

Using a Multi-Sided Platform and Network Effects to Deliver Land Rights for All

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Key words: land administration, multi-sided platform, network effects

SUMMARY

The Global Land Tool Network (GLTN) is a network-based platform of partner organizations facilitated by UN-Habitat. The goal of the network is secure land rights for all. This paper uses social network analysis to describe GLTN as a network-based multi-sided platform (MSP) and its network properties and network effects from 2006-2015. The key network effect was the development of pro poor land tools. FIG was both a founding member of the network and a key player in the development of its tools. It also held a key position in the network and was part of many of the network effects.

Most current social network analysis is focused on the private sector digital data side of MSPs. This paper draws from both this and the public sector governance platform literature. Social networks are a set of nodes (persons or organizations) tied by relationships and interactions. They have their own structure, properties and governance systems and fulfil specific functions. GLTN's network nodes are its partner organizations and the GLTN Secretariat. The platform sides are the clusters of partners and other GLTN arrangements. The relationship and interactions between the nodes and platform sides involved collaborative work among the nodes around tools. The network positions emerged from GLTN-as-MSP governance structure. GLTN's functions are adapted from a major study undertaken for the United Nations.

GLTN-as-MSP had a range of network effects. Those more usually described in regard to digital private sector platforms were: high quality growth and scale; creating value; the acquisition of more and diversified resources; and the curation of tools developed by the network. Governance-related network effects were: collaborative interaction across nodes and clusters of nodes to develop the global land agenda; new pro poor technical standards for land, and particularly land administration; joint innovation and the co-creation of knowledge on pro poor land tools for implementing global land policy; building trust in the global land industry public space by bridging silos and through collaborative interaction; the strengthening of the global land industry ecosystem through creating a form of modularity across independent partner organizations without a hierarchical structure; learning; and the enabling of multi-level non hierarchical coordination of multiple organizations to deliver program activities.

This GLTN data answers a range of questions. What does the data tell us about social network analysis, network effects and land administration and the delivery of land rights for all? Given the viral growth of MSPs in the platform economy this is a useful question for the land

industry. Also, what does the data tell us about the United Nations as a convener of platforms delivering technical land-related functions? This can be useful when deciding on starting a land-related MSP, designing its structure and functions, or evolving an MSP to maximize network effects and value. Finally, GLTN-as-MSP, including FIG as a key partner, and the surveyors associated with FIG, contributed to the Sustainable Development Goals of ending poverty and reducing inequality through the GLTN platform and its network effects. FIG can learn lessons and use and adapt them for other useful work for the last decade of the SDGs.

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1. INTRODUCTION AND FRAMEWORK

The Global Land Tool Network (GLTN) is a network-based platform of partner organizations facilitated by UN-Habitat, a specialized United Nations agency. Individuals represent the partner organizations. The GLTN Secretariat, which manages the program and funds, is facilitated by UN-Habitat. The goal of the network is secure land rights for all. GLTN is a network-based multi-sided platform (MSP) with network properties and network effects from 2006-2015.

Social network analysis and MSPs are increasingly popular topics in the academic literature and on the internet. They are associated with a range of disciplines including information systems management, platform based economics, sociology and anthropology. Also, these topics have evolved over a number of decades going increasingly digital and viral. Today most of the literature is based around the analysis of the digital private sector, with very little on the public sector, particularly from the governance angle rather than the digital angle. This paper draws from both angles. Social network and MSP analysis is used to understand GLTN-as-MSP. The definitions used draw, and are adapted, from both the private and public sector angles to explain GLTN as a network-based platform. Ethnography, in the form of examples, provides the context for the data.

