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Networks of universities as a tool for GCIO education

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Abstract. Networking and collaboration, at different levels and through differentiated mechanisms, have become increasingly relevant and popular as an effective means for delivering public policy over the past two decades. The variety of forms of collaboration that emerge in educational scenarios makes it hard to reach general conclusions about the effectiveness of collaboration in general and of inter-institutional networks in particular. The university environment is particularly challenging in this respect as typically different agendas for collaboration and competition co-exist and are often promoted by very same entities. Although no 'one-fits-all' model exists for the establishment of a network of universities, the prime result of the research reported in this paper is that the concept of such a network is a most promising instrument for delivering specific services within the high education universe. In this context, the paper discusses the potential of these networks for the design of educational programmes for the GCIO (Government Chief Information Officer) function and proposes a set of guidelines to successfully establish such networks.

Keywords: GCIO, networks of universities, educational programmes

1 Introduction: Networks for GCIO education

Government Chief Information Officer (GCIO) refers to a leadership position on Information Technology (IT) within a government organization. In general, a GCIO [3, 5] is responsible for developing and managing IT capabilities within an agency, for strategically aligning such capabilities with existing organizational objectives, and for leading the organization towards adopting new strategic objectives made possible by the dynamics of digitization. Although the concrete characterization of this function may depend on the national context (namely, on the maturity level of digital governance mechanisms), its relevance is widely acknowledged.

If the function is emerging, the design of specific educational programmes for GCIO training is still an open issue in most countries. Some Governments in the developing world (e.g., Mozambique and Colombia) are pursuing an integrative strategy, building on their university systems' resources, to foster synergies

and establishing institutional partnerships to jointly deliver GCIO training programmes. In such a context, the present paper discusses the establishment of network of universities (NoU) to deliver GCIO related education, as a cost-effective alternative.

Networking and collaboration have become increasingly popular as an effective means for delivering public policy over the past two decades. Governments became commissioners of services and partners in delivery networks rather than direct services providers [8]. Indeed, there is a current global trend of governments to empower different stakeholders, from individuals and communities to institutions and networks, as an opportunity to achieve better governance, and to harness the power of technology to deliver new and better services. Networks as frameworks for public policy are supported by digital technology, which allows for ever greater volumes of information to be collected and stored, and facilitates information sharing among agencies and organisations, through electronic communication and shared or jointly accessible databases and repositories.

This paper's context is provided by the prospect of structuring a GCIO-related education NoU in a developing country. The relevance of this study is further compounded by the perceived growth of the importance of networking and cooperation structures in education. Inter-institutional cooperation, despite its tremendous potential, is by no means straightforward. Collaborating actors need to possess sufficient cognitive distance for new insights to emerge, but at the same time need to be similar enough for dialogue to be possible and constructive, thus imposing upper bounds on cognitive distance. The educational context, moreover, is complex [7]. The autonomy of universities implies the existence of diverse missions, goals and agendas, leading, over the last decades, to a greater emphasis on competition rather than collaboration. The consolidation of a bidding culture where an increased part of funding is obtained through competitive processes, the public availability of institutional performance data and related ranks, the need to compete for students, seem incompatible with promoting a culture of sharing and collaboration. However, NoUs stimulate deeper organisational learning and have potential for redesigning local systems and structures by promoting different forms of collaboration, linkages, and multi-functional partnerships.

Methodology and paper's structure. The paper studies the concept of a network of universities in order to identify a set of guidelines for establishing such a network devoted to GCIO-related education. This is done through a literature review, surveyed in section 2, followed by a detailed analysis of six interviews to leading actors in different kinds of networks of universities. Each interview, conducted either face-to-face or through videoconference, followed a specific protocol which covers the following six areas of inquiry: i) context and structure; ii) governance; iii) membership and interaction; iv) activities; v) challenges; and vi) success factors.

