# The Infrastructures of War and Peace

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# The Infrastructures of War and Peace


## ABSTRACT

### Purpose

Identify the need for and develop a framework for research on the effects UN peace operation infrastructure has on a host nation. Mission infrastructure serves primarily to sustain a mission. As the mission terminates, infrastructure is often transferred to the host nation. The mission infrastructures could have both positive and negative implications for the host nation and for local communities.

### Design/methodology/approach

Exploratory approach to develop a foundation for a research agenda in an area with little existing research. Identify theoretical contributions related to infrastructures, combine with primary data from one peace operation, secondary data from five other peace operations, and from the UN repositories

### Findings

We propose a research agenda. As such our findings relate to the identification and classification of different infrastructures and their interdependencies.

### Research limitations/implications (if applicable)

Our framework would contribute to new ways of exploring and analysing both the effectiveness of peace operations and the impact a mission has on the development in the host nation.

### Practical implications (if applicable)

We propose a framework for research. As such it will have implications primarily for researchers.

### Social implications (if applicable)

Understanding the implications between mission infrastructures and the material and social infrastructures of a host nation would help understanding what value mission infrastructure brings to a host nation and the local communities

### Original/value

Analysing the logistics in peace support operations as networks of infrastructures brings new perspectives into humanitarian logistics



*Keywords: Infrastructure, Resources, Adaptability, Peace Support Operations, UN logistics*

## Introduction

***Zalingei, 29 December 2019-*** *On 27 December 2019, an estimate of hundreds of residents, as well as individuals in uniform, entered the former UNAMID Sector South Headquarters (Super Camp) in Nyala, South Darfur, by breaching the perimeter fence. Former United Nations-owned assets were looted and the premises of the Super Camp were vandalized. The situation continued throughout the duration of 27 December and was still ongoing on 29 December 2019.*
*https://unamid.unmissions.org/unamid-strongly-condemns-looting-its-former-headquarters-nyala-south-darfur*

This Super Camp was put up to accommodate the various mission components and UN agencies present in Darfur, Sudan, and is an example of what we will denote 'mission infrastructure'. Without the UN Peace Support Operation's need of a camp this would not have been built. Hence, we make a distinction between mission infrastructure and other types of infrastructure projects undertaken by the UN and other actors, projects primarily meant to improve the living conditions for the civic community.

After the mission reorganised, the camp was no longer a vital asset. When terminating their presence in the camp, UNAMID handed the camp and the UNAMID airport terminal over to the civilian authorities of Darfur the 19th November 2019. In addition to the camp itself, with perimeter safety, roads, buildings with more than 580 rooms, power cables, water & sanitation etc, the handover also included 204 vehicles and 175 generators. The estimated value of this transfer was US$99.4 million. The Government of Sudan pledged to use this camp as a police training academy and premises for the University of Nyala (Mamiya et al., 2020).

This was not the first incident of this kind; in May 2019 the UNAMID (United Nations and African Union Hybrid Mission in Darfur) West Darfur headquarters in El Geneina was looted the same day as it was handed over to the local authorities. Why weren't these gifts of excellent infrastructure taken properly care of and protected by the Host Nation (HN)? There is no easy answer to this question. Besides, the explanation factors vary with the perspectives of the observers. Our perspective is based on our knowledge about logistics and supply chains, and how different types of resources link together in supply networks. In this perspective, these two camps could be regarded as UN production facilities designed and adapted to produce an output in line with the mission mandate. A production facility is always embedded in a political context. One way of seeing the looting and vandalism of these two camps is as a result of differences between the political superstructure they used to belong to (the UN system of peace support operations) and the political superstructure of the host nation, and that the looting and vandalism produced a (political) outcome that suited the new owner.

This example shows that the value of a material infrastructure differs between the UN mission and the host nation, of different reasons. The purpose with this article is to explore these differences and propose a research agenda to understand the impact handing mission infrastructure over to a host nation may have on the host nation. To do so we need to know what types of infrastructures that exist and their interdependencies, both from the UN and the HN perspective. Our research context is infrastructures related to UN Peace Support Operations (PSOs).