1.1 Key definitions

GLTN is a social network and a MSP with network effects. These are the major terms defined here. Drawing on current digital social network analysis approaches, most, but not all, of which is focused on the private sector, “(s)ocial networks are formally defined as a set of nodes that are tied by one or more types of relations...Nodes, or network members, are the units that are connected by the relations whose patterns we study. These units are most commonly persons or organizations..” (Marin and Wellman: 2009). For Borgatti, network researchers focus on describing the nodes and the relationships and interactions between actors, and the structure of the network in regard to network properties and positions (2020). Schwarz adds governance to this, as he states that governance in the form of governing systems that control, interact, and accumulate are also integral to social network analysis (2017). Zhu and Iansiti also include functions, and state that platforms are a type of network and “..network-based platforms help users find opportunities by connecting them with other users in the network while simultaneously fulfilling a function” (2019).

The nodes of the GLTN social network are the GLTN partner organizations and the GLTN Secretariat. The platform sides are composed of clusters of partners and other GLTN arrangements. The relationship and interactions between the different nodes and platform sides involved collaboratively work around tools. The network properties and positions of the nodes emerged from GLTN’s governance structure as an MSP. All of these will be described

below and how they contributed to the network effects. In regard to functions, a major study was undertaken for the United Nations (Reinicke and Deng: 2000) on global platforms and their functions. These are: contributing to the global agenda, facilitating processes for negotiating and setting standards, developing and disseminating knowledge, providing innovative mechanisms for implementing global agreements and building trust in global public space. As described below, GLTN was engaged in all these functions.

In regard to MSPs, Hagiu states that “(m)ulti-sided platforms are technologies, products or services that create value primarily by enabling direct interactions between two or more customer or participant groups” (2014). Hagiu and Wright identify the key characteristics of a MSP as being where there are multiple users utilizing the platform. They state that MSPs have two key features that set them apart namely, “(t)hey enable direct interactions between two or more distinct sides. Each side is affiliated with the platform” (2015). GLTN-as-MSP had 7 platform sides working collaboratively to create value (see below).

Social network analysis examines network properties. The GLTN-as-MSP network properties are the boundary specifications, ego or whole networks, nodes, sides, clusters, proximity, positions, centrality, structural holes, ties, relationships, interactions and flows, embedding and multiplexity. These will each be defined as they are discussed below.

Network properties are linked to network effects. Hagiu states that the “cross-side network effects”, sometimes referred to as “indirect network effects” are an important feature of most MSPs (2014). Johnson states that direct network effects are associated with networks where every new user adds value to existing users. By comparison, platforms are associated with indirect network effects (2018). Johnson goes on to state that “(p)latforms have two or more user groups exchanging value with one another (and) the type of user that joins matters” (2018). To develop pro poor land tools a range of partner organizations with different expertise was needed. So the type of GLTN partner organizations joining GLTN “mattered”. GLTN was set up as an MSP not a network from the outset. GLTN-as-MSP produced cross side or indirect network effects. It was increasingly designed to strengthen these through “connection, communication, collaboration, curation and community” (adapted from Johnson: 2018) to extract maximum value and deliver pro poor tools.

1.2 Network properties and types of network effects

GLTN-as-MSP had a range of social network properties and network effects, which are integral to any social network analysis. This paper is based on both public sector governance and digital private sector perspectives of these. The social network properties include: community, nodes, sides, proximity, centrality, positions, ties, embeddedness, multiplexity and structural holes. The network effects include: more sides led to potentially greater network effects (Hagiu: 2014); high quality growth and scale and the ability to compete in a global environment (Johnson: 2018); building synergies between different networks and organizations (Hagiu: 2014); creating value (Hagiu: 2014); the acquisition of more and diversified resources; and the curation of tools developed by the network (Johnson: 2018).

Network effects associated with the governance and public sector aspects of platforms were achieved by GLTN. Reinicke and Deng (2000) identify the network functions (see below), associated with global policy platforms linked to the United Nations of which GLTN is one kind. Adapted from the network functions they describe, this paper identifies a range of network effects achieved by GLTN such as: collaborative interaction across nodes and clusters of nodes to develop the global land agenda; new pro poor technical standards for land, and particularly land administration; joint innovation and co-creation of new knowledge on pro poor land tools for implementing global land policy; building trust in global land industry public space by bridging silos and through collaborative interaction (adapted from Reinicke and Deng: 2000).

