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PATHWAYS TO PROSPERITY AND INCLUSIVE JOB CREATION IN NEPAL

Background Paper: ICT

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INTRODUCTION

The ICT sector in Nepal

The information and communication technology (ICT) sector in Nepal, though currently small, is undoubtedly growing. ICT businesses cater mostly to foreign clients, and though there are some large firms that employ more than a hundred of workers, most firms are small, supported by a significant number of freelancers. In 2014, the Computer Association of Nepal (CAN), the umbrella body representing the private sector, estimated that in 2016 there were more than 6,000 firms in this industry, of which only 256 were officially registered (*The Kathmandu Post*, 2012). However, scarcity in terms of employment in ICT in the country is scarce.

The country has made some important strides in terms of improving its levels of connectivity, mainly centred around mobile internet connectivity (see Table 1). The 2013 World Bank Enterprise Survey reports a greater level of internet usage by Nepali firms *vis-à-vis* other South Asian countries and other low-income countries (LICs): 26% of firms in Nepal have their own website (21.9% in South Asia and 18.6% for LICs) and 48.3% of firms use the internet to communicate with clients and suppliers (41.7% in South Asia and 46.3% in LICs).

Table 1. Selected ICT connectivity indicators in Nepal, 2010 and 2016

| | 2010 | 2015 |
|---|------|------|
| Fixed broadband subscription (per 100 people) | 0.22 | 1.06 |
| Fixed telephone subscriptions (per 100 people) | 3 | 3 |
| Internet users (per 100 people) | 7.9 | 17.6 |
| Mobile cellular subscriptions (per 100 people) | 34 | 97 |
| Secure internet servers (per 1 million people) | 2 | 4 |

Source: http://data.worldbank.org/indicator/IT.NET.SECR.P6?end=2015&locations=NP&name_desc=false&start=2010

The World Economic Forum provides a Networked Readiness Index. On this, comparisons for Nepal of 2010 and 2016 show a small improvement in the ranking from 131st to 118th place (WEF, 2010, 2016). The International Telecommunication Union (ITU) states that the country is a net exporter of communications services, with the value of communication exports rising from \$58 million in 2010 to \$355 million in 2013, averaging 77% per annum growth in the period (ITU, 2013).

ICT sector policies

The Department of Information Technology, under the Ministry of Science & Technology, currently acts as the governing body of the sector. Nepali ICT sector policy is currently set out in the IT Policy 2067 (Nepali year) implemented in 2010 by the Nepali government. This iteration of the policy follows on from previous the IT Policy, formulated in 2000. The current policy regime¹ does not go into further great detail, essentially acting as an affirmation of the importance of the IT sector in the country and setting up a future roadmap for the formulation and implementation of IT policy.

¹ Of which a limited translation was found at <http://www.asianlii.org/np/legis/laws/itp2057311/>

The government of Nepal is updating its IT Policy with a new iteration, the National Information and Communication Technology Policy 2015. This policy is currently in draft form² and is open to public scrutiny. It aims to mainstream the use of ICT in all key sectors of Nepal's economy, including increased e-governance (i.e. greater use of ICT for government activities and procedures), and eventually help the sector represent 7.5% of gross domestic product (GDP) by 2020. The ICT sector is included as an earmarked export sector in the Nepal Trade Integration Strategy (NTIS), though the practical implications of what such support entails are yet to be fleshed out.

The Electronic Transaction Act 2007³ provides a regulatory framework for the use of digital signatures in government and non-governmental document transactions. The Office of Controller Certification was established to implement an asymmetric cryptosystem in electronic transactions. Proper implementation of this Act is particularly important for e-commerce, e-procurement, data centres, etc. However, as key public infrastructure has not yet been put in place, only commercial banks (providing e-banking services) and a limited number of e-commerce-related businesses, such as MunchaHouse, are operating under its guidance (UNCTAD, 2011).

Other relevant policies for the sector include those that govern foreign exchange rules and foreign employment. In terms of foreign exchange, the main governing policy is the Nepal Rastra Bank Act 2058 of 2002. Payments (and receipts) in foreign currency are strictly controlled by the Nepal Rastra Bank (NRB) and, beyond \$2,000, require its approval. Changes executed in the 2014/15 monetary policy allow for online payments below the \$2,000 limit to be carried out through a 'dollar credit card', obtaining which, however, still requires approval from the NRB. Repatriation of profits through foreign direct investment (FDI) is wholly allowed through the Foreign Investment and Technology Transfer Act of 1992 (and all subsequent amendments), although it has been noted that in practice repatriation of profits is not guaranteed and requires multiple permits from government ministries and agencies. Complete foreign ownership of enterprises is allowed, except for financial institutions (USDoS, 2015).

