

Status of the university-productive sector relationship in Central America

Utz Dornberger¹, Marco R. Estrada-Muy²,
Martina Pletsch-Betancourt³ & J. Alfredo Suvelza G.⁴

Aims and objectives of the study

The study was conducted with the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), as part of the University-Industry Programme for Sustainable Development (PUEDES), and had the objective of ascertaining the situation of the relationship between the private sector and public and private universities. The critical analysis of experiences in Central America and their contribution to the pertinence of higher education and to sustainable development in the region were concepts that shaped both the development and focus of the study as well as its findings and proposed solutions.

In the current scenario of global economic flows, excellent higher education institutions and their relationship with the productive sector has a very strong impact on competitiveness and innovative potential, and hence, on the economic growth potential of a region. Examples from developed countries show that the establishment of strong cooperation between public or private universities and companies delivers great benefits in terms of quality and level of research, development and innovation, efficient and effective technology transfer, the establishment of demand-driven educational

¹Innoways GmbH, Käthe-Kollwitz Straße 60, 04109 Leipzig, Germany; utz@innoways.de

²Facultad de Agronomía, Subarea Manejo y Mejoramiento de Plantas, Universidad de San Carlos de Guatemala, Ciudad Universitaria, zona 12, Guatemala, Centroamérica; macomuy@gmail.com

³ProFuturas, Am Salzbach 3, 37215 Witzzenhausen, Germany; pletsch-betancourt@gmx.net

⁴Innoways GmbH, Käthe-Kollwitz Straße 60, 04109 Leipzig, Germany; suvelza@innoways.de

offers, the ability to integrate the workforce into the labour market and the achievement of adequate funding for related university activities.

Objectives

The study aimed, firstly, to identify and determine the significance and impact of different types of existing relationships and the main problems that hinder an effective relationship between academia and the productive sector. It also sought to identify and analyse the positive impacts which linking efforts have had, both on academia and also on the productive sector, highlighting examples of good practices in Central America. Naturally, it was necessary to propose recommendations to strengthen the relationship, by suggesting specific actions and practices that should be adopted by both universities and productive sector.

Methodology

The study was conducted between September and December 2009, gathering data from 15 of the 20 public universities as well as 12 of the 50 private universities in the region, including Belize and the Dominican Republic. In addition, meetings were held with focus groups in different countries of the region with the participation of managers responsible for the relationship between universities and the productive sector. Additionally, 11 entrepreneurs or representatives of business organisations provided valuable information. Finally, during a PUEDES Programme Expert Meeting held in Guatemala from 16 to 18 November 2009, academic coordinators and their business partners provided information on activities and lessons learned from seven pilot projects.

Actors and forms of university-productive sector linking and cooperation

The cooperation partners are distributed across a very broad spectrum. The scale of the firms and the size of the sector play a role, just as the nature of the sector determines whether firms and private players are service providers, producers of goods or both. The extent of technical development or the degree of use of advanced technologies also determines the possibilities and interests

of linkage and cooperation, as does their character or presence at the national, regional, multinational or transnational level, and, of course, their attitude towards society and the environment.

Although the opportunities for cooperation are virtually unlimited, there are four typical forms of cooperation between universities and the private sector.

Development of scientific infrastructure	Cooperation and funding for research	Support of undergraduate and postgraduate students	Intervention in studies and perfecting
<ul style="list-style-type: none"> ▪ Sponsorship of teaching positions ▪ Recruitment of specialised labour ▪ Co-financing of physical infrastructure and equipment ▪ Support of alumni associations and events ▪ Donations to the university 	<ul style="list-style-type: none"> ▪ Shared public-private partnership resource base ▪ Joint research ▪ Joint foundation of institutes and centres ▪ Staff exchange ▪ Donations for scientific conferences ▪ Contribution to science awards ▪ Support the establishment of professional associations ▪ Contract research and consulting services 	<ul style="list-style-type: none"> ▪ Loans or grants for study ▪ Student internships in businesses and private sector organisations ▪ Integration programmes for interns ▪ Apprenticeship programmes ▪ Development of jobs within firms ▪ Awards for the best students 	<ul style="list-style-type: none"> ▪ Creating dual programmes of study with practical components ▪ Contribution to curriculum design ▪ Joint creation of careers to improve future employment opportunities ▪ Participation in the university council and accrediting agencies ▪ Provision of instructors and trainers from companies ▪ Excursions to companies and holding of workshops

► Typical areas of cooperation between academia and the private sector.