The networks analyzed here are quite heterogeneous, ranging from typical bottom-up networks, promoted by groups of academics, to top-down ones, created by inter-governmental initiatives, and others exhibiting mixed profiles. They

are also distinguished by scope, mission, object, activities, governance and forms of interaction. This analysis is documented in section 3.

Finally, section 4 concludes the paper by enumerating a number of guidelines for the design and maintenance GCIO-related educational programmes.

2 A Brief Review of Literature

According to [2], the concept of a network of universities covers two dimensions: 1) the collaboration through partnerships intended to strengthen the individual institutions in the fulfilment of their missions, and 2) purpose-driven platforms to address specific issues, typically societal challenges (e.g. global health, food security, etc.). In both cases, the success of inter-institutional collaboration projects depends on the clear perception, by all partners, that the collaboration in the process configures a win-win situation for all involved agents [4].

In a number of illustrative case-studies that can be found in the literature, the political context emerges as a key-issue for the network, particularly for the development and sustainability of partnerships. One reason for failure is the lack of suitable legal regulation [1]; another is insufficient funding. A clear political framework and full autonomy to educational institutions seem essential for maintaining any collaboration process. Thus, the success of this collaboration depends on the commitment and interaction amongst all stakeholders.

The case-study described by Chapman et al [2] shows the importance of networks of universities as a way to ensure social and educational development. Consequently, the focus is put on the definition of the network's structure and its operational model. The sustainability of the network depends on the ability to keep the partners informed, engaged and involved in the decision-making process as well as in the activities developed. This implies a set of indicators that are essential for networks success, namely the organisational issues in the operation of university networks (e.g. value of university networks; *loci* of leadership matters; transparency versus bureaucracy); and the academic staff issues in the operation of university networks (e.g. staff incentives, bureaucratic complexity).

External success factors for networks include: suitable motivation for collaboration between partners; incentives that connect appropriate rewards with organisational goals; and an accountability system that encourages collaboration (see e.g., [7, 10]). On the other hand, typical difficulties [1] include:

- Imperfect information: the network objectives and the partners' role need to be clear from the beginning.
- Uncertainty and immeasurability: the partners may not be able to accurately evaluate the quality of each other's potential contribution.
- Irreversibility: The partners may be reluctant to make contributions to the relationship that cannot be reversed if the relationship ends (for example, the sharing of intellectual property).
- Absence of focal points: Without them agreements become less likely and may have impact on partners' commitment and engagement.
- Disincentives to share gains.

- Sustainability: partnerships will need to be ‘renewed’ if they are to be sustained, perhaps through the renegotiation of points of focus.

The literature also identifies a number of risks associated to the establishment of networks in educational contexts that include:

- Poor performance by any of the partners may lead the network as a whole to underperform or even fail in the delivery of essential services [6].
- The level of resources required to set up collaboration and the additional workload that can result for staff in partner organisations [9].
- Delays in the decision-making process due to the negotiation processes.
- Power imbalances between different network partners and goal incongruence, which may lead to major misunderstandings.
- Poor network culture and, in particular, the fact that network management is not usually part of the training or career path of civil servants.

3 State of the Practice: Expert Interviews

This section introduces six examples of successful networks of universities. The choice considered their heterogeneity in terms of scope, mission, structure and forms or governance, membership and interaction. The six cases are based on detailed expert interviews to leading actors in each of the networks, according to a specially designed protocol.

AUN – *ASEAN University Network of the Association of Southeast Asian Nations*, Thailand (www.aunsec.org). AUN is a multi-country, broad scope network of universities established by the Governments of ASEAN Member Countries in 1995. It has a clear institutional strategic focus aimed at facilitating regional inter-university cooperation.

RedUNCI – *Red de Universidades Nacionales con Carreras de Informática*, Argentina (redunci.info.unlp.edu.ar). Joins together a number of Argentinian universities offering degrees in Informatics. It was created in 1996 to extend to Informatics, as a new academic discipline, an internationally funded core programme for scientific development in Argentina.

