table 3: Excerpt from the Draft National ICT Policy 2002	13
Table 4: Excerpt from the Policy and Strategies on ICT in Education 2007, MoEYS.....	14
Table 5: Mediums Used to Raise Awareness of Decision Makers in Cambodia	15
Table 6 Excerpt from the National Policy on Information and Communications Technology 2006	16
Table 7: Mediums Used to Raise Awareness of Decision Makers in Laos	18
Table 8: Mediums Used to Raise Awareness of Decision Makers in Mongolia	20
Table 9: Excerpt from the Localization Policy of Nepal	20
Table 10: Mediums Used to Raise Awareness of Decision Makers in Nepal.....	22
Table 11: Mediums Used to Raise Awareness of Decision Makers in Nepal.....	24
Table 12: Mediums Used to Raise Awareness of Decision Makers in Pakistan.....	26
Table 13: Excerpt from the Sri Lankan Country Report on ICT Localization Policy.....	28
Table 14: Mediums Used to Raise Awareness of Decision Makers in Sri Lanka	30

List of Figures

Figure 1: Impact of Project on Expanding Policy Capacities	8
Figure 2: Impact of Project on Affecting Policy Regime.....	9

1 Introduction

Knowledge utilization is the prime focus of a research project through either its application in technology or in decision making and policy. The knowledge generated thenceforth is useful in improving societal conditions (Carden, 2004). Development research projects aim to build the capacity of the indigenous people in effective utilization of the developed technologies and techniques and also specifically focus to address the contemporary policy. Some research projects are conducted with the aim of very immediate impact and focus their research on issues of direct relevance in their societies. While some research projects are launched to those issues that are very significant but hidden. The impact of such type of research project may not be as visible as they former one has but these projects contribute more in the development of the country.

Influencing policy and decision making are intended outcomes and expectations from the research of social scientists (Neilson, 2001). The essential objective derived to conduct social science research is to influence policy. It was originated in the 19th and early 20th centuries to expose and shed light on a variety of social and health problems, and to stimulate public debate in the United Kingdom and United States (Lindquist, 2001). As the social sciences grew, the utilization of the knowledge in developing and influencing policy becomes more evident (ibid).

2 Link between Policy and Research

It is conjectured that policy makers often utilize research outcomes in decision-making. Different perspectives emerged out with the passage of time on research utilization in policy development as explained below.

Caplan (1979) developed the theory of “*two communities*” that discuss the use and non-use of research in policy development. They elaborate research utilization as a symptom of the cultural and behavioral trait, a gap between researchers and policy makers. According to him, both researchers and policy makers have different perspectives and it becomes the cause of limited utilization of research in policy development. In addition, the notion of a cultural gap between researchers and policy makers has positively explained the minor utilization of research in developing policy. Caplan (1979) believed that research outcomes are directly involved in policymaking process. However, Weiss (1977), Webber (1991), Sabatier and Jenkins-Smith (1993) cited by (Neilson, 2001) do not believe this relationship as linear. They think that research-policy link is not a direct one, particularly in relationship to data and information sources. To them, research is among one of many sources of information for policy makers, and that it is not a simple dichotomy between use and non-use but rather that knowledge/research utilization is built on a gradual shift in conceptual thinking over time (Neilson, 2001).

According to Weiss (1977), research has mostly no direct relevance to policy decisions, but can make contribution in influencing policy through other important ways, namely by changing the language and perceptions of policy-makers and their advisors. Such change may occur less decisively, but will exert influence in a powerful manner over a longer period of time. Weiss refers to this perspective as the

“enlightenment”. Through this approach, research contributes indirectly over time through the circulation and “percolation” of ideas and concepts in influencing policy (Lindquist, 2001).

How research can be used in influencing or making policy is the fundamental question that needs to be addressed when any research is being considered to influence on policy. Weiss (1977) has discussed seven ways through which research can contribute in policy development. These points are elaborated below.

Knowledge-driven: application of basic research; this model assumes that basic research provides an opportunity for policy-relevant research which can then be applied;

Problem-solving: communication of research on an agreed upon problem to the policy maker; this model implies that there is consensus between the researchers and the policy makers on the solution or end-state;

Enlightenment: education of the policy maker; that with time the accumulation of research will influence policy by educating the policy maker;

Political: rationalization for previously arrived at decision; used by policy makers to bolster support or provide ammunition for opposition;

Tactical: requesting additional information to delay action; often used by government agencies or other organizations/institutions as a response to a problem or issue;

Interactive: competing information sources; this implies that policy makers are actively searching for policy-relevant information that is not based on social science research; this type of use is considered to be more realistic of how policy makers use information in the policy process;

Intellectual enterprise: policy research is just one type of many intellectual pursuits (Webber, 1991; Auriat, 1998 cited by Neilson, 2001).

According to Lindquist, 2001, “Assessing policy influence, then, is typically about carefully discerning intermediate influences, such as expanding capacities of chosen actors and broadening horizons of others that comprise a policy network. This requires developing a full view of the range of actors involved in a project’s “domain”, the nature of relationships among those actors, and a very good sense of how that network and policy field has evolved over time”.

The following sections explain the influence of a long term local language computing project on policy making at the regional as well as country project levels.

3 Policy Evaluation Framework of PAN Localization

The project has also been looking into policy related issues to bring sustainability to this effort. One of the general objectives of the project was to advance policy for development and use of local language computing and content. A wide variety of activities were carried out to develop effective policy for local

language technology, training and content across region. Thus evaluation demands to review the contribution of PAN Localization project in influencing local language computing policy. In this regard, a research question was developed that to what extent has PAN Localization project contributed to influence local language computing policy?

Therefore, following evaluation objectives were developed to answer above said evaluation question.

To assess the project (directly or indirectly) contribution in affecting public policies, laws, regulations, programs and government structures

To see the project contribution to the development of the network of technologists, social scientist and policy makers for collaborative work

To observe the project, capacity built the policy makers on IPR (intellectual property rights) Issues

The overall influence of this project in developing policy on local language computing and localizations of ICTs in Asia region has been appraised through Lindquist (2001) approach.

While at country level, *Context, Evidence and Links framework* developed by Crewe and Young (2001) has been adapted to evaluate the project's influence in the respective countries. In addition, influence has been also viewed by considering it as direct and indirect.

Context, Evidence and Links framework is an analytical tool used by Overseas Development Institute's RAPID (Research and Policy in Development) program and the Global Development Network's Bridging Research and Policy project to understand how research-based and other forms of evidence contribute to policy (Crewe and Young , 2001) .

3.1 Framework for Discerning Policy Influence in Research

Lindquist (2001) proposed three types of policy influence in the assessment of overall policy influence. These three types are expanding policy capacities, broadening policy horizons and affecting policy regimes and are defined as follows.

3.1.1 Expanding Policy Capacities

According to Lindquist (2001), the development of innovative ideas and its presentation as applicable solutions for the development of society are the primary objective of research. In developing such ideas, skills are required to make it reality. In this regard, development of new talent for doing issues-based research and analysis are needed. In other words, research can improve the institutional framework surrounding policymaking.

3.1.2 Broadening Policy Horizons

As Lindquist (2001) envisions "Research can introduce new ideas to the policy agenda". It must be ensured that provided knowledge to the decision-makers is in a form of utilization. This knowledge has to nourish dialogues among researchers and decision-makers. To put it another way, research can improve the intellectual framework surrounding policymaking.

3.1.3 Affecting Policy Regimes

To Lindquist (2001), “Research can sometimes influence public policy in a direct way”. Research findings can be used in the development of laws, regulations, programs, or structures. However, such process is rare and normally circuitous, and it happens in fewer cases where change can be attributed, visibly and directly due to the inspiration of research alone.

The following table presents the indicators in assessing above discussed types of policy influence. As Lindquist (2001) approach is adopted in assessing overall policy influence of PAN Localization project, the assessment of the project has been done on the following criteria.