When speaking of liaison and cooperation, it is necessary to note that private sector interests are generally subject to a principle of economic rationality. Moreover, the establishment of cooperative relations based on networking and building relationships of mutual dependence pose difficulties in defining the roles and responsibilities; for example, companies decide to act in the academic field and universities are interested in moving into entrepreneurial activities; or universities are interested in publishing the results of joint research activities, while cooperating companies are interested in

maintaining the confidentiality of the findings to protect and exploit these in the market in a sustainable manner. For reasons such as these, the definition of institutional policies on intellectual property rights is as important as the establishment of sustainable agreements which enable mutual benefit.

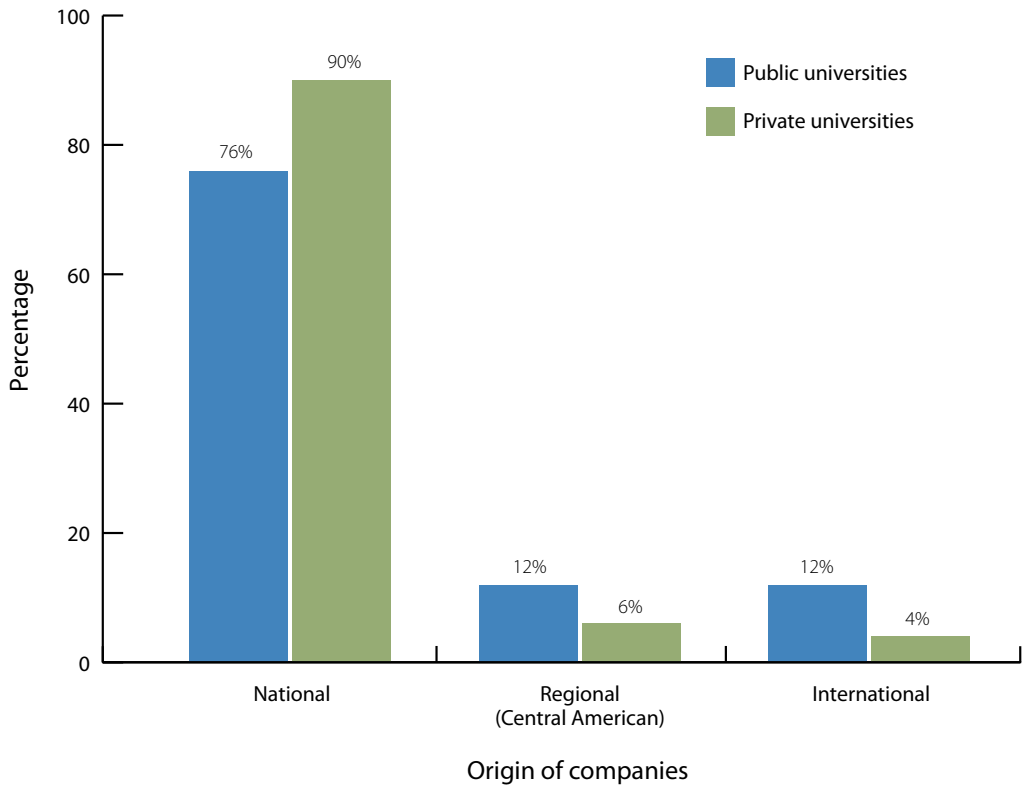
Main findings of the study

The study revealed great differences among the Central American universities regarding the development of their capacities, resources and practices in creating links with the private sector. However, a general feature of the study showed that many universities do not have information on their own management practices of creating linkages, and downplay the issue in many cases. A brief summary of relevant data is presented below.