Logistics in UN Peace Support Operations, what we for the sake of simplicity will denote PSO logistics, share many of the properties of other humanitarian logistics systems. There are, however, some differences that needs clarification. Firstly, both humanitarian logistics and PSO logistics operate along the rapid response – long-term development continuum. Whereas PSOs are led by the UN Security Council (UNSC) through the UN Department of Operations (UNDPO), humanitarian logistics could be partly coordinated through the UN Country Teams, and partly organised by NGOs. PSOs are mandated by the UNSC after negotiations between the UN and the HN. Humanitarian logistics could be said to be mandated by the Humanitarian Organisation (HO) donors. The aim for PSOs is to protect peace by sustaining the UN mission, whereas the aim for humanitarian organisations differs between the different HOs. Further, PSOs contribute to creating the humanitarian space in which the humanitarian organisations operate. The PSO logistics links the financial contributions of the UN and the Police/Troop Contribution Countries (P/TCCs) with the mission command whereas humanitarian logistics link donors to the beneficiaries. In short, PSO logistics ensures that the military and police forces can do their mandated job; humanitarian logistics ensure that the HOs can do their diverse tasks.

UN PSOs must be analysed with different tools at different levels. The processes leading to a Mission mandate are geo-political, involving the UN member states, their international alliances and relations their worldviews, as well as the political play within the Host Nation; a play that often is linked to political interests in and of its neighbouring countries. From our perspective, we view the mission as a business system, in which actors, activities and resources are combined with the purpose to fulfil the mission mandate. The mandate itself is a natural starting point to understand the infrastructures of a mission as it has implications for the operationalisation of the mission, including what resources to use to solve the mandate.

Infrastructure is thought of as having an important role in state building. In fragile states, infrastructure could help cater for stability through business development, improve living conditions, and education. *"To be sure, logistics and physical reconstruction have always constituted a big part of the budgets of complex peacebuilding missions, which typically unfold in some of the world's most logistically daunting environments. What is different today is that infrastructure has become one of the main ways in which peacebuilders aim to achieve their typically wide variety of highly political goals such as local security, the extension of state authority, and the restoration or establishment of the rule of law […] Infrastructure is no longer the background to meaningful action but itself constitutes political agency"* (Bachmann and Schouten, 2018, p. 382)

The politics of logistics should not be underemphasised. Ideally a nation's infrastructure should be a public good; investments in infrastructure could improve access to villages off the beaten track, it could promote trade and mobility, and improve health conditions through access to water and sewerage systems. However, building infrastructures in places with uneven distribution of power could also magnify differences in a society by giving access to some and denying access to others. As put forward by Michael Mann, cited in Schouten & Bachmann (2017, p.386), infrastructure projects can be used by a central government to arrange or limit social relationships between groups, and impose logistically political decisions on a population. In fact, (Bachmann and Schouten, 2018, p. 388) claim that the existing studies of the effects of infrastructure projects show that these have increased stability 'exactly nowhere'.

Infrastructure projects in PSOs are not only a tool for peacebuilding, but also for improving and maintaining mission specific infrastructures. As stated in the *SOP Development of Energy Infrastructure Management Plans for UN Field Missions* (UN DPO, 2018), "the cost of provision of electricity to peacekeeping facilities in the field is estimated to be between 2-3% of whole of mission costs […] all indicate that annual cost savings of up to 50% of this figure may be achievable through the right investments in equipment and processes". This Standard Operation Procedure further claims that major benefits can be realized through standardization and securing economies of scale across all missions if investments are technically and financially comparable.

Based on their research, (Schouten and Bachmann, 2017) identified six dilemmas related to infrastructure projects in peace operations: keeping the balance between doing good vs doing no harm; the differences between quick impact projects and long-term transformation; relationships to local or central capacities; deciding whether a project should benefit specific beneficiaries or be freely available; following international standards or accepting solutions that are fit-for-purpose; and emphasising economic growth or sustainable development.