Expanding Policy Capacities	Improving the knowledge or data of certain actors
	Organization’s capacity to conduct policy relevant research
Broadening Policy Horizons	Providing policy makers with opportunities for networking and learning
Affecting Policy Regimes	Initiation of any LLC projects nationally or internationally
	Any Implicit contributions in policy decisions/ decision making process
	Changes in policy development process (inclusion or exclusion of certain organization, criteria, membership and representation)
	Translation of project outputs into policy decisions/ laws/ regulation directly

Table 1: Three Types of Policy Influence Lindquist (2001)

The activities of each partner institution have been assessed on the above said indicators as a case study to evaluate the participation of each partner institution in influencing policy in their respective countries.

3.2 Context, Evidence and Links Framework

The following section briefly explains the three broad areas of policy influence as described in the said framework:

1. Context: Politics and Institutions
2. Evidence: Approach and Credibility
3. Links: Influence and Legitimacy

3.2.1 Context: Politics and Institutions

According to the said framework, Context defines the political context in a given country. As defined by Crewe and Young (2001), “Political context includes the degree of political freedom in a country, levels

of contestation, strength of vested interests, institutional pressures, attitudes and incentives among officials, their room to move and be innovative, power relations.”

Scientific research and policy development can be significantly influenced by the political context in a country. The policy process and the production of research are in themselves being the subject of political environment of any country. Political environment plays a critical role in conducting scientific research. To conduct issues based research and then developing a public policy on such issues is needed the civil and political freedom that country gives to the researchers. The capacity of government to respond on policy based research is another significant factor in influencing policy (Young, 2005).

In this regard, to determine the political context for the project in partner countries, major organizations and key stakeholders dealing with local language computing policy have been identified. In addition, language and IT policies have also been examined to highlight the provisions regarding localization within the policy document.

3.2.2 Evidence: Approach and Credibility

Crewe and Young (2001) suggest that, “Evidence must be topically relevant and credible.” Information collected and synthesized as evidence is always fruitful in presenting applicable solutions to the problems. Research allows examining the usefulness of such solutions by conducting pilot studies in different context and settings. In addition, presentation of such solutions is required communication with policy-makers. This communication must be interactive for policy makers to understand those solutions.

To evaluate this dimension, country project activities regarding sharing of knowledge, research and learning with the policy makers have been discussed, specifically focusing on the interaction of partner representatives with policy makers through meetings, seminars and other events.

3.2.3 Links: Influence and Legitimacy

Crewe and Young (2001) defines Links as, “Involvement of researcher/influencers in networks with policymakers such as policy communities or advocacy coalitions (that) creates trust, legitimacy and openness.”

Under this dimension, the use of media and publicity in affecting policy change has been discussed. The project partners have followed different strategies to disseminate its work and created awareness of the advantages of local language technology. Project activities have been widely covered by the print, electronic and online media.

3.3 Methodology of Policy Evaluation

A questionnaire was designed to gather information on policy related developments from leaders of partner institutions (attached in appendix A). In addition to this, Interim final reports of PAN Localization developed by Regional Secretariat and annual/research reports from partner institutions were also used to collect relevant data. In this part of the evaluation, data was collected from the following partner institutions.

1. Department of Information Technology (DIT), Bhutan

2. Ministry of Education, Youth and Sports (MoEYS), Cambodia
3. National Authority for Science and Technology (NAST), Laos
4. InfoCon Co. Ltd, Mongolia
5. Madan Puraskar Pustakalya (MPP), Nepal
6. University of Colombo School of Computing (UCSC), Sri Lanka
7. CRULP (National University of Computer and Emerging Sciences-NUCES), Pakistan

The project is interested to measure the extent to which the PAN Localization project contributed to influence local language computing policy. To analyze this question in detail, the case study technique has been used. Initially a case study focuses on the overall policy influence of PAN localization project, then individual case studies on partner institutions highlights the project achievements in the respective countries.

4 Findings

This section presents PAN Localization project 's contribution in influencing local language computing policy in the partner countries. The descriptions are based upon the information collected regarding country specific developments based upon the Lindquist's and Young's framework explained above.

The first part of findings presents the summary of PAN Localization Project's overall policy impact while the remaining section presents specific case studies of each partner institute in affecting policy locally.

4.1 Overall Policy Influence of the Project

Following the Lindquist (2001) approach analysis was conducted to assess the influence of PAN Localization project in "Expanding policy capacities", "Broadening policy horizons" and "Affecting the policy regimes" in the partner countries.

While determining the project's influence on expanding policy capacities, project leaders' self-assessment regarding their "*Capacity to deliver relevant policy recommendations*" was considered. The assessment was based on a Lickert scale where its range was defined as, "1" representing *very limited capacity* – "5" representing *very high capacity*.

The following graph presents the project leader's self evaluation of their capacity to deliver policy relevant recommendations to the policy makers.

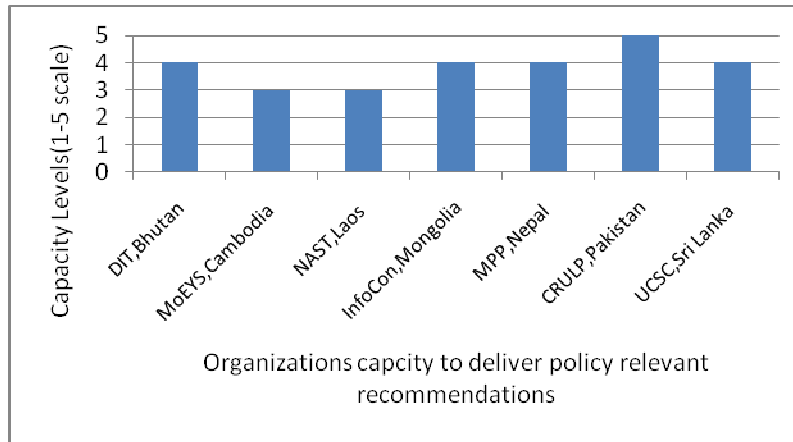


Figure 1: Impact of Project on Expanding Policy Capacities

Figure 1 present that majority of the project leaders rated their capacity to provide policy relevant recommendation through PAN Localization project as high. Different factors have contributed to this assessment across the project partner countries. E.g. Project leader in Bhutan attributed their success in forwarding policy relevant recommendation to the seminars and workshops that their organization had conducted to raise awareness of the policy makers regarding the need, challenges and solutions for local language computing. Similarly, project Leader in Mongolia attributed their high capacity to forward policy relevant recommendations primarily to their nomination for participation in the consultations for drafting the relevant policies. Project Leaders in Nepal attributed their high capacity majorly to their advocacy in developing the capacities of senior and middle level government officials to the potential and impact of local language computing. In addition, almost all the project leaders surveyed have regarded sharing of best practices with the policy makers and their advocacy for the identification and need of the training requirements associated with the development, implementation or monitoring of the policy as the salient factors contributing to their capacity to forward local language computing policy relevant recommendation.

PAN Localization project has also facilitated frequent interactions between the policy makers and the country project leaders, attempting to broaden the policy horizons by presenting research from a utilization perspective. These interactions have played a key role in creating awareness about local language computing research work being done under the project. In addition to meeting, the project has provided a number of opportunities for the relevant policy makers to acquire requisite skills for using the localized technology for their operational needs. For example, MoEYS in Cambodia conducted training of the government officials from the Ministry of Interior and National Assembly about the usage of local language applications. Similarly, in Nepal, two significant “Training of Trainers” were organized by MPP for the government officials, providing their requisite training to use the local language software. They had conducted about thirty orientation sessions on Nepalinux within the period Jan 2006-September 2009 for participants including government officials.

Fruitful outcomes of such interactions has resulted in the initiation of collaborative work between the respective public organizations and five of the seven country partner institutes surveyed to provide recommendations for public policy development.

