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A model and system for an integrated analysis of the iterative life cycle of university-industry partnerships

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Abstract

The Asian countries (Sri Lanka, Thailand, Bangladesh) in the ASCENT project have an unequally spread out and restricted RTD ability. An interactive and cooperative university - industry partnership can increase the quality of life and reduce the risk of disaster. Here the fields where universities consider the involvement of industry are recognized (e.g., fundamental and applied research, development, production life cycle and such). There is a recognized need for the private sector to engage the research community in the context of disaster resilience research to tackle disaster risk. The definition of "industry" in this research is deliberately vague to allow exploration of what useful collaborations "industries" can develop with universities for disaster management research (here collaborations mean different life cycle interactions). There is the need for an integrated multiple criteria decision analysis to mitigate the effects of disaster on the built environment at three levels: the micro (research and innovation performance, transfer and absorptive capacity, technology development), meso (institutional arrangements, communication network, local and indigenous rules) and macro (supply and demand, regulations, financing, taxes, culture, traditions, market, climate, political, demographic, technology) levels. Disaster management involves numerous aspects for consideration in addition to making economic, political and legal/regulatory decisions. These must include social, cultural, ethical, psychological, educational, environmental, provisional, technological, technical, organizational and managerial aspects. This research produced a model and a system for integrated analysis of the iterative life cycle of university-industry partnerships. The model and the system make it possible to perform multi-variant design and multiple criteria assessment of alternative university-industry partnership life cycles, calculate their market and investment value,

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conduct online negotiations, and select options that offer the best efficiency.

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Keywords: University-industry partnerships; Multiple criteria modeling; Micro, meso and macro environments; Societal resilience to disasters; Alternatives

1. Introduction

Many scientists and practitioners analysed university-industry partnership models [1-11]. [3] suggest that university-industry linkages (UILs) in Mozambique weak and informal, and that academics engage with companies mainly through UIL-innovation model and exchange of embodied knowledge, particularly ideas in informal meetings, internship/employment for students, consultancies for academics, rather than through disembodied knowledge, such as patents and technology prototypes, embedded in R&D and STI-innovation model. In [4] opinion, the industrial partners do not necessarily have all the competencies to perform each operation in-house for the development of competitive products. [7] present a review of various models that focus on collaboration management, the formation of knowledge integration community, and research collaboration activities between university and industry. [2] adopt the Actor-Partner Interdependence Model (APIM) for the analysis of data on 98 matched pairs of recent UI research collaborations and find that relationship maturity moderates the associations of reciprocal communication and decision process similarity with trust. Drawing on the contemporary turn to discursive practices [6] examine how the organizing practices of industry, university and government facilitate (or impede) developing countries transition to a hybrid triple helix model of innovation. Placing emphasis on the everyday situated practices of institutional agents, their interactions, and collaborative relationships, [6] identified three domains of practices (advanced research capabilities and external partnerships, the quantification of scientific knowledge and outputs, and collective entrepreneurship) that constitutively facilitate (or impede) partnership and in turn the successful transition to a hybrid triple helix model. The open innovation model suggests that firms should combine external and internal ideas and technologies as effective pathways to market when advancing and commercializing technologies [12]. Technology Transfer Offices (TTOs) are the main institutions responsible for the establishment of university–industry partnerships. R&D contracts exemplify the indirect mechanisms through which enterprises and universities collaborate on a win–win basis [5]. [5] study addresses organizational and institutional aspects that act as drivers for the establishment of successful university–industry partnerships (regression models, etc.).

The models mentioned above, along with other models [13-21], looked at the life cycle of university-industry partnerships (UIPLF) and their components from various perspectives. [13] analysed the evolution of university industry linkage phases (pre-linkage that leads to an agreement to work together, establishment that leads to a contract, engagement that leads to the delivery of a project, advancement that leads to an ongoing partnership and word of mouth, and the latent phase that means potential future cooperation should a suitable project arise, with continuing personal linkage). [21] employed a systematic procedure to review the literature on university–industry collaboration. [21] examined three main phases in university–industry collaboration: formation (identifying partners, making contact, assessing partners, negotiation, agreement signing), organizational forms (informal and formal personal relationships, third party, targeted and not targeted formal agreements, focused structures), and operational phase activities (meetings, communication, trainings, personal mobility, employment, other activities).

Major stakeholders are involved in the development of all main life cycle stages. This helps support close links between various stakeholders and university-industry partnership iterative life cycle formation stages.

In an attempt to make the life cycle of university-industry partnerships and their components more efficient, many different databases have been built and information systems created [22-24].

The academic-industry interface system and the interactive academic-industry partnership database enable academic investigators and industry to match up their needs based on complementary knowledge, initiate contact, and work to develop effective partnerships [22]. [23] draws on a database of collaborative research grants between universities and business firms awarded by the UK Engineering and Physical Sciences Research Council (EPSRC). The scope for [23] research collaboration between university and industry varies greatly at the territorial level and in