Material infrastructure built for the mission itself serves other purposes than infrastructure projects undertaken to support the civilian population in the host country, namely, to sustain the units assigned to the mission in their pursuit of solving their tasks. Peacekeeping missions evolve over time. They need to be dynamic to mirror progress made on the ground, their mandate changes over time, the host nation could impose or ease e.g. travel restrictions and import restrictions, the force composition changes both as the TCCs rotate their personnel and when tasks and responsibilities are transferred from one TCC to another. As missions change, its infrastructure evolves as well. Camps close, new camps are established. Roads are improved, new airstrips and helipads are constructed. And ultimately the mission terminates.

When infrastructures established for a mission no longer serve a purpose for the mission it is either disassembled, demolished, or handed over to the host nation. What use does the host nation have of this when handed over to them?

*More specifically, how does mission material infrastructure impact the host nation?*

Since UN PSOs are rather complex structures our aim is not to map it all. Where necessary, we will concentrate on the uniformed personnel, namely the military Force Units (FU) and the Formed Police Units (FPU).

## Methods

The purpose with this work is to develop a tool for studying the effects of handing mission infrastructure over to a host nation. Since there is relatively little literature to find on this matter, we design an explorative study. Firstly, by identifying relevant theory, which in our case is literature about infrastructures and of resource interdependencies. Based on our epistemological stance we choose to regard the mission as a business system in which resources made available from the UN, the TCCs, and the host nation, are combined to produce an output ideally in line with the mission mandate. The mission infrastructure has implications for how well the uniformed forces are suited to meet their mandate. Secondly, we include primary data from a field visit to UNAMID/Sudan, January 2020, organised through the Effectiveness of Peace

Operations Network; EPON (https://effectivepeaceops.net/). The UNAMID study is one in the series of peace operation assessments undertaken by members of this network. These data consist of active data (Dubois and Gadde, 2002, p. 557) obtained by talking to UNAMID personnel, UN Country Team members as well as local population; passive data obtained through semi-structured interviews with the same groups of informants, survey data obtained from different groups of local population in Darfur (Arabs, Furs, and Zaghawa) and IDPs (mainly Fur people), as well as observations from the Nyala Super Camp. Thirdly, we utilise information from the other EPON studies undertaken in the period 2018-2020.

Finally, we build on studies, reports and guidelines available through the DAG repository (dag.un.org).

## How to understand mission infrastructure

### *UN Peace Support Operations*

UN PSOs are initiated and mandated by the UN Security Council. Most the missions are carried out in fragile states. The level of fragility can be measured by the Fragile State Index (FSI), which consists of the three categories Cohesion, Economic, Political, and Social and operationalised in 12 sub-categories in total (https://fragilestatesindex.org/indicators). Countries scoring low on this index tend to lack a strong state, investments and maintenance of infrastructure, and international trade. The ability of the host country or a local community to maintain and develop infrastructures would depend on aid from others.

As pointed out by (Maertens and Shoshan, 2020, p. 21), the UN's organizational culture and member states' preferences shape the way peacekeeping operations are designed and carried out. UN peace operations are planned as short-term operations; although the median duration of peacekeeping missions since 2000 has been 6.5 years, their mandates are renewed each year. Missions are also carried out on a yearly budget. Based on the initial mandate the Force generation process follows a rather instrumental process of firstly working out the Statement of Forces Requirements describing what kind of troops to include, the Statement of Unit Requirements in which equipment and supplies for the units is described, and the Rule of Engagement detailing out how to use the forces. Next, based on these requirements the member states (Police or Troop Contribution Countries; P/TCCs) make their offers, which are discussed and accepted by the Department of Peace Operations (DPO). As troop contributions are accepted, the P/TCCs submit their organisation structure and their Contingent Owned Equipment (COE) documentation. The COE outlines what types and standards of equipment the P/TCCs are required to provide for themselves for self-sustainment, and what services the UN is responsible for. Following a Reconnaissance visit, a complete equipment list is worked out, and MoUs are negotiated between UNHQ and each P/TCC.