In terms of Affecting policy regimes referring to the modification of existing programs or policies or fundamental re-design of programs or policies, the project has significantly contributed towards initiation of local language computing projects across the region. A prime example of this direct influence on policy was the project on development of Language Interface Package (LIP) for Microsoft Windows Vista and Microsoft Office. In this project, Microsoft Corporation supported the country teams in Afghanistan, Bangladesh, Cambodia, Laos, Pakistan and Sri Lanka to develop local language interface for Microsoft Vista operating system. The project generated interest among public sector agencies to develop more local language computing projects. The project also influenced the governments to develop action plans to give out local language computing projects. There have also been contributions in policy decision making process. The project has made significant progress in shifting the focus of governments on language issues in ICTs and thus changes have been introduced in the policy development process in terms of inclusion or exclusion of certain organization, criteria, membership and representation. Worth mentioning examples in this regards are of Pakistan and Nepal. In Pakistan, public participation in policy development process can be considered one of the most significant achievements. Pakistani team was actively involved in developments taking place in IDNs. This work invited public participation. A workshop was organized by CLE, previously known as CRULP in year 2008, gathering participants representing various local languages spoken in Pakistan. This was an initial attempt to draft character sets for different languages through this workshop. A follow-up workshop on IDNs was arranged on behalf of the Ministry of IT Pakistan in May 2009, to build on the earlier work for Pakistani languages. An open discussion was also arranged where general public was invited through newspaper advertisements. Similarly, the project also contributed towards the growing realization that new IT policy draft must be open for comments from public and other stakeholders. In some of the PAN Localization project partner countries, the project outputs have also directly translated into policy decisions. Note worthy achievements in this regard is the development of Sinhala Collation Sequence through PAN Localization project that has directly translated into policy and incorporate by Sri Lanka Standards Institution into the SLS 1134 standard. The following table summarizes the project's impact on affecting country specific policy regimes.

Affecting Policy Regimes	Bhutan (DIT)	Cambodia (PLC)	Laos (NAST)	Mongolia (InfoCon)	Nepal (MPP)	Pakistan (CRULP)	Sri Lanka (UCSC)
	No= X, Yes=√						
Initiation of LLC projects	√	√	√	X	√	√	√
Implicit contributions in policy process	√	X	X	X	√	√	√
Changes in policy development process	√	X	..	√	√	√	√
Translation of project outputs into policy decisions/ laws/ regulation directly	X	√	X	X	..	√	√

Figure 2: Impact of Project on Affecting Policy Regime

4.2 Country Partners: Case Studies

The following section present country case studies highlighting the most direct or in direct policy influences affected by the PAN Localization project. Each case study first presents the political context of the external policy environment of the country highlighting the key policy making organizations and relevant provisions in the policy documents facilitating local language computing. The next section presents the project achievements in terms of direct or indirect influences to the national policies. The last section debates on the strategies adopted to affect the change, specifically discussing research evidence communication strategies adopted and networks and linkages established.

4.2.1 Bhutan

In Bhutan, key institutions contributing to the development of local language computing policy are Department of Information Technology (DIT), Ministry of Information and Communications (MoIC), Dzongkha Development Commission, Ministry of Education, Ministry of Home and Cultural Affairs. The Ministry of Information and Communication (MoIC), established in July 2003 is the lead government agency for the formulation and implementation of ICT policies. Department of Information Technology (DIT) is the lead department working under MoIC for the development and coordination of all ICT-related activities in the country. The Dzongkha Development Authority was formed in 1986 to develop and promote Dzongkha. Dzongkha Development Authority became an independent commission, separate from the education ministry in 2007.

Bhutan 2020 (ref) and Bhutan ICT Policy and Strategy (BIPS, ref) are key statements defining the political context for the project. The Government's long-term vision and objectives have been set out in its Bhutan 2020 – A Vision for Peace, Prosperity and Happiness, published by the Planning Commission in 1999. The development of national language – Dzongkha has been identified as a priority in this document. It states that: *“Dzongkha has been a particularly powerful force for unifying the Kingdom, establishing a lingua franca among diverse ethnic groups. It is our national language and we must seek to ensure that the position it occupies is further reinforced”* (Planning Commission, 1999). According to Bhutan 2020, the Dzongkha Development Commission should actively promote the use of Dzongkha and ensure that it is responsive to the future as well as the past (Planning Commission, 1999).

Bhutan ICT Policy and Strategy (BIPS) launched in July 2004, serves as the main policy statement on the development of ICTs. The overall policy objectives of BIPS initiatives are:

- i. Use ICTs for good governance;
- ii. Create a Bhutanese info-culture; and
- iii. Create a 'high-tech habitat'.

Under each objective 'Content and Applications' strategy has been identified. Content and application targets include:

- i. Establishing the framework for e-business, using ICT to preserve Bhutan's cultural heritage,
- ii. Enhancing the quality and accessibility of health and education,
- iii. Broadening national media and web presence, and
- iv. Supporting good governance.

BIPS lists under the ‘content and applications’ initiatives the development of ‘a digital archive of significant Bhutanese religious texts and cultural contents in sound and picture format’. Department of Information Technology (www.dit.gov.bt) DIT started National Digital Library Project in 1997 to provide texts, audio and videos, and images on Bhutanese culture and development related issues.

4.2.1.1 PAN Localization projects role in Influencing Policy

In Bhutan, PAN Localization project was conducted by Department of Information Technology, Ministry of Information and Communication (MoIC). DIT is the leading department working under for the development and coordination of ICT-related activities in the country.

The work done through project in Bhutan influenced local language computing policy in the country both directly and indirectly. Direct influence on the country policy through PAN Localization project is evident from the formalized of the Memorandum of Understanding (MoU) between Bhutan’s Department of Information Technology (DIT) and Thailand’s National Electronics and Computer Technology Center (NECTEC). The MoU focuses on promotion of R&D in the area of ICTs, specifically in language computing and included a plan to strengthen open source natural language processing, image and speech processing technology in Bhutan.

4.2.1.2 Evidence: credibility and communication

In addition to this direct impact, the project also influenced the policy development process indirectly by creating awareness among policy makers and other stakeholders about the need and usefulness of research in local language processing through the work done under the project.

The policy influence can be attributed to regular interaction of the country team with the policy makers to present their work. The country team provided an overview of the various activities undertaken as part of the project in their meeting with the policy makers. In a meeting hosted at DIT on August 13, 2007, officials from DIT and Dzongkha Localization Project team reviewed the progress achieved by PAN Localization project in first phase. Dzongkha Localization team pointed out the need to launch version 2 of Dzongkha Linux distribution and the need to promote it to general public. The meeting also deliberated on progress in the areas of Text to Speech, Optical Character Recognition.

The following table presents different means used to raise awareness about the potential/impact of local language computing and intellectual property rights (IPR) issues.

Medium used to raise awareness of decision makers	Potential and Impact of LLC	IPR Issues
	No= X , Yes=√	
Seminars and workshops	√	X
LLC awareness-raising sessions for policy makers	√	X
Developing the capacities of senior and middle level	X	X

government official		
Consultation occurred in drafting the Policy	X	√
Assisting government official by providing information	√	√
Training requirements associated with the development, implementation or monitoring of the policy	√	√

Table 2: Mediums Used to Raise Awareness of Decision Makers in Bhutan

4.2.1.3 Links: Influence and Legitimacy

As Department of Information Technology (DIT) is the lead department working under MoIC for the development and coordination of all ICT-related activities in the country, thus the work done under the project directly contributed towards local language computing policy in the country.

Research work accomplished by the project team on terminology translation for Dzongkha Linux with the support of Dzongkha Development Commission has been standardized. DIT also collaborated with Country Code Top Level Domain codes (cc TLD) that operates .bt domain to create the test bed for deploying Dzongkha IDNs.

DIT also focused on dissemination and publicity of its research work through media to affect policy change. The team developed and distributed about 3000 copies of Dzongkha Linux 3.0 cds and key boards with Dzongkha Layout. These efforts were presented to the policy makers, private sector and public through formal release ceremonies conducted by DIT. These events were widely publicized by local media. Government officials have also been regularly invited in the trainings, seminars and other activities conducted by DIT.

4.2.2 Cambodia

The National Information and Communication Technology Development Agency (NiDA), established in 2000, works for promotion of ICT in the country. This agency is also responsible for formulation of ICT policy. There are five divisions under NiDA: infrastructure, policy, human resource development, enterprise and content and applications.

The Ministry of Commerce (MoC) plays a lead role in the development of Cambodia's ICT infrastructure. The Minister of Education, Youth and Sport (MoEYS) looks into ICT integration into education and also encourage the use of Khmer language source software.