Other governance-related network effects of GLTN were: the development of strategic network based alliances which allowed the co-creation of value and innovation by different nodes or partners (Rosenkopf and Metiu: 2001); the strengthening of the global land industry ecosystem through creating a form of modularity across independent partner organizations without a hierarchical structure (Jacobides *et al.*: 2018); network governance design for the purposes of learning (Newig *et al.*: 2010) and capacity development of GLTN partner organizations; and the enabling of multilevel non hierarchical coordination of multiple organizations to deliver program activities (adapted from Reinicke and Deng: 2000). All these network effects enabled GLTN to deliver increasing value, in the form of an increasing number of collaboratively developed pro poor land tools.

Finally, the description of the network properties and network effects makes it possible to ask questions about what this data tells us about social network analysis, network effects and land administration and the delivery of land rights for all? Given the viral growth of MSPs in the platform economy this is a useful question for the land industry. Also, it is possible to ask questions such as, what does the data tell us about the United Nations as a convenor of platforms, particularly platforms delivering technical land-related functions? This can be useful when deciding on starting a land-related MSP, designing its structure and functions, evolving an MSP to maximize network effects and value or when evaluating MSPs.

1.3 Research methods

GLTN is presented here as a case study of a network-based platform. According to Marin and Wellman (2009) networks themselves are a unit of analysis. Here the GLTN network is the unit-of-analysis as it existed from 2006-2015. This is a longitudinal study allowing for the assessment of network dynamics and not just structure. The boundary of the network being analysed (Marin and Wellman: 2009) is: the universe of GLTN partner organizations from 2006-2015; the GLTN Secretariat based in UN-Habitat; and UN-Habitat, where UN-Habitat is both a partner of GLTN and a facilitator of GLTN. GLTN was launched in 2006 and all together there were 69 partners by the end of 2015 (GLTN Annual Report: 2015). The analysis will take a “whole network” approach by covering all of GLTN partner organizations and the individuals representing them on the GLTN platform. It will also take an “ego network” approach, as it will only focus on those nodes connected directly to the GLTN Secretariat node that is treated as “ego network” node (Marin and Wellman: 2009). Findings from social network analysis are validated against context through participant observation and

ethnography. Ethnographic examples are used to aid the understanding of the network effects of GLTN-as-MSP.

2. NETWORK PROPERTIES AND GLTN DATA

A description of the network properties of GLTN needs to be understood in terms of both social network analysis and ethnographic context. For the social network analysis a range of GLTN's network properties will be described such as: community, nodes, sides, proximity, centrality, positions, ties, embeddedness, multiplexity and structural holes.

2.1 Network-based platform design

GLTN was designed from the outset as a network-based platform, although the word 'platform' only came to be used later in the first decade. GLTN was set up as a platform to be able to deliver an agenda of 18 pro poor land tools. This goal could not be reached by UN-Habitat, on its own. Different expertise resided in different silos in the global land industry. The gap in pro poor land tools could only be filled if key global land organizations worked together on a commonly agreed agenda. This meant that certain organizations, like FIG, were needed as nodes in the network to bring their knowledge. The structure of the network had to facilitate different types of organizations working collaboratively. There were silos in the global land industry that had to be bridged. Buy in to the agenda was needed from key nodes such as funders. The network had to cover the whole globe to be credible and this meant operating virtually, while at the same time it had to be able to work towards implementation at country level. All of this was taken into account in the design of the GLTN network-based platform, including its governance rules.