UASnet – *Universities of Applied Sciences Network*, EU (www.uasnet.eu). Created in 2011, to build a representative instance for Applied Sciences Universities within the EU and strengthen the integration and contribution of the UAS sector within the research and innovation strategy of Europe.

MAP-i – *MAP Doctoral Programme in Comp. Sci.*, Portugal (mapi.map.edu.pt). Launched in 2007 to establish an inter-university doctoral programme in Computer Science, open to the international, highly-competitive PhD market. It joins together the three top public universities in the North of Portugal, involving eight research centres.

CIO University – United States of America. Active from 1998 until 2014, this virtual university was established as a consortium of seven North American universities, to other graduate level programs addressing the essential knowledge, skills and abilities of federal CIOs.

REDCUPS – *Red Colombiana de Instituciones de Educación Superior Promotoras de Salud*, Colombia (www.aunsec.org). It was founded in 2010 as a network of universities, under their own leadership, in order to articulate efforts to strengthen the contribution of universities to the promotion of Health, and optimise resources in what concerns training, qualification of processes and institutional capacity building.

The main findings of this exercise, classified with respect to the categories mentioned in section 1, are presented in the sequel.

Context, purpose and structure. The first conclusion than can be drawn from the expert interviews concerns the suitability of the concept of a network of universities as an instrument for delivering specific services related to the high education universe. Moreover, these forms of association can: 1) expand the scope and reach of activities that a single university can perform; 2) enrich a university's mission; and 3) address endogenous and exogenous challenges through new tools.

MAP-I, RedUNCI and REDCUPS are examples of networks created to address specific challenges in the core mission of a university: the design of a top quality doctoral programme in the first case (MAP-i), the consolidation of Informatics as a new curricular area and collection of professional careers in the second (RedUNCI), and the involvement of higher education institutions in promotion of public health at a national level (REDCUPS). In all cases, the network brought together extra resources and critical mass.

The CIO University network had a different nature that emerged as a collective project in response to a mandate from a governmental agency designed to address a very specific need: Federal agency CIO training. It was perceived from the outset that the desired goals could be more easily achieved through a network of complementary institutions than by a single university implementing a new stand-alone programme.

Both AUN and UASnet respond to more global needs: the overall development and strengthening of the higher education system in Southeast Asia, in the former case, and the establishment of a representative instance and an institutional voice for universities with a more applied focus within the European Union, in the latter.

The existence of a clear, shared mission seems to be a decisive factor across the cases. The six networks studied were created to address a specific and well-identified problem – not a ‘small’, operational one, such as getting access to extra core funding. The association scheme, although implemented in different ways, was clearly understood as the most effective, if not the only, way to achieve the set of objectives defined.

The expert interviews also revealed the diversity of forms that the creation of a network of universities may take. Some of the networks studied, such as AUN and CIO University, were built by external initiative, where the governmental or even international, inter-governmental level acted as a driving force. In the cases of RedUNCI and MAP-i, the idea of a network emerged within the academic community and later made its way to the highest levels of the university man-

agement structure. Finally, the case of UASnet is an example of a network also promoted from inside the academic system, but at the level of an inter-university cooperation structure, the UAS Rector's Conference in Europe.

Networks can also emerge along a bottom-up or a top-down process. RedUNCI, REDCUPS, MAP-I and UASnet are examples of the first modality, the CIO University and AUN, of the latter. In all cases, however, a strong institutional commitment, involving the right level of responsibility (i.e. the administration of the member universities, the inter-university structure or the governmental agency) was given. Commitment beyond constituting a success factor, seems to be a necessary condition for the NoU very existence.