In 2003, recommendations for a national ICT policy were developed within a study of the sector performed by NiDA with the assistance of UNDP-APDIP (ref). The scope of this study included policy, infrastructure and access, content and applications development, human capacity development, and ICT enterprise development. It has been under review by the Council of Ministers for several years. The following excerpt from the draft national ICT policy (ref) highlight the key provisions provided in the draft that focus on localization or local language computing. They are as follows:

Policy on Human Capacity Development

3.4 “Promote access to ICTs nationwide, by adopting a two pronged approach. Firstly, it will promote and support general access methods like the Community Information Centers (CIC). Secondly, it will standardize the Khmer script for widespread access to ICT across Cambodia. The Government will mandate NiDA to produce and encourage the production of computer applications in Khmer language, in order to facilitate adoption of ICT in education and in all sectors of society.”

Policy on Standards, Software and Content

4.2 “Develop and adopt a standard Unicode-based Khmer characters system to be adopted in all ICT applications and systems. Other aspects of this important issue such as keyboard, lexicon, sorting, etc. will also be standardized and codified. The Government will take international ownership of all aspects of Khmer (in Unicode, etc) such that this can be freely used and not be liable for payments for its use in any form.”

4.3 “Use local language in ICT applications for the rapid development of ICT and at the same time continues encouraging the learning of the English language and its application in ICT.”

4.4 “Actively promote the development of relevant Cambodian content in all media, including all computer-based systems and networks. It will take the lead in creating all Government websites in a bilingual (Khmer/English) format for the rapid assimilation and use in all sectors from the government to citizen.”

4.14 “Establish ICT procurement policies aimed at assuring that applications purchased or developed by the government are secured, are localized to the Khmer language whenever possible, and are the best available value, and can be managed by local company. FOSS should be considered as an option.”

Table 3: Excerpt from the Draft National ICT Policy 2002

In 2005, the Ministry of Education, Youth and Sport (MOEYS) released their “Policy and Strategies on ICT in Education in Cambodia (ref)”. The following extracts from Policy and strategies on ICT in the education document are the main provisions in it highlighting the governments focus to promote and use local language.

3.2.3 Development of Local Contents, and Use of Open Source Software

b) “Promote the development of content in Khmer for both formal schools and distance education and equivalency programmes by providing an annual award for the best teaching and learning resources submitted to the National Clearing House.”

c) “Promote the development of the Operating System in the Khmer language, which will greatly facilitate all literate people in Cambodia to use ICT for communication and learning.”

3.2.5 Knowledge Management System

a) "Set up an online National Clearing House for teaching and learning resources in Khmer and foreign languages."

3.2.7 ICT Use in Universities

"Since Cambodia is in serious shortage of well-trained lecturers and professors, it is essential that the universities must use its scarce human resources to their full capacities through ICT as well as connecting learners to virtual learning resources worldwide. The Ministry will promote the use of ICT in teaching and learning process, research and administration by creating a cyber campus consortium and linking this to other virtual universities in other countries. It will also promote the digitizing of the Khmer language books and translating of foreign core books into Khmer."

Table 4: Excerpt from the Policy and Strategies on ICT in Education 2007, MoEYS

4.2.2.1 PAN Localization projects role in Influencing Policy

IDRC's flagship project on the Informatics for Rural Empowerment and Community Health (i-REACH) project (ref) can be marked as a significant direct contribution of the PAN Localization project's awareness rising and capacity building of public organizations. This projects aims to pilot test by offering ICT services to local communities in two areas, Kep and Kamchai Mear. The ICT services provided include access to the Internet and training to use computers within the rural communities. The project participants included government officials, students and monks.

In addition, localized applications developed through the PAN Localization have been widely used and adopted in Cambodian government. E.g. the National Election Committee (NEC) of Cambodia has used the sorting application developed through the project to sort over six million registration names in Communal Election 2007 and National Election 2008. Ministry of Finance has been using localized applications since 2006. National Institute of Language also tested, approved and has been using Khmer based application since its start. Extraordinary Chambers in the Courts of Cambodia (ECCC) used localized applications and accepted Kep font size 12 as a regulation for all official communication.

The project has also provided various training opportunities to the policy makers for learning localized ICTs. Specific training conducted by the PAN Localization project teams in Cambodia includes the training of Ministry of Interior (MOI) and National Assembly (NA) on utilization of Khmer Unicode and applications package. As a result of this training, MoI and NA accepted the Khmer Unicode and the applications developed by the project team to be used within the ministry. Due to this relationship, the ministry continued to provide feedback to the project team regarding the needed localized applications.

As a significant project outcome, the project contributed in improving the capacity of its country teams to forward useful policy recommendations to their governments. When asked to rate their capacity to deliver relevant policy recommendations to the government, the Cambodian project leader rated his capacity as high or 4 on a 5 point likert scale ranging from 1(low) to 5(Very high).

4.2.2.2 Evidence: credibility and communication

The country team has been regularly presenting its research work to the policy makers. The country team provided an overview of the various activities undertaken as part of the project in their meeting with the policy makers. A notable example was training on utilization of Khmer Unicode and applications package for Ministry of Interior (MOI) and National Assembly (NA). As a result, MoI and NA accepted the Khmer Unicode and the Applications developed by PLC to be used internally. They also provided continuous feed back to PAN Localization Cambodia. The table presents different means used to raise awareness about the potential/impact of local language computing and intellectual property rights (IPR) issues.

Medium used to raise awareness of decision makers	Potential and Impact of LLC	IPR Issues
	No= X , Yes=√	
Seminars and workshops	√	X
LLC awareness-raising sessions for policy makers	X	X
Developing the capacities of senior and middle level government official	X	X
Consultation occurred in drafting the Policy	X	X
Assisting government official by providing information	√	√
Training requirements associated with the development, implementation or monitoring of the policy	√	√

Table 5: Mediums Used to Raise Awareness of Decision Makers in Cambodia

4.2.2.3 Links: influence and legitimacy

In Cambodia, the project involved partners Ministry of Education, Youth and Sports (MoEYS). The work done under the project directly contributed towards local language computing policy for ICT integration in Education within in the country. The project also followed different strategies to create wide spread awareness for its outputs to affect policy change. Project partner created awareness of the advantages of Khmer Unicode and Khmer based applications among the computers users and developers. Cambodia country component also conducted seminars to introduce its research work .The seminars were attended by a large number of participants from academia and public sectors. CD containing the research outputs (Khmer Smart Typing, Encoding Conversion Utilities, Collation and Sorting Utilities, Word Wrapping Utilities, Spell Checker Utilities) was also freely distributed at these seminars. iREACH project also used Khmer applications to teach students and the communities at their 20 hubs. In 2010, IT

Representatives from 24 provinces and cities decided to use Khmer based applications in all districts of the country. Some NGOs also started to use localized applications.

4.2.3 Laos

In Laos, two major organizations mandated for the development of IT and Internet are National Authority for Science and Technology (NAST) formerly known as *Science Technology & Environment Agency (STEA)* and National Post and Telecom Authority (NPTA).

NAST is responsible for the national information technology policy, regulation, research, development, training and services, while the Department of Telecom and Internet, under NPTA is responsible for overall administration and development of telecom and the Internet in Lao.

National Policy on Information and Communications Technology 2006 serves as the main statement on the promotion of ICTs and local language computing to determine the political context for the project.¹ Within its nine priority areas, this national policy identifies “Standardization and Localization” as one of the key focus areas. The Standardization and Localization section of the policy focuses on concrete strategies for promoting localization. The following excerpt from the policy document highlight the key provisions provided for promotion of localization in this document.

Standardization and Localization

“The adoption of new technology necessarily requires the adoption of national and international standards to ensure network interoperability within and without the country; the preservation of language and culture; and increased productivity through rapid adaptation.

(i) The GOL (Government of Laos) shall promote software, hardware, and protocol standards, including telecommunications equipment and services, to ensure interoperability and harmonization with international, regional, and sub-regional standards.

(ii) To promote digital interchange in the Lao language, the GOL shall adopt the Unicode standard for the Lao script.