Sweden and Norway government's funding was key from the beginning. They insisted that partners' meetings were needed to assess the relevance and interest in the creation of such a network and in its agenda, prior to their funding the GLTN proposal. Two meetings were held to discuss these issues. Representatives from international organizations interested in land attended. They were from international civil society, professional organizations, bi-laterals, multilaterals, and research and training institutions from across the land spectrum and globe. There was agreement that the network should go ahead and broad agreement on the agenda, with differences of understanding on the meaning of tool terms. Many of these organizations became the first nodes in the network. Other organizations joined the network over the next 10 years, all of them being international organizations (global or regional) which were involved with land, who shared an interest in pro poor tool development, shared the GLTN values, and were from international civil society, land professionals, academia, bi-laterals and multilaterals. By the end of 2015 there were 69 GLTN partners who composed the vast majority of key players in the global land industry. This is the network community and the majority of nodes that are being analysed here.

2.2 Governance, platform sides and silos

Hagui states that many MSPs regulate interaction between the different sides of the platform by resorting to governance rules that regulate who is allowed to join the MSP and how the different sides interact and what the sides do (2014). Many of the governance rules for the nodes in the GLTN network were set up right from the outset, followed by some evolution

over the decade. GLTN-as-MSP right from the beginning was designed with at least 7 sides. In 2006 at the launch of GLTN the global land industry was much more fragmented than it is today. People and their organizations were often in silos. There was a major divide between policy and land administration specialists, and between civil society and land professionals. From the outset GLTN was designed to fill “structural holes” in the global land networks, with a “structural hole,” being “(t)he property of having ties to people who are not in the same social circles with each other..” (Borgatti: 2020). The silos had to be bridged to be able to reach the goal of developing optimal pro poor tools that could be adapted at country level in most places in the world. Representatives of all the silos were invited to join the network from its inception.

From the start GLTN created what was termed ‘clusters’ of partners. GLTN clusters were “..composed of clusters of densely connected nodes.. with many ties within clusters” (adapted from Marin and Wellman: 2009). GLTN’s clusters were the land-related professionals, rural civil society, urban civil society, research institutions, training institutions, bi-lateral and multilateral institutions. Quite early on the research and training institution clusters joined to become one cluster. An International Advisory Board was set up to give policy advice to the network and was chaired by government, the only government representative in the network. The board was composed of representatives from these clusters. GLTN’s sides included UN-Habitat (and its linked United Nations administrative agents – UNON and UNOPS), the GLTN Secretariat, GLTN’s funders, and the 5 clusters of partners, based on the original