Governance. Network governance assumes different formats depending on where the main locus of institutional responsibility resides. The 'external stakeholder', as in the cases of AUN or the CIO University, plays an important role in the decision-making process. The networks established internally to a set of universities, such as MAP-i, RedUNCI, REDCUPS, and, to a certain extent, ASUnet, exhibit open, peer-based, essentially democratic and representative governance bodies at the relevant level of representation. In all cases, however, it seems that successful networks favour:

- a simple, often minimalistic governance structure;
- a decision-making process based on consensus, which is actively sought;
- and an effective, dedicated administrative support.

Interaction and membership. In all the cases effective interaction among the relevant actors, both at the institutional and personal levels, is clearly present, explicitly desired and sought through dedicated communication strategies and clear management rules. Creating trust among all the players seems essential for the network to achieve its aims and become smoothly integrated in the university ecosystem. Several communication strategies were mentioned in the interviews, essentially supported by digital technology and collaborative platforms. This seems, however, to be the easy part: promoting interaction supposes more active policies. Two of them were mentioned, with different flavours, in all interviews:

- The importance of acting in a transparent way, with clear operation rules and open decision processes. In the case of MAP-i, in which the network activities imply/promote some form of competition among the involved universities and academics, the open-call principle established for all resource-concerned decisions plays a fundamental role in ensuring the smooth operation of the network and increasing collaboration between academics.
- The effort to create a collective identity and a sense of membership to the network among not only institutional stakeholders, but also individual actors, from academics and students to managers and secretarial support. In some cases this even lifts to explicit branding activities.

The decision to admit new members is always made by consensus. Structural stability is implicitly regarded as a network asset.

Activities. The activities developed by the six networks analysed are rather specific to each domain of intervention and, as expected, driven by each network mission. Curricular development and management, course delivering, organisation of conferences and workshops, branding management, promotion of mobility and internationalization, are typical examples. Key aspects to emphasize include:

- Having a clear action focus and activity plan, shared by the whole network, is perceived as a relevant element in building the network identity, known and recognised among the partners and externally.
- Regard the role of the network as subsidiary to the normal activity of each member institution. In some cases, MAP-i being the typical example, the network is actually offering an activity which has replicas at the local level, and some competition seems inevitable. The crucial point to overcome this sort of possibly disruptive effect, is to build the awareness that the network, even in a somehow competing situation, brings real added-value to each partner, in the form of tangible or intangible assets.

Challenges. Most of the challenges that the five networks face are concerned with improving administrative support (UASnet and MAP-i) and keeping or increasing the funding level (AUN, UASnet, CIO University). Improving the coordination structure was additionally identified through the RedUNCI case. A second category of challenges concerns the operation of the network itself: accomplishing the mission is always understood as a challenge, which is probably an interesting indicator of the vitality of the five networks studied. This category includes:

- Enduring (as UASnet puts it, ‘continue to do well what as been done well from the outset’, or, for CIO University after its official closing, to keep the market value of its brand certificate);
- Scaling;
- The ability to cope with its own success and avoid denying internal and external expectations (AUN);
- Pursuing difficult objectives and being more and more ambitious with respect to attainable objectives; and
- The broad scope of the network mission (RedUNCI mentions, for example, the heterogeneity and extension of the Argentinian high education systems) and some institutional resistances to change.
- Finally, the need to seek and maintain a high level of personal and institutional motivation, and the ability to generate institutional processes able to internally appropriate the network experience and incorporate it in the mainstream dynamics of the university (REDCUPS).

Success factors. The following issues were identified as main success factors in the six expert interviews:

- clear mission and objectives from the outset;
- ability to focus in its mission over time;

- shared values leading to a collective sense of identity;
- clear institutional support at the suitable level of responsibility;
- effective support structure at the operational level;
- wide involvement of the community;
- past achievements and quality of the work done;
- collaborative culture (enforced at the management level and promoted along the whole network); and, in several cases, participative governance models;
- the inclusion within international dynamics of already established associations of universities;
- effective interaction between stakeholders; and
- establishment of trust and even of personal links and friendship among the main actors, over time.