(iii) The GOL shall establish a network, including national and international experts, academia, government, and the private sector to advise on all issues relating to the localization of ICTs – this include Open Source and proprietary software.

(iv) The GOL shall establish a set of standards for data and information storage, exchange, and access for all government bodies and agencies, in line with international data standards. The GOL shall adopt Open Standards for all government data/information systems over proprietary standards, wherever possible, to minimize technological lock-in. (Chanthanasinh 2007)ⁱ

Table 6 Excerpt from the National Policy on Information and Communications Technology 2006

The original policy in Lao can be found on the APDIP website at <http://www.apdip.net/projects/2004/kh-la-policies/la/LaoPDR-ICTpolicy-20060731.pdf>

4.2.3.1 PAN Localization projects role in Influencing Policy

In Laos, the collaboration between Microsoft and National Authority for Science and Technology (NAST) for the localization of Windows Vista and Office 2007 in Lao, is a significant policy influence through the PAN Localization project. Through this initiative, the government developed a vision to deploy Microsoft solutions across all government departments.

The project also raised the awareness of decision makers and other relevant stakeholders about the potential and impact of local language computing. A number of meetings were held under the auspices of the NAST. In one of the meetings, organized by NAST on January 10, 2008, Country team highlighted the research work done under the project. The president of NAST highly appreciated these efforts.

4.2.3.2 Evidence: credibility and communication

The policy influence can be attributed to regular interaction of the country team with the policy makers. These meetings were effective for the country team to present their work and get feedback from policy makers. On January 10, 2008, NAST organized a meeting of policy makers and IT people. The meeting was an excellent opportunity for the country team to highlight the research work done under the project. The president of NAST was also present at the meeting and was greatly impressed by the research work. The team also conducted awareness and dissemination workshop on March 19, 2009 at NAST Vientiane where Lao UNICODE set was adopted by government as Lao National character set.

The table presents different means used to raise awareness about the potential/impact of local language computing and intellectual property rights (IPR) issues.

Medium used to raise awareness of decision makers	Potential and Impact of LLC	IPR Issues
	No= X, Yes=√	
Seminars and workshops	√	√
LLC awareness-raising sessions for policy makers	√	√
Developing the capacities of senior and middle level government official	√	√
Consultation occurred in drafting the Policy	X	X
Assisting government official by providing information	X	√
Training requirements associated with the development, implementation or monitoring of the policy	√	√

Table 7: Mediums Used to Raise Awareness of Decision Makers in Laos

4.2.3.3 Links: influence and legitimacy

In Laos, the project involved partners within National Authority for Science and Technology (NAST), policy making body of the country. So the work done under the project had direct influence on local language computing policy in the country. The country team also realized the need to publicize its work to affect policy change. The team presented the project at the National ICT fair where the prime minister of Laos was invited for inauguration, and public and private sector were able to view the outputs of the project.

The team conducted a technical workshop for 80 government officials, students and journalists, where CD containing fonts, keyboard utilities and open office applications were distributed. The team also conducted awareness and dissemination workshop on March 19, 2009 at NAST Vientiane where Lao UNICODE set was adopted by government as Lao National character set. PAN Localization regional conference on “Localized ICT Development & Dissemination across Asia” was organized at Vientiane, Laos from 11-16 January, 2009. It aimed to examine the status, progress and future prospects of the PAN Localization project. The event proved to be a good opportunity for Lao team to create awareness among the policy makers about the work being done under the project. The country team also developed its website to highlight its research activities (<http://www.laol10n.info.la/>).

4.2.4 Mongolia

In Mongolia, key institutions and organizations contributing to development of local language computing policy are Information and Communications Technology Authority (ICTA), Communications Regulatory Commission (CRC) and National Information Technology Park (NITP).

ICT Vision 2010 (ref) aptly lays out the political context for conducting local language computing research and development in Mongolia. In 2000, Mongolia adopted the ICT Vision 2010 as a blueprint for ICT development in the country.

ICT Vision 2010 has three major components: Government-Legislation framework, Business-Economy framework and People-Society framework.

Within the Government-Legislation framework, one of the strategic objectives is creation of policy and regulatory regime. This strategic objective emphasizes the implementation of the following activity related to localization, i.e. *“Ensure the state use of software application developed in Mongolian language.”*

Within the Business-Economy framework, one of the strategic objectives is the expansion of ICT business and making it highly efficient economic sector. This strategic objective emphasizes the implementation of the following activity related to localization, i.e. *“Develop market for software applications in Mongolian language.”*

4.2.4.1 PAN Localization projects role in Influencing Policy

In Mongolia, PAN Localization project was executed by Infocon Co. Ltd. in collaboration with teams at National University of Mongolia (NUM) and Mongolian University of Science and Technology (MUST). Infocon Co.Ltd is a consulting company, offering information and communication technology services to government and non-government organizations.

The country team was actively involved in providing recommendations on important policy matters to the government decision makers. Research on IT terminology translation in Mongolian was approved by the committee in Information and Communications Technology Authority (ICTA). The country team developed standards for Internationalized Domain Names (IDNs) and reviewed and released generic Top-Level Domain (TLD) and Country Code (CC) TLDs for Mongolian. The local language software developed through the project has been adopted by the government, thus directly reinforcing policy decisions.

The country team influenced the policy indirectly by creating awareness among government decision makers and other stakeholders about work being done under the project. The team has been interacting regularly with Information and Communications Technology Authority (ICTA). The meetings deliberated on open source software localization, standardization of terminology, IDNs and other related issues.

The project also influenced public policy indirectly by improving the capacity of its partners to make policy recommendations to their governments. The country teams were asked to rate their capacity to deliver relevant policy recommendations on a 5-point scale ranging from very limited (1) to very high (5). Mongolian team rated its capacity as high.

4.2.4.2 Evidence: credibility and communication

In Mongolia, the PAN Localization team has been interacting regularly with Information and Communications Technology Authority (ICTA). The meetings deliberated on open source software localization, standardization of terminology, IDNs and other related issues. The country team worked on IT terminology translation and the work was approved by ICTA committee. The table presents different means used to raise awareness about the potential/impact of local language computing and intellectual property rights (IPR) issues.

Medium used to raise awareness of decision makers	Potential and Impact of LLC	IPR Issues
	No= X, Yes=√	
Seminars and workshops	X	X
LLC awareness-raising sessions for policy makers	X	X
Developing the capacities of senior and middle level government official	X	X

Consultation occurred in drafting the Policy	√	√
Assisting government official by providing information	√	√
Training requirements associated with the development, implementation or monitoring of the policy	X	X

Table 8: Mediums Used to Raise Awareness of Decision Makers in Mongolia

4.2.4.3 Links: influence and legitimacy

InfoCon and National University of Mongolia have been disseminating project research and information through their websites as well. InfoCon website at www.infocon.mn, and NUM through the website of the Center for Research in Language Processing developed through PAN Localization project at <http://crlp.num.edu.mn>.

4.2.5 Nepal

In Nepal, the Ministry of Environment, Science and Technology (MoEST) is responsible for the formulation and coordination of ICT policy. The High Level Commission on Information and Technology (HLCIT) helps the MOEST to develop supportive and appropriate policy environment. The National Information Technology Council (NITC), working as the secretariat for the HLCIT, looks into implementation side of the policy. National Language in Information Technology (NLIT), a steering committee, formed by HLCIT aims to promote the use of Nepali in information technology. The committee looks after all issues pertaining to localization including standardization and Locale issues.

Information Technology Policy 2000 prescribes the political context for undertaking local language computing initiatives in the country. This document defines an aggressive strategy to put the country on the global IT map. The Action plan for implementing the IT policy includes the following activities.

- i. Participation of the private sector in infrastructure development
- ii. Infrastructure development
- iii. Human resource development
- iv. Dissemination of IT
- v. Promotion of e commerce

Information Technology Policy 2000 identifies the following measure under the Action Plan for dissemination of Information Technology. The following excerpt from the IT Policy 2000 presents the defined measures

6.4.6 Content shall be prepared to enhance materials with Nepali materials on the Internet to promote Nepalese arts and culture and to develop rural areas.