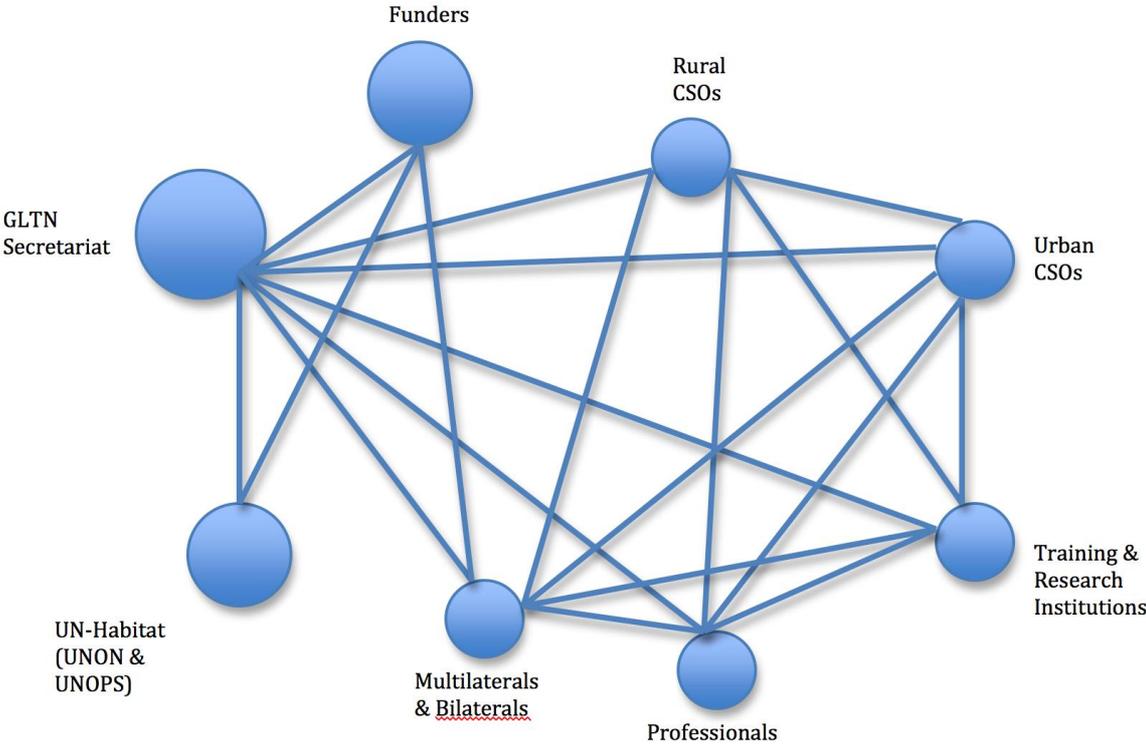


Figure 1. GLTN network sides, positions and ties

global land industry silos (see Figure 1. above).

2.3 Network ties, relationships, interactions and flows

Social network analysis is not just about nodes but also about the ties or relationships between the nodes. These ties could include collaborations, hierarchical relationships, multi-level arrangements, framework agreements, friendships, resource and information flows. There are “..four broad categories of relations: similarities, social relations, interactions, and flows” (Marin and Wellman: 2009). GLTN partners/nodes at the outset had far fewer social relations across the entire network by comparison to the end of the decade. Initially social relations were mostly clustered in what became GLTN clusters. Cluster social-relations tended to be grouped together because of similarities, such as for example those nodes from professional associations or international civil society focused on urban areas. Bridging cluster silos and building collaboration across the network clusters around the development of pro poor land tools was an important interaction undertaken by the GLTN Secretariat. Examples of GLTN interactions included: partners meetings, knowledge development by consultants working with reference groups of experts, co-created technical publications and joint projects at country level.

GLTN flows between nodes included information, knowledge, resources and influence. Examples of flows included: the financing of consultants and partners projects; the peer review of publications where knowledge flowed between the consultant and the reference group and back again; the GLTN website; and lobbying by the GLTN network. By the end of the decade GLTN partners/nodes had a much greater “..number of relation types shared (multiplexity)..” (adapted from Marin and Wellman: 2009), than at the beginning of GLTN. For example, partner organizations across the clusters and from different sides of the platform who had first jointly created tools later lobbied the global policy scene together. Also, co-creators of tools went on to co-author academic papers.

2.4 Node positions and embeddedness

Marin and Wellman argue that network analysis should also include the analysis of the position of nodes in the network as this could point towards “..the network positions most likely to receive flows..” (2009), among other things. In regard to general node centrality (see Figure 1. above), the most central node was the GLTN Secretariat. Funders were also key nodes, particularly in regard to start up, longevity and sustainability. Often, but not always, representatives of the clusters on the International Advisory Board were also central nodes. UN-Habitat’s administration (along with UNON and UNOPS) was central in regard to its status as a United Nations platform, its legal framework, administration and disbursement. Some GLTN partners/nodes played a much more active role than others and they often filled structural holes in the network. GLTN partners/nodes associated with specific GLTN tools, such as the work on technical land administration tools, were central both in that technical work and often had a central role in the whole network. Some partners held central political and normative roles because of their organizations role (e.g. United Nations Economic Commission for Africa). Marin and Wellman’s (2009) argument that network positions are most likely to receive flows was confirmed in GLTN’s first decade of operation.

