

OFFICIAL DEVELOPMENT ASSISTANCE ‘ODA’ AND HUMAN RESOURCE DEVELOPMENT IN THE CONSTRUCTION INDUSTRY OF A DEVELOPING COUNTRY

Rajendra Niraula ¹, Yoichi Hirota ², and Shunji Kusayanagi ³

¹ Ph.D. Candidate, Infrastructure System Engineering Course, Kochi University of Technology, Kochi, Japan

² Ph.D. Candidate, Infrastructure System Engineering Course, Kochi University of Technology, Kochi, Japan

³ Professor, Infrastructure System Engineering Course, Kochi University of Technology, Kochi, Japan

Correspond to 076024c@gs.kochi-tech.ac.jp

ABSTRACT : Delay, cost overrun and inferior quality in public works are common in Nepal and Cambodia. Almost 90 percent of the civil construction engineers working in the industry were one-degree graduates without appropriate training. The civil engineering education had provided elemental engineering knowledge to the graduates however integrated engineering and management knowledge and skill are essential for efficient infrastructure development. ODA in developing countries had been concentrated in hard infrastructure development without improving the quality of higher education. Integrating ODA to engineering education system would help develop qualified technical manpower and appropriate technology domestically, and improve the efficiency in infrastructure development in developing countries.

Key words : ODA, Human resource, construction industry, engineering education, technology

1. INTRODUCTION

Hard infrastructure development has been occupying the major priority area of many developing countries including Nepal and Cambodia. Despite the large investment including official development assistance (ODA) Nepal and Cambodia still could not offer efficient infrastructure to their citizens. Delays, cost overrun and poor quality are still the characteristics of public works. Lack of in-house qualified human resources and appropriate technology in developing countries resulted poor performance of the construction industry and to depend on foreign expatriates and construction firms. Moreover, the technical manpower development system in these countries was not linked with industrial needs and national development. Universities and

the industry were working independently. Further, ODA was not directed to improve the quality of higher education in many developing countries including Nepal and Cambodia. This paper discusses infrastructure development environments and human resource development systems in Nepal and Cambodia, and suggests an integrated system for infrastructure and human resource development to improve the existing development environments in developing countries.

2. INFRASTRUCTURE DEVELOPMENT ENVIRONMENT

Infrastructure development environments in Nepal and Cambodia were highly fragmented. Various executing

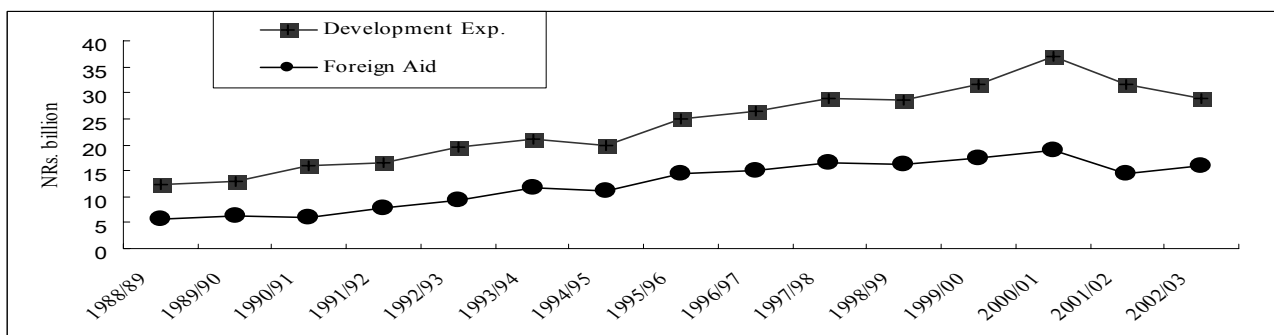


Figure 1. Total development expenditure and foreign aid in Nepal

agencies have been involved in infrastructure development without appropriate coordination. The traditional project delivery system is the domain of public infrastructure development. Like many other developing countries Nepal and Cambodia have been dependent on foreign assistance for economic and social infrastructure development. More than 50 percent of the whole development expenditure in Nepal figure 1 [1] and 75 percent of capital investment in infrastructure in Cambodia had been covered through foreign assistance as shown in the figure 2 [2].