Table 9: Excerpt from the Localization Policy of Nepal

4.2.5.1 PAN Localization Projects Role in Influencing Policy

In Nepal, PAN Localization project was executed by Madan Puraskar Pustakalaya (MPP), a non-profit library and archive, established to preserve resources in the Nepali language. PAN Localization project team in Nepal was a core member of NLIT, the steering committee of HLCIT. During the second phase of the project 2007-2010 however, political instability in the country impacted upon the national plans and ICT sector could not assume appropriate place in national development. As a result, NLIT also became dysfunctional.

One of the most significant contributions of the project is the establishment of Language Technology Kendra (LTK) which is a collaboration of Department of CS and Engineering, Kathmandu University, Tribhuvan University and Madan Puraskar Pustakalaya (MPP) that has a mission “To carry out research and development activities and actively involve in technology transfer and acquisition in the field of language technologies, to contribute to the advancement of Technologies for the languages of Nepal.”

In addition, PAN Localization project team in Nepal has also been successful in drawing government attention towards language issues in ICTs. Significant research work was undertaken on Nepali IDNs and language tables and lists of gTLDs and ccTLDs was released.

The country team also worked to create awareness regarding the need and benefits of local language computing applications among the government decision makers and other stakeholders by presenting the research accomplished through the project. In September, 2007, the project team in a meeting with policy makers emphasized the development of standards and sound policies for the successful implementation of IT. In February, 2008 standardization of keyboard layouts for Nepal was discussed with the policy makers. In September 2008, computer curriculum in schools was discussed. In March 2009, MPP team and policy makers deliberated on Internationalized Domain Names in Applications (IDNAs) for Nepali. In September 2009, MPP team and policy makers deliberated on some proposed issues and MPP also highlighted the progress achieved by PAN Localization project in Nepal. The project also provided learning opportunities to policymakers. For example, in addition to two major Trainers’ Trainings on NepalLinux, the Nepal Country Component, MPP conducted about thirty orientation sessions within the period Jan 2006-September 2009 especially to government officials, media students among others.

4.2.5.2 Evidence: credibility and communication

The policy influence can be attributed to regular interaction of the country team with the decision makers. The country team organized regular meetings with the policy makers. These meetings were effective for the country team to present their work and get feedback from policy makers. In September, 2007, the project team in a meeting with policy makers emphasized the development of standards and sound policies for the successful implementation of IT. In February, 2008 standardization of keyboard layouts for Nepal was discussed with the policy makers. In September 2008, computer curriculum in schools was discussed. In March 2009, MPP team and policy makers deliberated on Internationalized Domain Names in Applications (IDNAs) for Nepali. In September 2009, MPP team and policy makers deliberated on some proposed issues and MPP also highlighted the progress achieved by

PAN Localization project in Nepal. The table presents different means used to raise awareness about the potential/impact of local language computing and intellectual property rights (IPR) issues.

Medium used to raise awareness of decision makers	Potential and Impact of LLC	IPR Issues
	No= X, Yes=√	
Seminars and workshops	√	√
LLC awareness-raising sessions for policy makers	√	√
Developing the capacities of senior and middle level government official	√	X
Consultation occurred in drafting the Policy	X	X
Assisting government official by providing information	X	X
Training requirements associated with the development, implementation or monitoring of the policy	√	√

Table 10: Mediums Used to Raise Awareness of Decision Makers in Nepal

4.2.5.3 Links: influence and legitimacy

The country team also realized the need to publicize its work to affect policy change. NepaLinux is currently deployed in 10 telecenters (Fulchowki, Dhading, Sindhupalchowk, Myagdi, Kaski, Rasuwa, Dailekh and other places 8 established partly under the PAN Localization Project(<http://panl10n.net>), Bhasha Sanchar Project (<http://bhashasanchar.org>) and other collaborations, and in the process of deployment in another 16 telecenters (Bhaktapur and Butwal and 14 others) under the Rato Bangla Public Private Partnership Network and facilitated by Madan Puraskar Pustakalaya in direct partnership with Nepal Telecommunication Authority. MPP highlighted its activities through its website (<http://www.mpp.org.np/pannepal/>).

NepaLinux was displayed at annual exhibitions like CAN Info Tech organized by the Computer Association of Nepal (CAN) for the last four years. An estimated 3000 copies of CDs/DVDs of NepaLinux both the downloadable and CD/DVD burnt versions have been distributed to the end users.

4.2.6 Pakistan

The Ministry of Information Technology (MoIT) is the national focal Ministry and enabling arm of the Government of Pakistan. It looks after all aspects of policy planning and implementation regarding information technology and telecommunications at the national level. National Language Authority (Muqtidra Quami Zaban) is another key organization established in 1979 by the Government of Pakistan

to develop and promote Urdu as national language of Pakistan. Other institutions and organizations significantly contributing to development of local language computing policy are as follows

- Ministry of Information Technology and Telecommunications (MoITT)
- Pakistan Telecommunication Authority (PTA)
- Universal Service Fund Guarantee Ltd (USF)
- Pakistan Software Export Board (PSEB)
- Pakistan Computer Bureau (PCB)
- Punjab Information Technology Board (PITB), Government of Punjab
- Sindh Information Technology Board (SITB)
- IT departments of Provincial Governments
- Pakistan All Software Houses Association (PASHA)
- Internet Service Providers Association of Pakistan (ISPAK)
- Computer Society of Pakistan (CSP)
- Federation of Pakistan Chambers of Commerce and Industry (FPCCI)
- Ministry of Education
- Sindhi Language Authority
- Seraiki Academy
- Punjab Language and Culture Center
- Pashto Academy
- Balochi Academy

The National IT policy of 2000, is the primary policy statement available on ICT development that frames the political context of local language computing in Pakistan. The focus areas identified in the policy include *human resource development, infrastructure development, software industry development, hardware industry development, Internet, incentives, IT promotion & awareness, IT usage, legislation and regulations*. IT policy also significantly focuses on the development of Urdu and regional language software. The provisions related to localization in this policy are as follows.ⁱⁱ

“Software development is a high growth industry and forms a major segment of the vast IT market and will continue to do so in the future. Integrated efforts to develop software industry with focus on

exports (in addition to the local market) would be undertaken. This would include encouragement of local software houses in Governmental projects, local content development, Urdu and regional language software development, promotion of software exports through establishment of International Marketing Network, special bandwidth rates for software exporters, encouraging joint ventures, hiring of international consultants for global business development and fiscal and regulatory incentives for software exporters through State Bank of Pakistan.” (Software Industry Development)

3.4.7.4 Urdu and Regional Language Software Development

3.3.7.4.1 Standardized Urdu code plate will be launched and a concerted plan to encourage the development of open source and licensable Urdu software would be undertaken. This will enable plug-ins for popular office and e-mail packages to be made available. This initiative is expected to drive the development of other Urdu and Regional software packages for word processing and data base applications.

3.3.7.4.2 The government will encourage the use of open source operating systems and low cost or free English language Office software for normal operations.

3.3.7.4.3 The intent of this initiative is to encourage people to develop skills in working and writing core software for applications and developing tools, which will go beyond the development of the local languages. The application programs for translation, speech to text conversion, databases, ASPs for popular packages will need to be written in currently and newly evolving software. (IT Policy Strategies)

Table 11: Mediums Used to Raise Awareness of Decision Makers in Nepal

4.2.6.1 PAN Localization Projects Role in Influencing Policy

PAN Localization project in Pakistan has been executed by Center for language Engineering (CLE), previously known as CRULP. Project lead of the project in Pakistan participated in the consultative process initiated to finalize five year Information Technology Policy 2010 by the Planning Commission of the government of Pakistan. Project leader was also a member of Broadband Stakeholders Group (BSG) formulated by Pakistan Telecommunication Authority (PTA), telecom regulatory body in Pakistan.

PAN Localization project has creditable contribution in Pakistan policy circles regarding the initiation of .pk (dot Pakistan) registry by Ministry of Information Technology. Another notable contribution of the project was the country team’s collaboration with Microsoft for the development of Language Interface Package (LIP) in Urdu for Microsoft Windows Vista and Microsoft Office. In this project, Microsoft Corporation supported the country team to develop interface terminology translation of 300,000 English words into Urdu. These terminology translations have been endorsed by the National language Authority (NLA) of Pakistan and thus the translations developed by the project team have been standardized.