After a number of years many GLTN partner organizations and their representatives became embedded in the network. “Human propensity to cooperate is driven by our embeddedness in social networks” (Melamed *et al.*: 2018). Embeddedness was in the critical path of the delivery of GLTN’s value proposition, as pro poor tool development needed trust and cooperation between diverse partners over a number of years, sometimes 8 or more years. It also often involved complex and radically innovative work by groups of partners across clusters and social relations that could involve many contested (and uncontested) conversations. Different partners in the network learnt to trust other partners from clusters on the other sides of the platform. Partners became embedded in the network because the structure allowed the dissemination of information on past behaviour that would make exchange and trust possible. This was despite it being a virtual global network involving numerous organizations operating simultaneously at different levels across the world and in many countries (adapted from Frey *et al.*: 2019).

3. NETWORK EFFECTS AND RESULTS

Johnson, when discussing digital private sector platforms, identifies the main five network effects as connection, communication, collaboration, curation and community (2018). Curation is quality assurance. GLTN as a network-based platform achieved all these effects but in an adapted form as it was not a digital private sector platform. GLTN also achieved network effects associated with the governance and public sector aspects of MSPs. Only two of the GLTN tools will be discussed to demonstrate GLTN’s network effects, namely the Social Tenure Domain Model (STDM) and the Global Land Indicators Initiative (GLII) land indicators. There is insufficient space to describe all the network effects of these two tools, let alone all the network effects for all the GLTN tools.

GLTN was able to undertake complicated, multi-level, multi-organizational, work across silos “building synergies between different networks and organizations” (adapted from Hagi: 2014). For example the STDM model, software and participatory approach was built over an 8 year period by one GLTN funded organization (ITC) and curated by another organization at the global level on a voluntary basis (International Federation of Surveyors), and piloted by a third GLTN funded organization at country level in an informal settlement in Mbale, Uganda (Slum/Shack Dwellers International), and scaled into that countries’ local governments by a fourth organization using their own funds (Cities Alliance). These organizations were from four different GLTN clusters or platform sides. Other sides of the platform (GLTN Secretariat, UN-Habitat and funders) supported these four organizations in terms of technical assistance and management by the GLTN Secretariat, and funding and administration. Technical capacity development of national partners was also undertaken during STDM piloting. Representatives from other interested partner organizations from other countries were included in the capacity development. Some of these partner organizations then went on to introduce STDM in their own projects for other purposes.

This example demonstrates how the governance-related network effects associated with collaborative interaction across nodes and clusters can lead to new pro poor technical standards in land administration through joint innovation by partners to implement global

land policy. This includes multilevel non-hierarchical coordination of multiple organizations to deliver program activities (adapted from Reinicke and Deng: 2000). The STDM example also shows the network effects of the acquisition of more and diversified resources (adapted from Hagui: 2014). It illustrates how tool development was quality assured or curated (adapted from Johnson: 2018) and that the network effect of value was co-created (Hagui: 2014) for GLTN partners, GLTN as a whole network, the local governments in Uganda, and the poor communities served by the STDM, at a minimum. It also demonstrates how governance-related network effects can emerge for learning and capacity development (adapted from Newig *et al.*: 2010). Finally, it illustrates how the bridging of structural holes between diverse organizations is a key network effect for value creation in land.

Another example that demonstrates the network effects associated with GLTN-as-MSP was the GLII. The initial goal of this GLTN work stream was to insert land indicators into the United Nations Sustainable Development Goals (SDGs). This was achieved with SDG indicator 1.4.2 on land in 2015, after 4 years of work and lobbying by GLII. At least 12 GLII partners were intensely involved in this tool involving all sides of the platform. It used GLII dedicated funding from GLTN, funding of partners, GLII dedicated staff from GLTN and the time and technical skills of partners. Different roles were played at different times by different collaborating partners, including technical, lobbying and negotiation, funding and administration of funds, co-funding and volunteer work, extensive global events organization, analysis, report writing and communication.