Donors' priority areas in infrastructure financing and implementation had influenced development plan and strategy of developing countries. Development projects are often prepared in haste without sufficient study and long-term plan when donors showed their interest to support. The procurement and implementation policy also varies with donors. Moreover, these countries could not prepare unified national procurement law, regulation and standards for infrastructure development. Donors' different approaches and lack of in-house capacity inhibited developing countries to develop own standards on infrastructure development. For instance, different design and construction codes have been using for infrastructure development in Cambodia which led to inconsistency in design and quality control. The Australian, Russian, French, British and the US codes have been following while implementing a project financed by the respective donors.

Contractors in Nepal and Cambodia have been classified in to four categories namely 'A', 'B', 'C' and 'D' where 'A' being the highest and 'D' is the lowest class. There were 176 'A', 315 'B', 1500 'C' and about 10000 'D' class contractors in Nepal [3]. The classification is based on the financial status, technical capacity and experiences. There were no specialized contractors development strategies, and monitoring system to evaluate the performance of contractors except a mere renewal of the license. The construction industry in these countries is still remained in a tiny executor position and is functioning as traders only. The industry still depends on the traditional skills and technology. Domination of foreign firms had been increased with the inflow of foreign assistance. Delay and cost overrun had been the major problems in infrastructure development. Irrigation and road development trend in Nepal showed that only a several projects had been completed within planned

resources [4]. The major reasons reported for delay and variations, and investigated through survey, interviews and field visits in this study were the scanty financial resources, insufficient skilled workers and lack of construction and project management knowledge and skills in construction engineers/technicians. In effect, domestic construction industry in these countries did not have enough resources and opportunities to enhance the capacity for efficient infrastructure development.

3. HUMAN RESOURCE AND THE CONSTRUCTION INDUSTRY

It was estimated that as many as 20 percent of the whole construction firms in Nepal had been managed by engineers and others are still managed as the traditional family business. Human resource involved in the industry can be classified in to unskilled and skilled workers, technicians and engineers. Normally, out of every seven construction engineers four are civil and one each may be from mechanical, electrical and computer [5]. The construction industry lacks enough number of skilled technical manpower. Authors' interviews with the construction industry professional revealed that sufficient number of technical manpower was not available even in the highest class of contractors in Nepal and Cambodia. Further, it was found that 4,690 engineers were registered (as of 2002) at the Nepal engineering council to deliver professional service in Nepal. Among the total 2,759 civil engineers almost 90 percent were one-degree graduates [6]. However, there was no necessity of registration to deliver professional service in Cambodia, and it was estimated that less than 500 civil engineers with as many as 90 percent undergraduates are working in the Cambodian construction industry.

There was no appropriate training and continuing education system existed in the industry. Neither the industry nor governments provided regular skills enhancement training for the technical manpower. The latest labor force survey in Nepal revealed that more than 80 percent of the whole labor force had education up to the primary level with as much as 60 percent never attended any education/training [7]. Similarly, 70 percent of the labor force in Cambodia had gone up to primary level with as many as 19 percent never attended [8].

Moreover, there were no evident linkages industry and

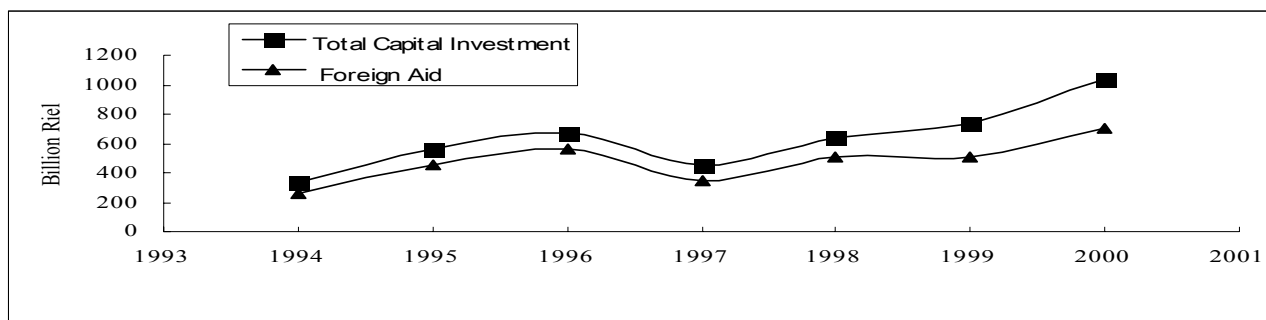


Figure 2. Total capital investment in infrastructure and foreign aid in Cambodia

universities to feed the industrial needs and development to education system. Professional practitioners, who could feed the industrial needs to education, were not involved in educational activities like teaching. On the other hand, university teachers did not have enough professional practice in the industry. In addition, employers in Nepal and Cambodia could not provide appropriate working environments for the employees who had attained the advanced degree, and had better knowledge and skills. Further, local private industry did not hold the capacity to deploy them. Such environments had made advanced degree holder people frustrated, low productive and ultimately emigrate from the country.