Only 30% of universities have structured interface units in place. Within this group, only half explained in detail the structure, budget, staffing, functions and the strategic direction of fairly developed units with considerable resources and authority. With respect to current management practices of linking, only 54% of the universities claimed to have a definite policy for cooperation with the private sector. Regarding the policy on intellectual property rights, less than half the universities in the survey (44%) showed a clear related strategy.

In turn, 67% of universities reported not having been recently active in monitoring the private sector and its demands and potential linkage requirements, revealing weaknesses in the information and dialogue with the private sector. Although there are some successful examples, the linkage of businesses and research institutes and international development is still in its infancy and could limit the opportunities for transferring knowledge and technology, the adaptation of successful linkage models and the access state of the art scientific resources.

Regarding the origin of the companies with which universities are involved, public universities show a greater percentage of linkages with companies from Central America and outside the region. The following chart shows the average percentages of the origin of the companies with which the universities are linked.



► Percentage of linked companies according to origin.

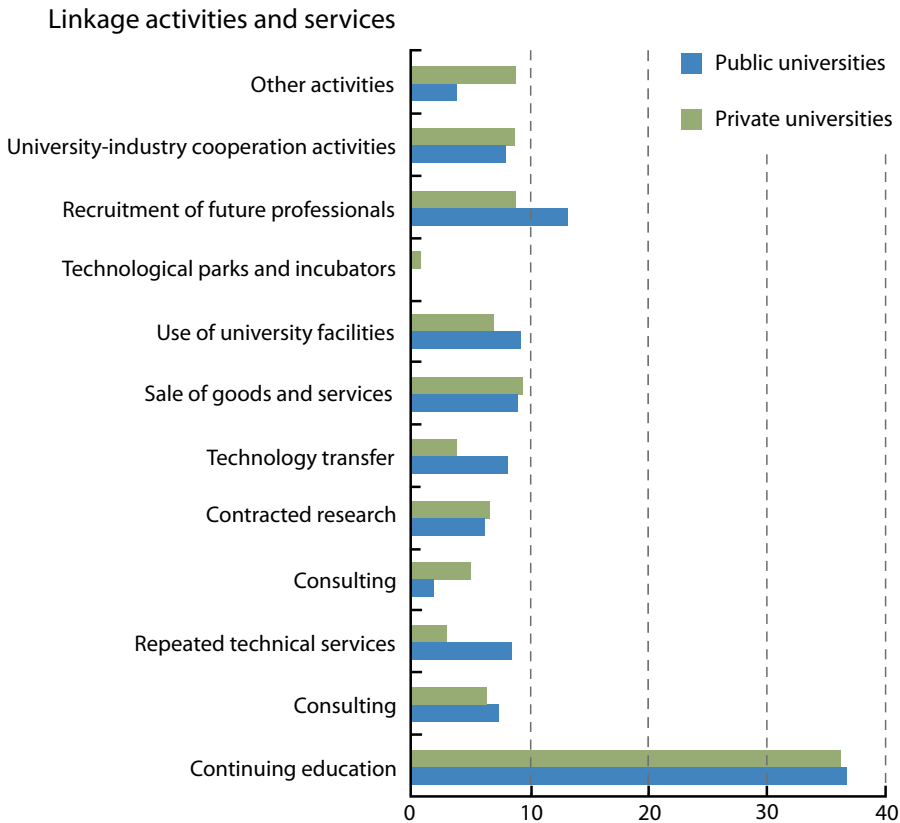
The universities feel that the area with the greatest potential for linkage is technology and see little potential in basic sciences.

Currently, the most important linkage and service activities are in the area of continuing education, suggesting that the vocation of academia in the region seems to lean more towards the role of teaching and learning than towards that of research and expansion. For example, technology transfer, joint research activities and contract research represented only between 6% and 7%.

Also noticeable is the absence of the public university and low involvement of private investment in the area of technology parks and business incubation.