This example demonstrates the network effect of the creation of a form of modularity across independent GLTN partner organizations. Civil society organizations, United Nations organizations and national governments' funding agencies formed strategic alliances without a hierarchical structure to lift a land indicator into a global United Nations process (adapted from Jacobides *et al.*: 2018). This included multilevel coordination of multiple organizations to lift the land indicators into the SDG process (adapted from Reinicke and Deng: 2000). This example also shows the network effects of the acquisition of more and diversified resources (adapted from Hagui: 2014) and that the network effect of co-created high level value (Hagui: 2014) and global scale was achieved for GLII members, GLTN as a whole network, and the countries and poor communities of the world.

4. DISCUSSION AND CONCLUSIONS

The data answers a range of questions, only two of which will be discussed here. What does the GLTN data tell us about social network analysis, network effects and land administration/land management and the delivery of land rights for all? Given the viral growth of MSPs in the platform economy this is a useful question for the land industry. Also, what does social network analysis, when applied as a longitudinal analysis to GLTN, tell us about GLTN and how global networks that are linked to the United Nations function as a convener of platforms? And can it take on additional technical land-related functions? This is a useful question when deciding on starting a new MSP, designing the structure and functions or evolving United Nations linked MSPs to maximize their network effects, as well as for evaluating these MSPs. The learning can also be adapted to other forms of global networks.

4.1 Social networks and network effects and the land industry

What does the data tell us about social network analysis, network effects and land administration and the delivery of land rights for all? The original agenda of GLTN was the 18 missing land administration tools needed for land administration to be able to also support the land rights of the poor, so that land administration systems could support land rights for all. This meant that the global land administration industry's mandate was front and centre of GLTN's goals. Right from the outset FIG became part of the GLTN platform. Land professionals were one of the 7 sides of the platform and FIG took prominent roles on the board and in the development of specific tools (e.g. STD, the costing and financing of land administration, the valuation of unregistered land). This included the curation of the work and building value for other stakeholders and the poor. During the first decade FIG held a central nodal position in the network, also on the land-professionals side of the platform. Many of the GLTN tools would probably not have been sufficiently robust or credible if FIG had not played these roles.

History has shown us that the delivery of land rights, land administration and land management in developing countries cannot be done by a single actor. It cannot be done without governments and land professionals. Civil society plays a key role in building trust and capacity. Often bi-lateral, and sometimes multilateral, donors are involved. Universities play a number of roles. The same holds true at the global level. The social network analysis of GLTN and its network effects describes the type of actors needed on a land-related platform. It demonstrates the need for collaboration across the silos often found in the global and country-level land industry, and over long time periods. This is in the critical path of robust land approaches that are both technically sound and politically inclusive and that address bottom up and top down concerns. It also shows that an informal structure, such as an MSP, makes it possible to achieve high value land-related goals. A network-based platform facilitates the necessary communication, shared interactions, and cross-organizational flows of resources and expertise required to produce value and develop pro poor land tools.

At the beginning of GLTN there were many structural holes or gaps in the network associated with land professionals and other parts of the global land community. However, FIG Presidents made sure that they used GLTN-as-MSP to bridge those structural holes and built their own new relationships with many GLTN partner organizations during the first 10 years. A number of FIG office bearers became embedded in GLTN's social network and became co-creators of value with many GLTN partner organizations. FIG office-bearers, and some individuals associated with FIG, were also able to work cross-organizationally and at multiple levels (global to local) with many GLTN partners without a hierarchical arrangement, sometimes funded and sometimes as volunteers.

GLTN-as-MSP produced some specific network effects useful to FIG and its members. Currently surveyors have a huge number of tools to draw from to deliver land rights for all. In 2006, when GLTN partners first set its land administration oriented agenda, things were very different. What GLTN-as-MSP accomplished was to both set the agenda for land administration relating to pro poor tools, and facilitate the thinking and the development of key tools needed to fill the gap. This type of thinking was foundational for what became the

fit for purpose land administration approach (Enemark *et al.*: 2014; Enemark *et al.*: 2016). From another angle, at the outset of GLTN some of these stakeholders stated that land administration had no role in the deliver of land rights (GLTN civil society and grassroots meeting: GLTN Workshop Report: 2007). GLTN-as-MSP work also improved the credibility of the global land administration industry with other land-related stakeholders. The GLTN tools pointed towards a time when land administration systems could cover all citizens and underpin land rights for all, including the poor. While GLTN-as-MSP focused on the poor, it simultaneously gave surveyors new market opportunities.