Intellectual property (IP) is mainly governed by the Patent, Design and Trademark Act of 1965, which the Nepal Investment Board highlights as a potentially old act that the government is considering revising by (eventually) issuing a unified intellectual property law (IBN, 2016). Current IP policy enforcement has been deemed weak (USDoS, 2015), and foreign patents are not automatically awarded or automatically recognised by Nepali law. Although the Copyright Act of 2002 does provide some protection to copyright, enforcement is not strict or pervasive (UNCTAD, 2011; USDoS, 2015).

Foreign employment requires a work permit, issued under the Work Permit Guidelines of 2014. Firms that want to hire workers from abroad need to abide by the Labour Act of 1992, which means they need to prove they cannot find Nepali people with adequate skills to meet their requirements. Firms that have a foreign investment component (either by equity, joint venture or wholly foreign owned) are allowed to hire up to 15% of technical staff from abroad thanks to the Nepal World Trade Organization accession agreement, set up when Nepal joined in 2004.⁴

The Income Tax Act of 2002 stipulates that estimated tax liabilities over NPR 5,000 are paid in advanced instalments, from mid-January to mid-July. Tax incentives are available to companies located in a special economic zone or those that fall under the 'Special Industries' definition, where there is a 20% tax rebate facility. The ICT sector, however, does not fall under such category. Of relevance to the ICT industry, a 15% income tax exemption, under the Industrial Enterprise Act of 2016, is allowed for companies with 300 or more employees. The second relevant provision is for ICT companies that are in the IT Park, which receive a 50% tax exemption (Sharma, 2015).

² http://www.youthmetro.org/uploads/4/7/6/5/47654969/ict_policy_nepal.pdf

³ <http://www.tepc.gov.np/uploads/files/12the-electronic-transaction-act55.pdf>

⁴ https://www.wto.org/english/thewto_e/acc_e/a1_nepal_e.htm

SURVEY RESULTS

A survey of 11 ICT firms was carried within Kathmandu, the central and only significant hub of ICT firms within Nepal. Firm typologies were highly varied but can essentially be split into three categories: 1) service providers (i.e. data outsourcing); 2) software developers; and 3) ICT infrastructure providers. For a full list of firms interviewed please see Annex A. Survey sampling was not random, nor was it stratified by size of firms, given the constraints on the project. Surveyed firms were therefore chosen primarily based on their availability to take part in the survey.

It is important to bear in mind that the results here can in no way be taken as representative of the ICT sector, given the small sample size of the survey. They can, however, begin to shed some light on potential issues in the sector for further investigation in more in-depth future studies.

From a methodological point of view, it is important to note that surveyed firms do not represent a stratified sample of the four sectors, either in Nepal or within the survey sub-regions, as the final representation is largely composed of firms that responded positively to queries during fieldwork. It is therefore important to note that the survey results should be used as indicative rather than as representing an authoritative view of the four key sectors.

Firm characteristics

All interviewed firms are relatively new, with the oldest set up in 2000 and the most recent starting up in 2012. With an average of nine years in operation, this reflects the relative 'youth' of the ICT sector in the country. Firms ranged from small in size, with eight employees, to larger, with over 500 employees, at an average employee count of 111 employees per firm across the sample, showing approximately average 21% growth in employees per annum.⁵

Hiring employees was not seen to be a particular challenge for firms, as vacancies could be rapidly filled, but there are issues with finding the right expertise and employee turnover rates, which were perceived to be high enough to represent a barrier to growth across all interviewed firms. Firms reported in-house on-the-job training and frequent hiring drives as solutions to both issues.

All firms had some type of planned expansion in their activities, though the nature of this varied greatly. Some firms wanted to enter new international markets in addition to those they already operated (typically the US or the EU); others wanted to start serving the Nepali market in addition to their international clients; still others wanted to increase their domestic presence.

Constraints

The survey aimed to identify the most important constraints to growth within for ICT sector firms. The top two constraints were predominantly labour issues, related to skills and movement:

- **Experienced workers:** The main constraint was found to be lack of experience and practical know-how. ICT firms need to deliver significant training (typically between two and six months) to new hires in order to impart practical knowledge and experience, a crucial component for employees perceived to be missing from the skill baskets of IT graduates in the country.
- **Migrating graduates:** IT graduates, hired and trained by IT firms, tend to work for only two or three years in a firm before leaving, mainly to study abroad, although in some cases also to work for international companies. Inter-firm movement within the domestic ICT market was not seen to be a contributing factor to high turnover rates.