Within the demand generated by private companies, the sectors that require the services of universities in general are agriculture, education, information technology, trade, food, health, tourism and chemicals.

Within the demand generated by private companies, the sectors that require the services of universities in general are agriculture, education, food, chemicals and health. The following chart shows the average percentages of public and private universities attributed to the different private sectors.

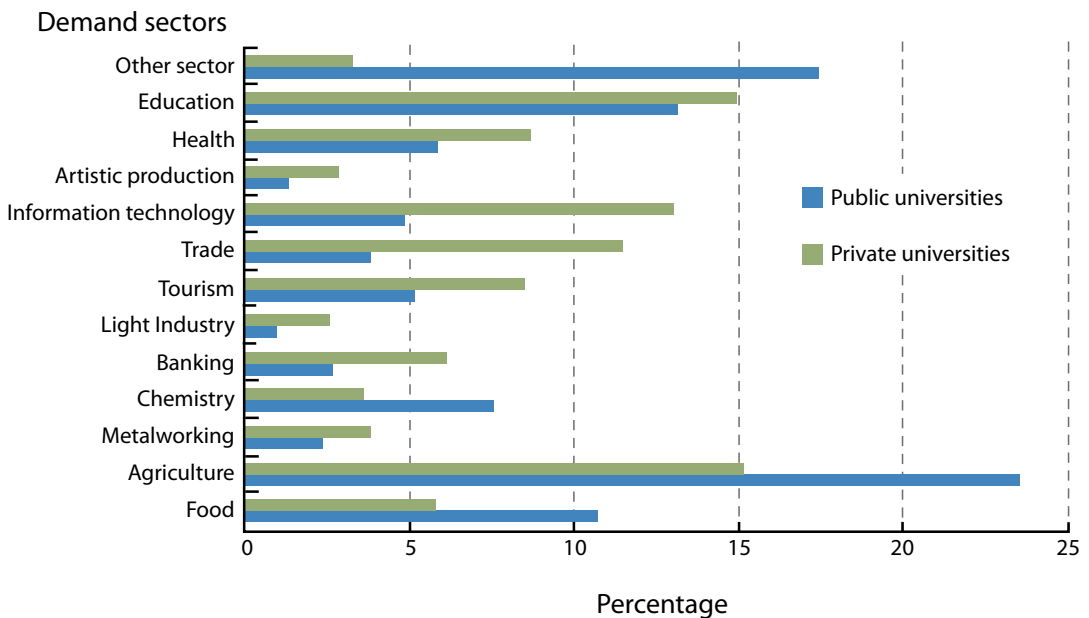


► Distribution (as a percentage) of linkage activities by area.

In the case of private universities, they find their greatest demand in the sectors of agriculture, education, information technology, trade, health and tourism in that order of importance.

Private companies included in the study attributed low relevance to the practice of exchange of personnel, while student research and practices catch their attention. Firms cite a range of needs from technology transfer, research, laboratories, equipment and improved management for certification, project design, technical assistance in production and marketing, production and economic studies, foreign trade, management of innovation in industrial processes, process safety training, implementation of effective management and laboratory analysis of products in development.

Among the main problems hindering the effective linkage of the productive sector companies and universities, identified by the business sector participants, the following are the most important: a) very bureaucratic practices in the public university which can prevent joint programmes, b) no state support, c) concern of many people at universities of losing the university's sense of academic and research. Among the positive impacts on the business or company highlighted by entrepreneurs are: a) use - by the company - of university infrastructure and equipment for research,



- Origin of demand generated by private business, according to sector (percentage).

training and development, b) highly qualified student staff can be used very economically, c) synergy which facilitates access to national and international resources, d) skilled and competitive human resources.

Academics and business people who worked in the focus groups agreed that the main obstacles to effective linkage are related to institutional policies, funding, mechanisms for consultation and the lack of interface units.