Authors' survey, interviews with industry professionals (consultants, contractors and clients) and university teachers in Nepal and Cambodia revealed that the fresh graduates in the civil engineering were poor at construction and project management. The civil engineering education in Nepal and Cambodia had incorporated more on elemental design of infrastructure and less in applied area. For instance, less than 6 and 9 percent of the whole civil engineering curricula in Nepal and Cambodia respectively incorporates the professional practice area which included a little on construction and project management in contrast to the views of the industry professionals who claimed that the construction and project management should share at least 10 percent of the whole curricula. It is to be noted that Cambodia still offers 5-year undergraduate program in engineering. Further, theoretical teaching was the domain of education, and the system could not offer opportunities to acquire practical skills from the university education. The curricula revision had been done only once in every 10 years. However, local industry professionals were not involved in the design of curricula. The existing system has made students to regurgitate the textbooks only instead of making them creative to search, create and use the engineering knowledge in practice. It was found that about 50 percent of faculty members in the department of civil engineering of a typical college from Cambodia and Nepal were one-degree graduates.

Moreover, government's expenditures on education in Nepal and Cambodia were very low compared to other developing countries. Less than 2.5 and 1.5 percent of GDP in Nepal and Cambodia respectively had been expending on education (figure 3) [9]. Further, the higher education was

not the central focus of the governments' policy for education. Around 10 percent of the government's whole educational expenditure had been allocated for higher education in Nepal. As a result, universities had been deprived from the financial resources to improve the quality of education, and support research and development activities. In addition, there were no evident support from the industry to activate research and development in the universities, and no appropriate training facilities had been established for continuing professional education to enhance the capacity of industry professionals.

4. OFFICIAL DEVELOPMENT ASSISTANCE (ODA)

The historical beginnings of official development assistance were the development activities of the colonial powers in their overseas territories, the institutions and programs for economic co-operation created under United Nations auspices after the Second World War. In 1950, the Commonwealth initiated the Colombo Plan ("Council for Technical Co-operation in South and South-East Asia") with 7 founding member: Australia, Canada, New Zealand and the UK as donors. The US and Japan joined the plan in 1951 and 1954 respectively. In 1955, Japan started reparation payments to Burma, the Philippines and Viet Nam. Development assistance group (DAG) was formed in 1960 as a forum for consultations among aid donors on assistances to less-developed countries. Further, the organization for European Economic Co-operation (OEEC) established in 1948 was reconstituted as Organization for Economic Co-operation and Development (OECD) in December 1960. Many countries started to establish their aid cooperation agencies in 1961 like Kuwait fund for Arab Economic development, USAID, Japan Overseas Economic Cooperation fund, SIDA and so on. However Official Development Assistance (ODA) concept was adopted by Development Assistance Committee (DAC) established in 1961 in OECD separating ODA from "Other Official Flows" (OOF) and identifying as ODA those official transactions which were made with the main objective of promoting the economic and social development of developing countries and the financial terms of which were "intended to be concessional in character". In other words, ODA consists of flows to developing countries and multilateral institutions provided by official agencies, including state and local governments, or by their executive agencies, each transaction of which meets the following test:

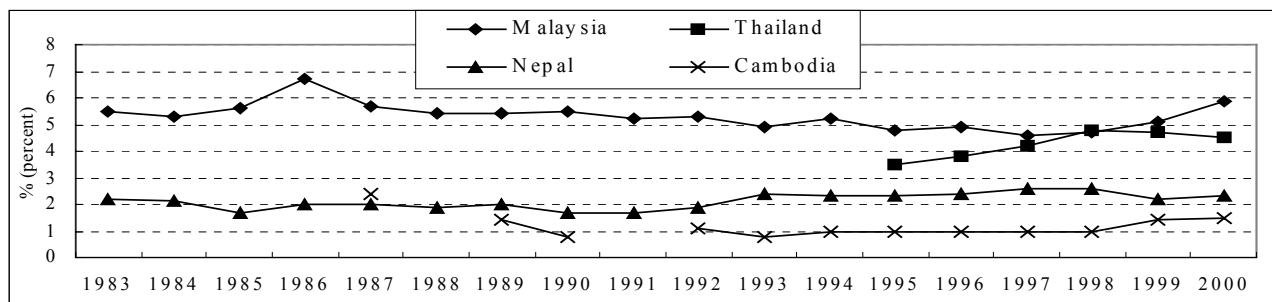


Figure 3. Government's expenditure on education as percentage of GDP

a) it is administered with the promotion of the economic development and welfare of developing countries as its main objective, and b) it is concessional in character and contains a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent) [10].