⁵ Given the average figure, estimates of employment in the sector can range from approximately 28,000 people (at the lower end, considering only the number of registered firms) up to 670,000 at the high end if unofficial firm counts are included. The top end estimate is, however, probably highly inaccurate as firm distribution by size is unknown.

In terms of other growth constraints, the following three were cited as having the greatest impact on growth:

- **National infrastructure:** Seen as a general constraint to growth, major infrastructure issues identified included limited connectivity, bandwidth and redundancy measures for internet. Common to all the respondents was the fact that energy was, but is now no longer perceived to be, a binding constraint to operations. However, respondents took a 'wait and see' approach to the current situation, as the energy supply constraint has only recently been resolved. Firms in the ICT sector are still wary of the energy supply situation in the longer term.
- **Foreign exchange controls:** Ability to pay in foreign currency is seen to be extremely limited. This has a number of impacts – including limiting the ability of ICT firms to import required hardware, preventing the use of international online payment systems (i.e. PayPal) and also stopping potential FDI into firms, though this constraint was more relevant for firms with ties to companies outside of Nepal.
- **Size of domestic market:** The small size of the Nepali domestic market for ICT services means firms have to rely on international contracts, which opens them up to international competitors (competition varied for firms, with main competitors cited as Indian, US, Chinese and Eastern European). This means ICT firms cannot build up a sustainable level of operations based on national demand.

Government and business association support

Although there was a pervasive sense that one of the major constraints was government and political instability within the country, which contributed to uncertainty in the business environment and associated investor uncertainty, the surveyed firms said government could still support the ICT sector by undertaking a number of actions:

- **Business regulations:** Changes to the business regulatory environment were listed as the main type of support the government could provide. These include simplified licensing systems (in terms of both production and human resources – i.e. hiring foreign labour), simplified FDI rules, updated IP laws, etc.
- **Business incentives:** A number of firms cited tax breaks and similar financial incentives as potential government support mechanisms for the sector, alluding to general tax incentives that the government has provided to other sectors.
- **Improve connectivity:** Although there was a general perception that internet connectivity was improving and prices were (slowly) decreasing, there were multiple calls to increase redundancy measures – that is, to increase both the number of links Nepal has to global internet backbones and internal connectivity pathways.

Engagement with government ministries and agencies was minimal across all surveyed firms. Those that deal with them do so mainly for operational issues (i.e. to obtain permits, licences, etc.) or to procure government contracts. Surveyed firms said there should be more information about the IT sector within government in order both to improve relationships with the sector and help policy-makers understand how to improve the ICT legal framework in order to bring it more in line with global ICT policy practices and regulations.

Likewise, engagement with industry/business associations was also minimal. The only cited business association – CAN⁶ – was not seen as particularly supportive of the industry, with perceptions of its activities as more inward-focused (i.e. promoting its own events) rather than resolving sector issues.

⁶ <http://www.can.org.np/>

CASE STUDY: DeerWalk

DeerWalk was founded by a Nepali ICT sector businessman to provide health care software and analytics for the US. The firm has its main operations in Kathmandu; its business procurement and headquarters are hosted in the US. It is currently one of the largest ICT firms operating in Nepal but is wholly focused on the US market.

In response to the perceived lack of skilled ICT graduates in the Nepali economy, DeerWalk has set up the DeerWalk Institute of Technology. This provides tertiary-level education and helps supplement ICT graduates from other local tertiary institutes. The institute provides a three-year graduate level course but does not guarantee employment at DeerWalk for its graduating students: in 2016, out of the 48 graduating students, the commercial arm hired seven. The intent of the DeerWalk Institute is to fill the practical exposure gap that local ICT educational institutions were perceived to be missing. It does so by providing opportunities for its students to work on commercial projects within DeerWalk (on a part-time basis) from their second year of study on.

DeerWalk has also founded a school for students aged 8–18 (Grades 1–10 in Nepal) in order to fill the gap in education as perceived by the founder of DeerWalk. In addition, DeerWalk provides educational loans to its employees through loans to pursue IT MScs and MBAs in Kathmandu universities, with the obligation of working for DeerWalk for at least two years after graduation from the course.

Worker profile

The average ICT employee profile was described as male and 26 years old and typically had already gained a tertiary-level ICT degree, usually a BSc in ICT Engineering. On average, 80% of ICT firm employees are male and 78% of all employees are below the age of 30. The lower representation of female employees was attributed to two main factors, the first being the limited amount of female ICT graduates and the second the firm requirement to often work both day and night, which was seen as a barrier as it was perceived both as a potential safety issue by females themselves and as inappropriate (in terms of cultural norms) by female family members. In practice, it seems ICT firms hire around the same proportion of females as the national firm average (18.2%) as reported in the 2013 World Bank Nepal Enterprise Survey (World Bank, 2013).