The force composition with its equipment will then be deployed and eventually reach a full operational capacity in accordance with the Concept of Operations (CONOPS). E.g., as for UNAMID; "*The establishment of a multidimensional operation in the Darfur region of the Sudan poses continuous formidable logistical challenges. Darfur is a remote and arid region, with harsh environmental conditions, poor communications, underdevelopment, poor infrastructure and extremely long land transport and supply lines from Port Sudan. The scarcity*

*of water presents a particularly difficult challenge, which must be addressed at both the political and logistics level. In consonance with the Review of Uniformed Personnel the military enabling units are to be streamlined. In this regard, taking into account the operational environment and the rightsizing of the military component, the Mission Support is, more than ever, required to support the Force in all its needs throughout the AOR". (CONOPS, November 2015 (unpublished).* The troops deploying to the area of operation will follow the supply routes cleared by the UN and establish themselves in camps built and equipped by the UN.

However, often there is a mismatch between resources promised by the TCCs and resources actually delivered. E.g., Secretary-General report to the Security Council (S/2009/38) reports that "Despite the arrival of additional troops and enabling units, the mission's actual operational impact has been limited by logistical constraints, inadequate supply of critical equipment and the continued absence of key military enabling units such as the medium transport units, an aerial reconnaissance unit, a level-II hospital and 18 medium utility helicopters". The lack of resources could negatively affect the establishment and maintenance of infrastructure, e.g. if engineering units are delayed or not equipped in accordance with the equipment list. The standard of established infrastructure impacts the Force Commander and the Police Commissioner's ability to perform their given tasks.

### *Definitions of infrastructure*

According to (Torrisi, 2009, p. 6), there are no standard definition of infrastructure, at least not in economic studies. Within the research areas of logistics and supply chain management, infrastructure seems to be implicitly assumed as production and warehousing nodes, connected by transport links. As such, infrastructure is treated as an important asset, although not always explicitly defined. E.g., (Closs and Thompson, 1992) say that infrastructure *"includes the facilities and links that form the supply and distribution channel. The "facilities" include the physical buildings that are operated by suppliers, manufacturers, distributors, and customers within a distribution channel. In a micro sense, the "facilities" also include the production, storage, and material handling equipment that are contained within the buildings. The "links" are the product and communication interactions between facilities. The product links are the transportation flows, both internal and external, to facilities, while the communication links are the information flows associated with inventory movement or order processing […]. The total infrastructure is this network of facilities and links that are planned and managed to meet logistics objectives."*

(Schraven et al., 2011) explain that "across the world the performance of public infrastructure networks (e.g., transportation, water supply, sewerage systems) strongly affects the economic viability and social welfare of nations". In addition, (Rehman and Ala, 2020) include (but without defining) telecommunication infrastructure, transport infrastructure, energy infrastructure, and financial infrastructure in their model to explain the role of infrastructure on FDIs in Southeast Asia.

Citing Jochimsen (1966), Torrisi concludes that infrastructure is "the sum of material, institutional and personal facilities and data which are available to the economic agents, and which contribute to realizing the equalization of the remuneration of comparable inputs in the case of a suitable allocation of resources, that is complete integration and maximum level of

economic activities". Infrastructure is thus a capital resource characterised by long duration, technical indivisibility and a high capital-output ratio. Torrisi also points out that the infrastructure is a public good, not necessarily in the sense that it is owned by the public sector, but that it is not excludable and not rival in consumption.

In our work we choose to build further on (Torrisi, 2009) and (Buhr, 2003) and their categorisation of infrastructures. Although their studied context is the State and as such can depict the situation in a Host Nation, we will argue that their descriptions of the State tasks and obligations are transferable to the UN as a supra national entity as well.