ODA since its adoption has become a major resource for socio-economic development of developing countries. Different donors have been involved in different areas of socio-economic development in developing countries. Among others the USA and Japan are the largest donors to developing countries. However, this paper is focused on Japan's ODA, as it occupies the largest amount of assistance in some Asian and African countries including Nepal and Cambodia.

Japan's official development assistance (ODA) is classified into three types: i) bilateral grants, ii) bilateral loans, and iii) financial subscriptions and contributions to international organizations. Bilateral grants include technical cooperation that transfers technology to developing countries and grant aid that provides funds with no obligation for repayment. Bilateral loans are the loans that provide the funds needed for development under long-term and low interest conditions. Subscriptions and contributions for multilateral aid are indirect methods of extending aid by channeling funds through international organizations.

Moreover, Japan's ODA to the least developed countries (LDCs) contains considerable amount of grants aid inclusive of technical cooperation as shown in figure 4 [11]. Like many other developing countries, Nepal and Cambodia have been very much benefited from Japan's ODA and Japan is the largest donor to these countries. However, the main activities of Japan's ODA seemed to be hard infrastructure development in developing countries. For instance, all grant aids excluding technical cooperation under Japan's ODA in 1994-2001 to Nepal was used in hard infrastructure development in which as much as 3 percent was utilized in educational infrastructure related activities-- materials and equipment for the construction of primary schools. Similarly, less than 1 percent of the grant aids to Cambodia in the same period was used in human resource development scholarship

[12]. Further, all grant aid projects had been executed by donor's own consultants and contractors. Human resource development and technology transfer were not the major elements in grant aid projects. Acceptance of trainees mostly from executing agencies of developing countries and dispatch of the Japanese experts in technical cooperation scheme were the only means for human resource development program in ODA. However, Japan's ODA had not been utilized to improve the quality of higher education in these countries.

5. DISCUSSION

The industry professionals in Nepal and Cambodia claimed, as investigated through survey and interviews, that knowledge and skills on construction and project management prevails in the construction in contrast to the engineering knowledge in planning and design stage of a facility. The actual human capital for infrastructure development in these countries consists of low productive human resources. The construction industry has deployed about 90 percent one-degree civil engineers who lack required practical knowledge and skills as demanded by the industry. This implied that the actual need of the industry had not been fed through the existing education system. There was a need to strengthen the civil engineering education to incorporate professional practice area in order to make industry oriented university education.

The skilled human resource development environment in Nepal and Cambodia were very dismal. On the other hand these countries could not provide appropriate working environments for the people who had attained higher education from the country and abroad. In effect, these countries could not create appropriate environments for qualified human resources and technology development which were necessary for the sustainable development of a country. Governments' efforts to improve the quality of technical manpower had been insufficient. Universities were lack of enough educational infrastructures. Industry professionals complained that graduates could not acquire practical skills from university education, but professional practitioners did not participate in education. Both universities and industry did not have evident research and