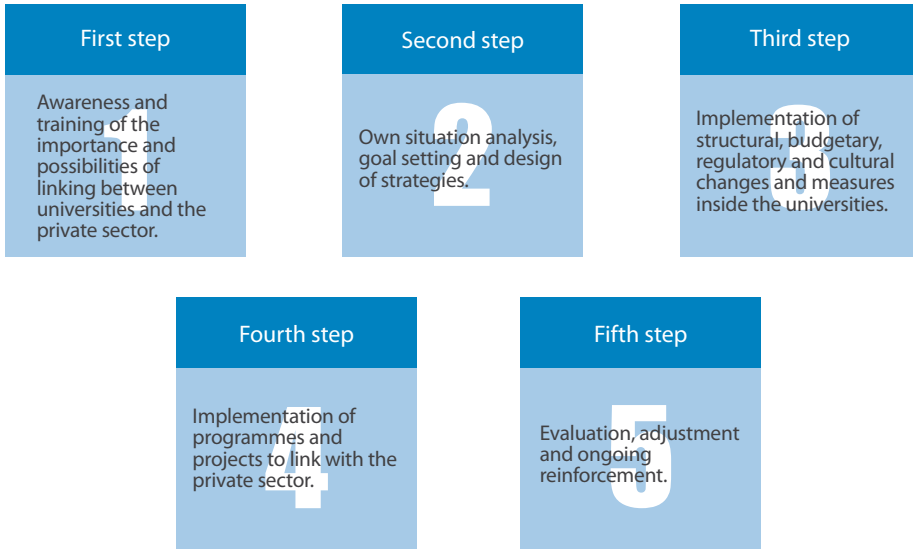
Proposed action and recommendations for change

The study does not end with the simple diagnosis of the situation. Given the results, the proposed change recommends concrete actions for the universities and the private sector. There is a very large gap between the universities in which the concepts of linkage are known and clearly understood and the ones in which this concept is still not clearly understood. The recommendations of this study start with a suggestion to implement a process that includes a sequence of 5 steps to improve conditions and practices in different fields related to linkages.

Since change and development of capacity building are not short-term processes and require feedback to be adjusted, some activities must be repeated periodically, while others are ongoing. The universities will have to



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► *Process of developing skills and resources for linking.*

make greater or lesser efforts at every stage of the process in accordance with the degree of development they have reached in their strategies, management practices and structures for linking.

■ **Step 1: Awareness and training**

It will be necessary to raise awareness among the legislative, administrative, teaching and scientific bodies of the universities and to disseminate the fundamental concepts of linkage and cooperation with the private sector and its importance to the economy and society. Training and awareness workshops are an effective means in this field.

■ **Step 2: Diagnosis, objectives and design of strategies**

Secondly, the stakeholders should form a basis for making decisions and changes in the future. Universities should initiate projects structured to gather useful information that enables them to determine and analyse the

current situation based on the well-classified information about budgets, structure, human resources and their qualification, indicators of equipment and facilities, available technology, among others. Depending of the scope of the university, a dialogue with the private sector represented by chambers and industry associations, economic analysts, experts and development and cooperation agencies should be initiated. The dialogue should clarify:

- ▶ the state of the development of strategic economic sectors at present in terms of growth and future potential;
- ▶ the needs and shortcomings of the sectors in terms of labour, technology and knowledge;
- ▶ the possibilities and contributions of partners and the determination of the strategic areas of work.

Of course, it is important to prioritise sectors as the unnecessary spread of resources and efforts often negate the impact of concerted action for development.

■ Step 3: Implementation of changes and measures

The structural weaknesses and limitations are countered by profound and planned changes. It is essential to adapt the organisational culture itself, which may limit the implementation of these changes.

The interface units must be dedicated to the design, management and monitoring of linkage activities in a planned and systematic way. The unit should have sufficient resources and authority to coordinate and link the activities of other functional units such as research, careers and institutes of the university. Suitable professionals who are qualified and trained in cooperation management, research and development in cooperation with the private sector will be required. Strong relationships with networks of strategic economic sectors are essential here. Of course, the unit should have financial resources, infrastructure, connectivity and adequate and sufficient information to carry out its work effectively and efficiently. Among the factors critical to the success of interface units is sufficient authority, outward linkages and the adequacy of human resources.