**The institutional infrastructure** determines the framework within which economic agents may formulate their own economic plans and carry them out in co-operation with others (Torrisi, 2009, pp. 11–12). The institutional infrastructure constitutes the social integration of values and is the object of the economic and legal order within a given structure. A nation's legal constitution includes regulations on the types of government tasks and on the distribution of these obligations to different institutions of the state. Government tasks lead to government expenditures which must be covered by government revenues (Buhr, 2003) and determines the organization and management of the public sector.

For our context we need to make a distinction between the infrastructure of a mission and the infrastructure of a host nation. The mission infrastructure is first and foremost established to sustain the mission. The UN would assume the role of the 'State' and regulate the relationships between the member states, the process of deciding on a PSO, the formation of the mandate, the negotiation with the Host Nation, as well as reimbursements to the P/TCCs.

Within the Host nation there is a formal institutional infrastructure represented by the HN authorities (central power) and distributed power (local government). In fragile or failed states, there will also be a strong *informal* infrastructure developed by the opposing parties of a conflict. The different sides of a conflict thus possess different variations of institutional infrastructures, reflecting their political and ideological basis as well as their support in local communities. These alternative institutional infrastructures could be stronger than the formal institutional infrastructure of the central government. One example that highlights this challenge is that in Sudan, a little handful of actors, including the military, is said to control 90% of the trade. Warlords, often located outside the State borders, channel funds and military capacities into the conflict area. Although these are not formally representing the State, they determine the economic and legal policy both in the country and in the conflict area (Darfur). The mission thus must relate to both the formal and informal institutional infrastructure.

**The material infrastructure** is defined as "those immobile, non-circulating capital goods that essentially contribute to the production of infrastructure goods and services needed to satisfy basic physical and social requirements of economic agents and unavailable to the individual economic agents (households, firms etc.) for production and cost reasons so that mass production is economically cogent" (Buhr, 2003). For example, the need of drinking water is met by the corresponding supply of water collected in a reservoir which […] is a specific type of material infrastructure (Torrisi, 2009, p. 12). Torrisi further exemplify material infrastructure as roads, highways, airports, naval transport, sewer networks, aqueducts, networks for water distribution, gas networks, electricity networks, irrigation plant and structures dedicated to the commodities transfer.

In UN PSOs the material infrastructure would encompass resources such as e.g., camps with buildings, roads, water and sanitation, perimeter safety etc (exemplified by the Nyala Super Camp), and roads, airstrips and helipads built by UN for mission purposes. Since PSOs take place in conflict zones, establishing mission material infrastructure is made under consideration of the security situation and the need for protection both of the infrastructure itself and of those utilising the infrastructure.

The HN material infrastructure consists of both public infrastructure and privately owned infrastructures. As demonstrated by (Jerome and Ariyo, 2004), privatisation and liberalisation has been frequently used to advance the provision of infrastructure in African countries, although with mixed results. Even if infrastructure projects are meant to benefit the whole population, e.g. (Clarke and Wallsten, 2002) demonstrate that 79.2% of urban households in which the household head has secondary education in 21 select African states had access to electricity, whereas just 32.1% of urban households where the household head has no education had access. Both the formal and informal institutional infrastructures possess or control material infrastructures. In some areas, infrastructures such as transport, water and electricity are owned by mining companies or forestry companies and not freely available to the population, and in some conflict zones public material infrastructure is 'privatised' by conflicting parties putting up checkpoints and toll stations and denying access both for UN personnel and parts of the population.

**The social infrastructure**, which also is termed 'human capital', is "the number and the qualities of people in the market economy characterized by the division of labour with reference to their capabilities to contribute to the increase of the level and the degree of integration of economic activities" (Jochimsen 1966, p.133, cited in (Torrisi, 2009, p. 11). (Buhr, 2003, p. 6) further states that the social infrastructure includes the motivations of the working population, the extent of learning by doing, social status and professional image, and reaction to the given degree of freedom of economic activity. The quality of the social infrastructure depends amongst other things on the access to training and education, structures for public safety, and accommodation and health systems.