The special roles played by some partners with high levels of institutional commitment to the network, are mentioned, namely by RedUNCI, as a success factor for the whole network. Equally important, however, seems to be the ability of the latter to integrate and manage smoothly such proactive behaviour.

These findings are consistent with what is reported in the literature, as reported above. The following aspects, however, were not mentioned so emphatically in our own expert interviews, although they can be found implicitly there:

- The relevance of the political and cultural context; and
- A rigorous balance of local autonomy and ability to compromise.

4 Concluding: Guidelines for a NoU for GCIO Education

From the research reported, the following guidelines emerged to frame the establishment of networks of universities to jointly deliver GCIO-related education.

Guideline 1: Definition of a clear mission statement. The question of which are the network's goals should be the starting point for its establishment and development. Goals need to be clearly formulated and linked to specific actions. There need to be clear benefits to all organisations within the network, or lead to an overarching outcome that is of importance and relevance to all network actors. Preferably, main goals should be made measurable, so that they can be clearly monitored for achievement. A network is always a means to an end, and not an end in itself. This awareness is essential to build a set of shared goals and mission.

Guideline 2: Identification of stakeholders and clear articulation of a uniform or differentiated membership scheme. The identification of stakeholders and articulation of a membership scheme entails the need for a detailed analysis of existing competences GCIO-related education within each national higher education system. This should be undertaken in three complementary movements:

- The identification of main training and capacity building needs within the public and the private sector, that this network may address;

- The design of a matrix of core competencies for the identified curricular needs; and
- The identification of existent degrees, courses or even just curricular areas, within each national high education system.

Guideline 3: Definition of the loci of initiative and responsibility in the network and its fundamental structure. The loci of the initiative, responsibility for the network, and its structure do not need to coincide, or even overlap, but can be distributed among the stakeholders to a greater or lesser extent. The expert interviews analysed in this paper illustrate different configurations that should be assessed in face of concrete context.

Guideline 4: Definition and planning of the network activity. The definition and planning of a network should be directly related to the mission statement and specify the extent of involvement and collaboration of each partner. Some categories of activities for the envisaged network can already be anticipated:

- Identification of core competencies and curricular design through collaborative research involving the network stakeholders;
- Delivering specific courses in collaboration and/or certifying existing courses and their combination; and
- Organisation of global activities (e.g. thematic conferences; joint workshops with communities practice, typically at sectorial levels; common graduation ceremonies; publications of dissertations, case studies or lecture notes, etc.).

Guideline 5: Development of policies for promoting membership and interaction. Active policies for promoting membership and interaction among the network need to be planned beforehand. A main challenge in setting up a network of universities is the creation of trust. Trust is based above all on shared values and personal relations between staff active in the network. While it is desirable at the outset, where that is not the case trust may emerge over the course of collaborating through interaction between the partners. A step-by-step approach to building trust through small-scale collaborations before going on to deeper relationships may be effective in this regard.

Guideline 6: Definition of a realistic model. The definition of a realistic operational model for the administration of the network, with a clear provision for shared resources, administrative support and funding. Those aspects, namely the suitable definition of sustainable funding models, were mentioned across the different expert interviews as a potential source of risks.

Guideline 7: Definition of a suitable policy for branding management. An aspect identified in all expert interviews was the relevance of a suitable policy for branding management. This should begin at an early stage of the network establishment, coming directly from the definition of the mission statement and the corresponding activity planning.

Guideline 8: Establishment of clear communication channels. Finally, it is necessary to establish clear communication channels within the network. This aspect also requires proper attention in the network design phase. In view of the difficulties involved in collaboration and networking, and the room for misunderstanding, communication among all partners is absolutely crucial. Communication flows are hard enough to effectively organise within an organisation, let alone within a collaborative network, and this is therefore a key task.

The proposed guidelines emerged from a qualitative, case-based research. We believe they offer a useful working framework, which needs to be instantiated and suitably adapted to each particular implementation context.

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