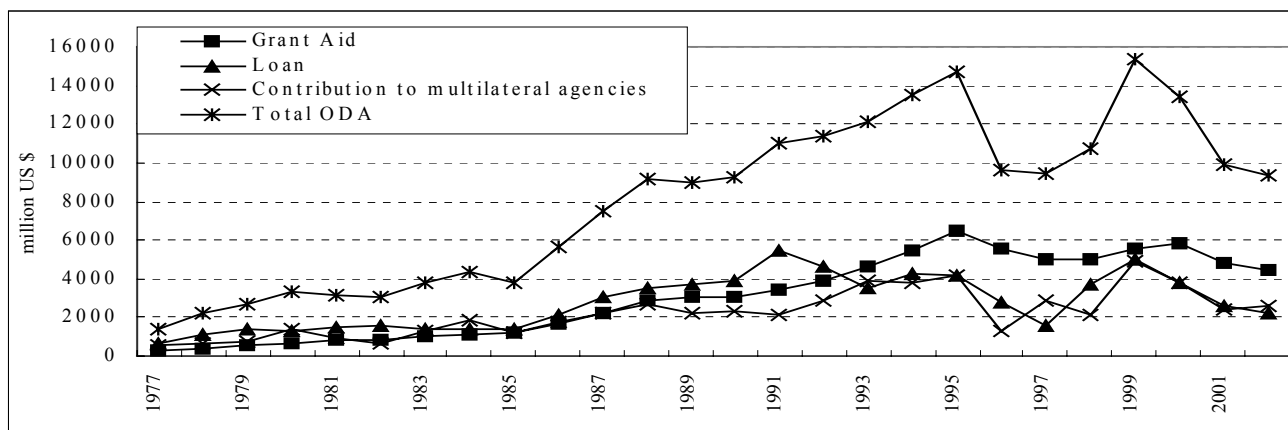


Figure 4. Japan's ODA (1977-2002)

development activities. Further, the clients were busy in hard infrastructure development without proper attention on human resource and technology development. Such fragmented human resource, technology and hard infrastructure development environment would further inhibit the development of developing countries.

In order to improve the development environments in poor developing countries including Nepal and Cambodia, education, research and technology development should be integrated in the process of infrastructure development.

6. INTEGRATED HUMAN RESOURCE AND INFRASTRUCTURE DEVELOPMENT

Integrated human resource and infrastructure development system developed in this study incorporates research and development functions of university and industry in cooperation with lending agencies and university/industry from the developed world to produce appropriate human resource and technology required for development projects. The proposed system is based on the Nepalese and Cambodian engineering education and infrastructure development system. This system integrates universities for qualified human resource development and research; industry for materializing the human resource and research product in practice; and ODA for providing financial as well as technical assistances to develop and internalize the technologies.

Like the Japanese applied education system in Meiji era, this system provides enough opportunities to acquire practical skills from university education, and help activate research and development functions of university and industry to satisfy the demands for human resources and technologies. This system includes universities collaboration to enable the local university able to acquire enough capacity to cope with the contemporary development and to

develop appropriate technology for the domestic industry. A non-profit making entity established in university to separate it from the traditional bureaucracy would be suitable for research and technology development. Technology diffusion would also be more efficient through such entity. The integrated system is shown in figure 5.

A seed technology transferred from the developed world through university collaboration would be realized in practice through the research and development activities of universities at the Center of Excellence and Research (COE&R) in developing countries. Further technology development and internalization would be done in cooperation with lending agencies and local industry through ODA infrastructure development project. This system would also enable university to deliver industry oriented education and the industry to provide continuing education for professional development.

6.1 Universities Collaboration

Existing universities collaborations in developing countries were limited to exchange of students/faculties and seminars/workshops, but not directed to address the needs of industries. This study has developed a unique system of universities collaboration to address the needs of local industries and enable universities to collaborate with industries. The system comprised of investigation of need of an industry followed by capacity building of universities relevant to the industrial needs in developing countries. A collaboration with appropriate universities from the developed world would enable local universities acquire hands on knowledge to contribute for the industrial needs.

6.2 A Case of Cambodia

A questionnaire survey and interviews with clients' engineers, consultants, contractors and university teachers followed by field visit were conducted in Cambodia.