Only 1.4% of surveyed firm employees were foreign. For the firms that cited having foreign employees, these tended to be in more senior positions or used to fill particular skill niches. Some firms cited foreign employment restrictions in Nepal as a potential barrier to growth as it hinders the potential to recruit talent from overseas, although the majority of interviewed firms were not actively recruiting from abroad.

Information on employees from disadvantaged backgrounds (socioeconomic, disabled, lower-caste) was minimal. Firms do not keep record of such details and said that positive discrimination practices were not in use as they were more interested in the skills of the workers than their background.

Skills, salaries and training

Skill requirements vary by firm, although the most common requirement is the achievement of a tertiary-level degree in ICT and knowledge of programming languages (preference of the specific type depends on firm outputs). English language requirements were seen as desirable (but not essential) in order to be able to communicate with international clients; greater emphasis was placed on vaguer concepts such as ability to communicate, firm cultural fit and willingness to learn.

There was also variation in terms of the actual viability of ICT graduates (and employee) skills, largely influenced by the degree of firm specialisation and the type of output. Those firms that require niche skills reported a limited pool of labour from which to recruit. On the other hand, firms that required more generalist skills, albeit still citing a scarcity of skilled labour (especially in terms of practical experience, as seen above), found this less of an issue as they could train workers to meet their standards.

Across the range of firms, this constraint was typically mitigated by providing in-house training to all new employees, although the intensity and duration of this varied, from three up to twelve months. About a third of the firms have a probationary employment period, with training provided to applicants but employment contracts given only to those that meet firm standards. This process was used mainly by firms hiring employees with limited skills in the required field and, though it was cited as a potential sunk cost, it was needed to assess the skills and employability of candidates. The most common typologies of firm training included:

- **On-the-job:** This is typically carried out by all firms through informal mentorship schemes whereby senior staff members impart their knowledge, work procedures and practical skills to new employees.
- **Online certification:** These courses are common among ICT sector firms, both to provide authentication of employee skills to international clients and as a way to bridge the knowledge gap within the country.
- **In-house courses:** These are courses carried out within the firm, typically using in-house resources (although some firms also hire external specialists).

For those firms willing to respond on this (approximately a third), direct and indirect training represents approximately 20% of total firm costs. A small number of firms provide support for individual academic qualifications – that is, loans to pay for post-graduate level education, conditional on continued employment with the firm for one or two years.

Interviewees provided a varied response when asked what, in their opinion, was the best type of training for employees working in the ICT sector. Overall, there seemed to be significant consensus that on-the-job training was the best training method, followed by a strong academic foundation.

Salary levels were estimated at three levels: junior (less than three years of work in the firm); intermediate (three to five years of work); and senior (more than five years of work). The following average levels were provided:

- *Junior:* NPR 21,700 per month
- *Intermediate:* NPR 50,140 per month
- *Senior:* NPR 135,000 per month

The average salaries reported below do, however, hide some significant differences in salary ranges. Entry-level salaries range from NPR 12,000 a month to NPR 30,000 a month, and senior-level salaries from NPR 50,000 a month to upwards of NPR 450,000 a month. All surveyed firms stated that baseline wages increased on a year-on-year basis, though increases ranged from those simply covering 'inflation costs' up to 20% annual increases in baseline wages.

CASE STUDY: Cloud Factory

Cloud Factory began operations in Kathmandu in 2012 and is specialised in outsourcing operations for US-based clients. The company uses a mixture of full-time (around 150) and contract (around 1,400) workers (an approximate ratio of about 1:10), typically for data-inputting services.

Cloud Factory is a rare example of a Nepali ICT firm physically expanding into international markets. Although the firm began in Nepal, it has subsequently opened offices in the US (mainly for work procurement reasons) and an additional operational office in Kenya.

For a landlocked country like Nepal, which is dependent on logistical connections, this example highlights export orientation when not limited by access to primary resources. Such firms can expand operations not just in the domestic market but also globally and are capable of providing unified services (Nepali and Kenyan teams often work together on the same projects).

ICT labour market tightness

ICT firms face a challenge familiar to the Nepali labour market – that is, capacity to retain labour. Firms in the sector do not have particular issues when recruiting employees with limited experience, which is strongly reflected in the demographic makeup of the firms (78% of employees under the age of 30). Female participation is limited but this is not significantly different from in the other sectors in the study. Firms cite practical experience gaps for new entrants in the market, solved through a (typical) period three to six months of on-the-job training, bolstered through online certification courses. In the short term, new entrant practical skills gaps could be resolved through systemic internships between academic institutions and ICT firms, as DeerWalk has done. However, the real issue with the ICT labour market is the significant perceived loss of experienced employees.