Inclusion and participation of public in the policy development process is one of the most significant contributions of the project. The country team was actively involved in developments taking place in research and standardization on global level for IDNs. To define IDN standards for Pakistan, a workshop was organized by PAN Localization project team in Pakistan in year 2008, gathering participants representing various local languages spoken in Pakistan. Through this workshop an initial attempt was

made to draft character sets for different Pakistani languages. A follow-up workshop on IDNs was later arranged by the project team on behalf of the Ministry of IT Pakistan in May 2009, to build on the earlier work for Pakistani languages. During this workshop, an open discussion was also arranged where general public was invited through newspaper advertisements and requested to contribute in this policy development process.

Similarly, the project has also contributed in creating the realization that new IT policy draft must be open for comments from public and other stakeholders.

It is further worth-mentioning that some of the project outputs have also directly translated into policy actions. In 2009, the Punjab Government in Pakistan started Punjab IT labs project to deploy IT labs in 4,286 secondary and higher secondary schools of the province. Through persistent advocacy of the project team, the government decided to include a phonetic keyboard layout and local language fonts (Nafees Nastaliq and Nafees Web Naskh) package within each of the computer installment through the project. This step was envisioned to improve the usability of Urdu on computers.

In addition, the country team also worked to create awareness among government decision makers and other stakeholders about the need and usefulness of local language computing research by showcasing the localized applications developed through the project. In this regard, the country team has been regularly meeting with policy making bodies such as Ministry of Information Technology and Telecommunications (MoITT), Ministry of Education, Pakistan Telecommunication authority (PTA), Universal Service Fund (USF), Pakistan Software Export Board (PSEB), National ICT R&D Fund, and Pakistan All Software Houses Association (PASHA). The country team has also been in regular contact with language academies and authorities, including National Language Authority (Muqtadra Qaumi Zaban), Urdu Science Board, Seraiki Academy, Pashto Academy, Sindhi Language Authority, Balochi Academy and Frontier Language Institute. During these meetings, the country team has been highlighting the important issues to be addressed at the policy level to promote local language technology, training and content.

The project has thus significantly contributed towards improving the capacity of its implementing partner organization to make policy recommendations to their government. In this regard, when the country team was asked to rate their capacity to deliver relevant policy recommendations on a 5-point scale ranging from very limited (1) to very high (5). Pakistan team rated its capacity as high.

4.2.6.2 Evidence: credibility and communication

The country team has been regularly presenting its work to the government decision makers. In 2009, the Punjab Government in Pakistan started Punjab IT labs project to deploy IT labs in 4,286 secondary and higher secondary schools of the province. CRULP contributed to improve the usability of Urdu on computers. CRULP in collaboration with the Punjab IT Labs Project organized a seminar titled “Integrating IT in Education: Language, Curriculum and Training Challenges in Government Schools of Punjab” on 17 December, 2009. The country team presented its experience of end user training on localized ICT in the seminar.

In Pakistan, students and teachers were trained on localized technology to generate online content. At the end of the training, a website development competition was organized for the participants. The websites received from the participants were evaluated by a team of experts from the IT industry, academia, government, media and other relevant organizations. With the support of National ICT R&D Fund, Ministry of Information Technology, a prize distribution ceremony was held on January 23, 2010 at the NUCES Lahore campus. This activity created awareness among government decision makers of the work being done under the project and highlighted the important issues to be addressed to promote local language computing policy.

The country team has been involved in developments taking place in IDNs. A workshop was organized by CRULP in year 2008, gathering participants representing the various languages spoken in Pakistan. An initial attempt was made to draft character sets for different languages through this workshop. Two follow up events were organized by Ministry of IT Pakistan to develop IDN ccTLD for Pakistan. <http://www.crulp.org/idn/>

The country team has been regularly presenting its work to the government decision makers and other stakeholders. The table presents different means used to raise awareness about the potential/impact of local language computing and intellectual property rights (IPR) issues.

Medium used to raise awareness of decision makers	Potential and Impact of LLC	IPR Issues
	No= X , Yes=√	
Seminars and workshops	√	√
LLC awareness-raising sessions for policy makers	√	√
Developing the capacities of senior and middle level government official	√	√
Consultation occurred in drafting the Policy	√	√
Assisting government official by providing information	√	√
Training requirements associated with the development, implementation or monitoring of the policy	√	X

Table 12: Mediums Used to Raise Awareness of Decision Makers in Pakistan

4.2.6.3 Links: influence and legitimacy

In Pakistan, the country team has been active in interaction with various stakeholders such as Pakistan Software Export Board (PSEB), All Software Houses Association (PASHA), Internet Service Providers Association of Pakistan (ISPAK), and Computer Society of Pakistan. In these meetings, the country team created awareness about the benefits of localized technology.

The country team also realized the importance of media and publicity in affecting policy change. A local language website development competition was organized by the project team. To evaluate the entries and select the best website, media representatives were also part of the team of experts invited to evaluate the websites received for this competition. The project activities in Pakistan have been widely covered by print and electronic media. Spider, popular IT Magazine in Pakistan published articles highlighting progress made by the project in the country. The country team also highlighted its work through its website (<http://www.culp.org/dareecha/>). A large number of flyers about the project activities were also distributed. The country team developed books on basic computer skills and localized applications, including OpenOffice (Word Processor, Graphics Editor), SeaMonkey (Browser, Email Client, and Web Editor) and Psi (Instant Messaging Client). The books created awareness about benefits of local language technology. The team presented its work at different events at national and international levels.

1. Sustainable Development Policy Institute (SDPI) Study Group Meeting on Women and ICTS: Exclusion or Empowerment on 13 August, 2009
2. Internet Governance Forum (IGF) Workshop on Equality in access to knowledge society, through language and cultural diversity held at Sharm El Sheikh, Egypt on 18 November, 2009
3. 2nd GEM Global Exchange, held in Bali, Indonesia from November 24-30, 2009
4. Seminar on Integrating IT in Education: Language, Curriculum and Training Challenges in Government Schools of Punjab held on 17 December, 2009 at NUCES, Lahore

4.2.7 Sri Lanka

The Information and Communication Technology Agency (ICTA) is the apex body involved in ICT policy development. State Language Commission and Department of Official Languages are involved in development of language policy. Sri Lanka Standards Institution (SLSI) is the country's leading standards development organization. The draft National ICT Policy 2006 serves as the main policy statement to understand political context for the project. The draft lays significant emphasis on local language computing as indicated in its excerpt below.

Access to information to be facilitated through the development of ICTs in national languages:

Standardization: Scripts based on the international Unicode / ISO10646 standards, to be used for local language web sites and in the electronic transmission of information.

Technical support: Measures to be taken to ensure that technical support is provided for localization of content.

Deployment: Measures to be taken for the deployment and implementation of standards based Sinhala and Tamil support to relevant sectors and organizations.

Content: Measures to be taken to promote content development in local languages for the Internet and also to facilitate translation of relevant English content to local languages.

Research to be carried out on the development of content to meet the needs of communities. Community participation in content development in local languages to be encouraged.

Accuracy, integrity and reliability of information in local languages to be ensured.

Collection, classification, protection of indigenous knowledge, and making such knowledge available through ICTs in local languages to be promoted.

Sector based content: Government organizations, universities to engage in development of productivity-enhancing information in local languages relevant to the agricultural sector, fisheries sector; Local language content to be provided on prices of agricultural products, on agro-based industries, and on agri-business development.

Educational content development in local languages to be implemented. (Sri Lankan Country Report on ICT Localization Policy)

Table 13: Excerpt from the Sri Lankan Country Report on ICT Localization Policy

4.2.7.1 PAN Localization Projects Role in Influencing Policy

In Sri Lanka, PAN Localization project was executed by University of Colombo School of Computing (UCSC). The Sri Lankan project team has been frequently interacting with policy and standard making bodies to promote local language computing and bring sustainability to its work. Project Leader of PAN Localization project in Sri Lanka was a member of IT Sectoral Committee of the Sri Lanka Standards Institution (SLSI) which is a member of ISO. Project Lead was also a committee member of ICTA Local Language Working Group (LLWG).