It is essential that these linkages and intellectual property rights policies are defined to ensure successful actions, as the activities of cooperation are most complicated when the link is closer and begins to generate valuable results. Policymakers and executives of the university must participate in the definition

of these policies, taking information and advice of professors and scientists, using the results of the second stage as a base, and seeking expert advice.

■ Step 4: Linkage projects

The results suggest that the divergence of objectives, the insufficient dialogue and the limited ability to see the mutual benefits are factors which hold both sectors in a dormant state without taking purposeful action. The different forms of liaison and cooperation open up possibilities for contribution, be it symmetrical or asymmetrical, but always with benefits for both parties.

One possibility is the promotion of enterprises, encouraging the students, scientists, and their trainees and assistants working on projects and at university centres to start and drive their own business. Business incubators and technology parks normally focus on areas where a university generates and has more knowledge, though where the required investment could be high.

It is very important that the private sector starts to offer services, for which the interface unit should facilitate the design, organisation and communication of the supply of private market-oriented services. Structures involved in research and training such as research centres and laboratories, which can generate value from their processes, must be included in this schema. The specialised professionals of the university have the possibility to form teams which provide highly specialised consulting services for process management, the application of technologies, improvement or implementation of production processes and design strategies.

The formation of strategic alliances with the private sector for the creation of new units for research, development and provision of services is another recommended action. These partnerships must have the agility of an independent structure and be able to adapt to the dynamics of the market,

Academics and entrepreneurs
of Panamá.



looking for high-demand segments, areas where there is a high degree of specialisation or specialised programmes that cater to defined segments of the private market.

The interface unit should also enable the different areas of the university to participate and cooperate in organising events with the private sector to remain on the scene and monitor the state of demand and opportunities. The organisation of conferences, dialogues, meetings and fairs often provide useful information to the interface units. To relaunch the initiatives and commitments in both sectors, linkage workshops contribute to deepen their own commitment and also prompt the institutions of promotion, development and cooperation to assume their role in promoting linkages. The linkage workshops seek to intensify the links, create areas of dialogue and matching, to increase the competitiveness of local higher education institutions in the field of research, development and innovation and to facilitate the positioning of higher education institutions as service providers.

The exchange of staff enables companies to incorporate highly qualified human resources and expertise in the form of doctoral students, scientists and professors from the university. And vice-versa, highly experienced and specialised staff provided by the companies makes it possible to bring closer the processes of generation, management and application of knowledge, maintaining a realistic link between the market and academia.

The joint research and development projects should be oriented to the market in order to reduce risks. As these generate benefits in the medium and long term, it is essential that the policies on intellectual property rights and linkages in general are clear.

In areas of science-economy projects, prizes are awarded for the best initiatives that facilitate the match of science and the economy, i.e. those which seek to improve technology transfer schemes between universities and businesses or to integrate the potential of universities in the innovation processes of firms.

■ Step 5: Evaluation, adjustment and reinforcement

The assessment completes the process of development of capabilities and resources. This assessment is based on the constant monitoring of the performance of the strategy and linkage projects from the standpoint of their efficiency and results. The interface units should make recommendations for the adjustment of the strategy and activities. The resulting process of

reinforcement takes place between the university and its cooperation partners from the private sector. It is necessary to monitor the details of each project and to encourage open dialogue to evaluate the impact of the different initiatives implemented.

In this context, the creation of a control mechanism or supervisory board which consists of representatives of universities and the private sector is also recommended. This would enable regular monitoring of the linkage actions.

Perspectives

Thus, the study shows the path towards the development of capabilities and the implementation of changes intended to strengthen and improve the effectiveness of the practices related to linkages between universities and the private sector. The efforts needed are not only the task of universities and the private sector. The political will and commitment of the involved players must back the initiatives, and these, in turn, must show continuity and sustainability within a coherent institutional policy. The study suggests that there is great potential for a larger contribution of the university-productive sector linkage to sustainable development in the region.