Essentially, this poses a medium-term problem, not in terms of labour demand or immediate labour supply but rather in relation to industry expansion potential. If firms are having no problems hiring new starters but severe issues retaining staff, growth will be hampered by a lack of experienced and managerially capable employees. Given very high turnover rates, ICT firms will always be chasing new recruits. The root causes of this problem are twofold: 1) the relative youth and small market size of the Nepali ICT industry, which means skilled labour is attracted to larger, more mature, markets with greater remuneration potential; and 2) the attraction of academic institutions abroad with attached, perceived, increases in prestige and potential life incomes for those able to move abroad to study. The labour argument, therefore, becomes one about retaining labour and not skills. Solutions are tricky: either play a wait-and-see game, hoping the sector grows enough to retain talent, or become more proactive by increasing its exposure to international markets (and associated competition) and relaxing the capital account and foreign employment restrictions to enhance competitiveness.

CONCLUSIONS: POLICY RECOMMENDATIONS

No feasible policy support can mitigate the major labour constraints to growth for the sector – that is, the outward migration of ICT firm employees to either study or work abroad. Resolution of limited market size requires time – ICT firms need to establish themselves in a global context – and the easing of restrictions on international operations. Limiting student movements can be tackled either through counter-productive travel restrictions or by improving domestic educational institutions.

- **Practical experience internships:** Rather than paying for training programmes on specific ICT programming languages – an elusive and ever-shifting target given the varied product requirements and programming language preferences of individual firms – an institutionalised internship programme linking ICT learning institutions to ICT firms would provide support to firms and potential employees alike, potentially bridging the main perceived employee skills gap – that is, in practical experience. From a practical perspective, support could be provided to a centralised hub that manages internships for second and third year students while ensuring interns are financially supported and internships are included in course credits.

One of the major demand-side issues facing the Nepali ICT sector is access to client markets, which are international rather than domestic. This means any policy needs to revolve around improvements in access to international markets, through hard infrastructure as well as reforms to policy governing international commerce.

- **Connectivity and data security:** Increasing the number of connections to the global ICT backbone may increase bandwidth and reduce connection costs, increasing redundancies for connectivity-sensitive ICT firms. The attraction of the only currently operational IT Park can be bolstered through the construction of a data centre meeting global security standards, acting as a catalyst for both local and international firms to set up operations in the area. The IT Park would, however, require prioritisation in terms of communication, transport and energy links.
- **IP law enforcement:** Although current IP laws could benefit from an update to bring them in line with current global best practices, enforcement is a more pressing concern, as weakness in this

regard limits local ICT firm propensity to invest in the development of new products and that of international ICT firms to invest in-country. Enforcement should be focused on commercial practices rather than consumer infringement, with the aim of safeguarding product development and promoting innovation in the ICT sector.

- **Business association support:** Service-producing ICT firms do not have a significant business association that represents their interests. CAN is geared more towards hardware importers and sellers, with less attention paid to service providers. A services-centred ICT business association would enable centralised lobbying action that can push for necessary reforms in the business regulatory environment (i.e. IP and capital account restrictions highlighted above) as well as help assess educational and skill requirements in the sector.
- **Industrial prioritisation:** The inclusion of ICT in the 2016 NTIS goes a long way in terms of signalling its importance as an export sector, but this could be mirrored by including ICT in the 'Special Industries' classification. In theory, ICT firms already receive financial benefits through income tax rebates and tax exemptions if they are located within the country's IT Park, as do firms that employ over 300 people. Moving ICT into the 'Special Industries' classification would open up incentives to smaller ICT firms located elsewhere in the country.

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ANNEX A: LIST OF INTERVIEWED FIRMS

| Sub-sector | Location | Firm name |
|----------------------------------|-----------|------------------|
| Mobile telephony | Kathmandu | Ncell |
| Wireless internet infrastructure | Kathmandu | Everest Link |
| Data input and processing | Kathmandu | CloudFactory |
| Digital animation | Kathmandu | Incessant Rain |
| Software development | Kathmandu | DeerWalk |
| Health market analytics | Kathmandu | Verscend |
| Software development | Kathmandu | Beeta Tek |
| ICT service provision | Kathmandu | Young Innovation |
| Start-up app development | Kathmandu | Gorato Works |
| Software development | Kathmandu | LeapFrog |
| ICT security systems | Kathmandu | LogPoint |