4.2 GLTN-as-MSP fulfilled its global functions

What does social network analysis, when applied to a longitudinal analysis of GLTN, tell us about how global networks linked to the United Nations fulfil their land-related functions? And what does this tell us about the United Nations as a convenor of platforms with additional technical land-related functions? The social network analysis confirms a number of Reinicke and Deng's findings (2000) about the functions of United Nations facilitated 'global policy platforms', as they term them. GLTN-as-MSP fulfilled the functions they identify and also did it from a land-related technical perspective. Firstly it shows that this type of global network can contribute to the global land agenda taking into account both the technical and political aspects, both the bottom up and top down, global and community level. The SDG land indicator was lobbied by GLII, a platform set up and funded by GLTN to achieve a global pro poor goal.

Secondly, it confirms that platforms facilitated by United Nations specialized agencies, such as UN-Habitat, can set standards, even land-related highly technical standards, such as the STDM. These were used and adapted by other nodes in the network. Thirdly, this type of MSP can support implementation. GLTN's major focus was on the development of pro poor tools to implement global land policy. The STDM example illustrates that under certain conditions these types of platforms can provide technical innovations to implement global agreements, such as land rights for the poor, at country level. The type of nodes on the platform sides mattered (Johnson: 2018), such as the right type of technical partners, including United Nations staff with the appropriate technical capacity, as well as political partners linked to an inclusive approach for civil society and local communities.

Fourthly, GLTN-as-MSP developed and disseminated knowledge through specific interactions that facilitated collaborative learning linked to the co-creation of tools. The land indicators were disseminated globally, across multiple Member States, international civil society, and numerous multilaterals. They were adopted into the SDG global policy process that set a global agenda for the planet for the next 15 years. A critical network effect that enabled this was the creation of a form of modularity across independent partner organizations without a hierarchical structure. In effect, GLTN-as-MSP demonstrates that it is possible to build trust in global public space for technical knowledge development, learning and capacity development.

Fifthly, the GLTN platform was also able to bridge the divide between diverse organizations and enable multi-level non-hierarchical coordination of multiple organizations to deliver

program activities right down to community level. That is, it enabled the inclusion of the poor as well. The STDM example demonstrates this. Sixthly, GLTN-as-MSP demonstrates both network structure and structural informality. The formal network structure for example included formal roles such as the GLTN Secretariat and the clusters, as well as formal funding. The structural informality was important for the network effects such as the lack of hierarchy among partners working together at multiple levels, as well as additional resources without contracts, such as volunteer work and other organizations funds being used to deliver platform tools and value.

To conclude, the paper goes beyond the public sector governance approach to social networks to also draw from the digital private sector platform literature. The network properties and effects more usually associated with digital private sector platforms are unpacked and adapted to GLTN-as-MSP, a public sector social network that is not a digital MSP. This approach enriches our understanding of what network properties should form part of the design of land-related or United Nations-related platforms, as well as the type of network effects we can design for and expect. It also aids the evaluation of the performance of these types of global network-based platforms and how they can be evolved to give increased network effects and value. Even as the land issue becomes more complex at the global and country level, challenging FIG members to find innovative solutions, lessons from GLTN as a social network with land-related network effects can be learnt and adapted.

Finally, GLTN, including FIG as a key partner, and the surveyors associated with FIG, contributed to the SDGs of ending poverty and reducing inequality through the GLTN multi-sided platform and its network effects. FIG can learn lessons and use and adapt them for other useful work for the last decade of the SDGs.

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Smart surveyors for land and water management
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