A significant achievement of the project was the development of Language Interface Package (LIP) for Microsoft Windows Vista and Microsoft Office in Sinhala. Through this project, Microsoft supported the country team to develop local language interface for Microsoft Vista operating system and the interface terminology developed has been standardized by ICTA.

The country team was actively involved in providing feedback to the government decision makers on important policy issues. The team has and also contributed in constructing policy development process on strong theoretical foundation. The research conducted through the project has been adopted within the government and standardized. E.g. project's research on defining the collation sequence has been incorporated into the SLSI 1134 standard.

National policy necessitating a change to develop government websites in three official languages was influenced by the project work to some extent.

The work done by the project's country team on IDNs resulted in the development of IDN ccTLD registry in Sri Lanka. The project also contributed to the development of ICTA Local Language Working Group (LLWG). The working group made significant progress towards localization of key software and government website standards.

The country team also worked to create awareness among government decision makers and other stakeholders about the need and usefulness of local language computing research by showcasing the localized applications developed through the project. The country teams held regular meetings with key standards development and policy making bodies namely Information and Communication Technology Agency of Sri Lanka (ICTA) and Sri Lanka Standards Institution (SLSI). Thus the project helped in improving the capacity of its implementing partner organization to make policy recommendations to their government. The country teams were asked to rate their capacity to deliver relevant policy recommendations on a 5-point scale ranging from very limited (1) to very high (5). Sri Lankan team rated its capacity as high.

4.2.7.2 Evidence: credibility and communication

The country team has been regularly presenting its work to the government decision makers and other stakeholders. The table presents different mediums used to raise awareness about the potential/impact of local language computing and intellectual property rights (IPR) issues.

Medium used to raise awareness of decision makers	Potential and Impact of LLC	IPR Issues
	No= X, Yes=√	
Seminars and workshops	√	√
LLC awareness-raising sessions for policy makers	X	X
Developing the capacities of senior and middle level government official	X	X
Consultation occurred in drafting the Policy	√	X
Assisting government official by providing information	√	√
Training requirements associated with the development, implementation or monitoring of the policy	X	X

Table 14: Mediums Used to Raise Awareness of Decision Makers in Sri Lanka

The country team has been involved in developments taking place in IDNs. The work done by the team on IDNs contributed to the development of IDN ccTLD registry in Sri Lanka.

4.2.7.3 Links: influence and legitimacy

Project Lead of PAN Localization project in Sri Lanka was member of two decision making bodies. He was a member of IT Sectoral Committee of the Sri Lanka Standards Institution (SLSI) which is a member of ISO. Project Lead was also a committee member of ICTA Local Language Working Group (LLWG). He has been successful to use these positions to highlight different local language computing issues to be addressed at policy level. The country team has been active in creating awareness among community-based organizations CBO's, technical people, general public and other stakeholders about the research work being done under the project. The project work was also disseminated through a website (<http://ucsc.cmb.ac.lk/ltrl/>).

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Appendix A: Questionnaire – Policy Development

Every response to this questionnaire is entirely confidential. Completed questionnaires will be seen only by the PAN Localization project’s regional evaluation team. The data compiled using descriptive statistics (not individual responses) will be used, for reporting purpose only and to improve program design for future work. We thank you for your time and expertise.

I. GENERAL INFORMATION

Respondent’s Name: Male Female

Country Partner Institute Name:

Are you a member of any public policy making body? Yes No

If yes, please provide the following information for EVERY committee (for membership in multiple committees)

Name of the Committee/Authority:

Membership type:

Duration of Membership:

Sector representing:

Name any salient policy issues/standardizations discussions completed

Name any salient policy issues/standardizations discussions in progress

As a member of policy making body describe challenges faced in developing and executing policy/standards development for Local Language Computing

II. BACKGROUND INFORMATION: “NATIONAL POLICY DOCUMENTS”

1. What is your **Language policy**? (Please provide English translation of relevant sections of Language Policy/other relevant public documents referring to the need for LLC)

If available please also provide the following information:

- i. Which authority is involved in the policy development process?
- ii. Who are the key players (with designations) involved in the process?

2. What is your **IT policy**? (Please provide an English translation of the relevant sections of IT Policy/ICT policy/ relevant public documents referring to the need for LLC).

If available please also provide the following information:

- i. Which authority is involved in the policy development process?
- ii. Who are the key players (with designations) involved in the process?

3. Do the above mentioned policy documents directly/ indirectly stipulate initiation of R&D in the respective domain? Yes No
4. At which of the following international standards development bodies is your country represented (you may tick multiple options)?
- ISO Unicode ICANN GAC Other:

III. BACKGROUND INFORMATION: “POLICY DEVELOPMENT PROCESS”

1. Please list which committee/authority is involved in the following:
- a. Standards development for Language :
 - b. Standards development for IT/ICT:
 - c. Authorization/Approval of LLC projects:
2. Has there been any change in the policy development process lately in terms of any of the following:
- Membership at policy development forums
 - Inclusion/Exclusion of a certain Org.
 - Inclusion/Exclusion of a certain Criteria
 - Representation
- Other: **Please provide brief description (if required)**
3. Has the project explicitly contributed through advocacy/or any other means to influence any of the changes mentioned in pt. 2 Yes No
- If yes, then please mention which one:
4. Has the project otherwise/implicitly contributed directly or indirectly in policy decisions/ decision making process? Yes No
- If yes, then please mention how:
5. Have any of the project outputs directly translated into policy decisions/ laws/ regulation? Yes No

If yes, please describe which one and how?

Output Name	Role in influencing Policy

6. Are any of the following indicators collected by the local statistical bureaus?
- a. Language
 - b. Technology

c. Technology & Language

7. Are there any inter organizational collaborations to develop the following?
- a. Local Language Resources? _____
- b. Language Technology (software)? _____
8. Is Local Language computing curriculum nationally recognized as a coursework to be included in Universities? Yes No

If Yes, from the options below, which disciplines are currently being taught?

- Linguistics Computational Linguistics CS (NLP)

At what level are the courses taught:

- Under Grad. Graduate Ph.D

IV. LLC PROJECTS

1. Are there any LLC projects initiated nationally or internationally that may be seen as a contribution of the project’s advocacy/awareness raising/capacity building at public organizations? Yes No
2. **If Yes**, then please provide the following information:

Title	Granted by	Granted to	Duration	Approx. Funding	Output Licence

3. Is there any public sector interest in developing more local language computing projects? Yes No
4. Are there any action plans to give out local language computing projects? Yes No
5. What is the primary project’s licensing schemes being followed in the public sector?

Licensing	Software	Content

V. PAN LOCALIZATION PROJECT’S ROLE IN POLICY DEVELOPMENT

1. How has the project contributed to raise awareness of decision-makers and other relevant stakeholders about the **potential and impact of LLC**? Tick all mediums used to perform the above:

- Seminars and workshops
 - LLC awareness-raising sessions for policy makers
 - Developing the capacities of senior and middle level government official
 - Consultation occurred in drafting the Policy
 - Assisting government official by providing information
 - Training requirements associated with the development, implementation or monitoring of the policy
 - To share best practices
 - Other
2. How has the project contributed to raise awareness of decision-makers and other relevant stakeholders **about IPR issues**? Tick a few mediums used to perform the above:
- Seminars and workshops
 - LLC awareness-raising sessions for policy makers
 - Developing the capacities of senior and middle level government official
 - Consultation occurred in drafting the Policy
 - Assisting government official by providing information
 - Training requirements associated with the development, implementation or monitoring of the policy
 - To share best practices
3. Has there been any collaborative work initiated through the project to provide recommendations for public policy development? Yes No
4. How would you rate the capacity of your organization to deliver relevant policy recommendation?
- Very Limited
 - Limited
 - Satisfactory
 - High
 - Very High

ⁱ Chanthanasinh, M. presentation on Local language computing policy initiatives computing policy initiatives of Lao PDR, at Bhutan

ⁱⁱ http://www.pseb.org.pk/UserFiles/documents/National_IT_Policy.pdf