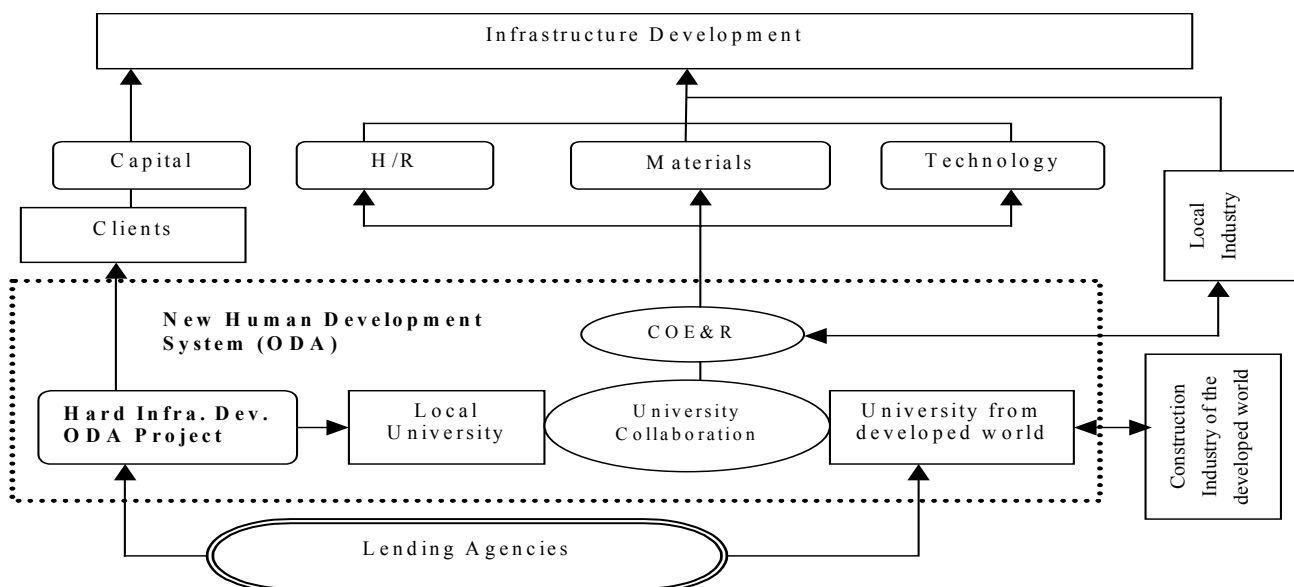


Figure 5. Integrated Human Resource and Infrastructure Development under ODA

Altogether 11 people (clients' engineers-3, consultants-2, contractors-3 and university teachers-3) participated in the survey and interviews. It was investigated that the Cambodian construction industry required to follow various design standards due to lack of own national standards for planning, design and construction of infrastructure. The Australian, Russian, French, British, Japanese and the US codes have been following while implementing a project financed by the respective donors. This has made engineers to follow different process and specifications which result in inconsistency in design and construction, and inefficiency in project delivery. Further, the universities could not realize the needs of the construction industry such as design codes, construction management and so forth. The civil engineering university did not incorporate construction management in the civil engineering education as a result the civil engineers were not familiar with the knowledge area and skills for construction project management. Universities and the construction industry in Cambodia did not have enough number of qualified human resources in construction materials and management to deal with the needs of the industry. The institute of Cambodia, the most equipped and oldest public university in Cambodia, employed total 15 faculty members in the civil engineering, 8 of them hold undergraduate degree and other 7 were masters. None of them were specialized in the construction project management. In addition, the construction industry and universities did not have research facilities.

In order to address the problems of the Cambodian construction industry and universities, Kochi University of Technology (KUT) has established collaboration with Institute of Technology of Cambodia (ITC) to enhance the capacity of ITC in construction materials and management. The primary objective of the collaboration was to enable ITC to be able to contribute for the Cambodian construction industry in construction materials especially in concrete and construction management. Two faculties members from ITC were invited for higher studies in concrete and construction management at KUT. A successful test production of self-compacting concrete from the local materials was demonstrated in Cambodia in June 2004. The collaboration is still continued and will further be extended to address other problems of the industry. Research and development work with the Cambodian construction industry will be started after acquiring enough capacity in the identified area.

A Center of Excellence and Research (COE&R), non-profit making entity, proposed in this study was agreed to establish at ITC with cooperation from KUT in order to activate research and development activities in Cambodia. The center would be an interface between the Cambodian construction industry and universities to bridge the industrial activities and education, and provide academia and practitioners opportunities to work together in Cambodia. This system would help the Cambodian construction industry develop appropriate human resource and technology for infrastructure development. The center would also enable the Cambodian universities to provide their organized professional services and research products

to address the industrial needs. Further the center would provide highly educated people opportunities in advanced research and development which could improve the environment for brain-gain in Cambodia.

7. CONCLUSIONS

Infrastructure development and human resources in the Nepalese and Cambodian construction industry are discussed here. Human resource development should be linked with industrial needs and development. Industry oriented universities collaboration from the developed world in developing countries integrated with infrastructure development would enhance the capacity of local universities in human resource and technology development to contribute to the construction industrial problems.

Since, especially, low-income developing countries could not support higher education and research from their own resources, ODA should integrate human resource and technology development along with hard/soft infrastructure development in developing countries. Research and development in cooperation with lending agencies (donors), universities from the developed world and the local industry at the Center of Excellence and Research in developing countries would help develop appropriate technology to satisfy the needs of the local industry. Such integrated cooperation would foster technology transfer, absorption and internalization in developing countries. Further, involvement of universities in research and infrastructure development activities offer faculties and students opportunities to acquire hands on knowledge from the real work of the industry which would make graduates ready-to-use and education industry-oriented. This system would also create favorable environments for brain-gain in developing countries. However, in-house as well as external, especially donors' consensus should be built to invest in enabling the proposed system establish and implement in developing countries.

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