The social infrastructure of the UN PSO relates to the mission institutional infrastructure since the Force generation process, the TCC offerings, and the vetting processes in TCCs determine what types of personnel is wanted and what personnel each TCC decides to send to the mission.

The social infrastructure of a HN would determine the access to both skilled and unskilled workforce, at the same time as the PSO will have implications for the development of skills within the population.

Hence, peace support operations encompass different types of infrastructures. These are interdependent in that the institutional infrastructure determines the process leading to the mission mandate and force composition, which again has implications for the material infrastructure. There are strong connections between the material infrastructure and the social infrastructure, since access to skilled and motivated workforce determines how effective the material infrastructure can be exploited.

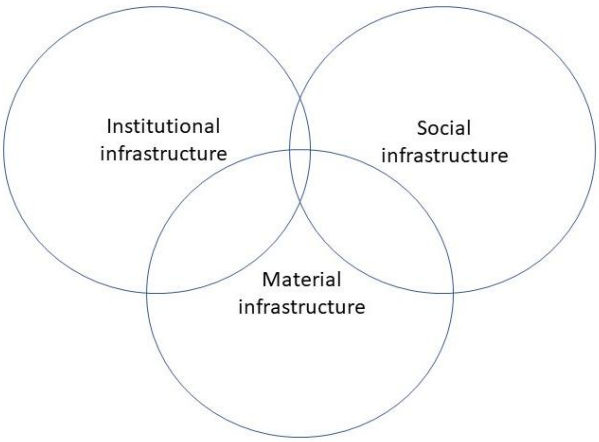


*Figure 1: The three infrastructures*

In our further work we acknowledge these interdependencies as depicted in Figure 1. We will have our focus on the material infrastructure, keeping in mind the reliance on both the institutional and social infrastructures and how these in concert affects the HN as material infrastructure is handed over from the mission.

### *A network of infrastructures*

Infrastructure is perceived as an important resource in peacekeeping operations, as indicated e.g., by (Bachmann and Schouten, 2018). The notion of 'resource' can however have different meanings, depending on what theoretical or conceptual grounds one speaks about resources. Seeing the mission as a production system, we choose to apply the views presented in the Industrial Network perspective (e.g., Jahre et al., 2006). The Actor-Resource-Activity network outlines how actors of a network are bound to each other, how activities are linked both within and across organisational boundaries, and resources tied to the wider network of resources. In this perspective, resources are categorised as products, production facilities, business units, and business relationships. According to (Jahre and Fabbe-Costes, 2005), "a logistics network is basically a set of more or less closely connected resources […] the value of a resource can and will vary, depending on how and when it is used and particularly on the ways in which it is combined with other resource elements" (see Figure 2).

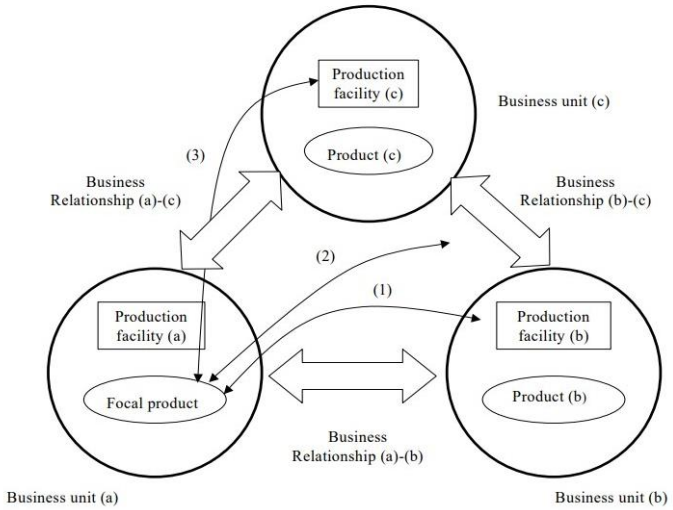


*Figure 2 Resource interactions. (Håkansson and Waluszewski, 2002, p. 38)*

In our case we will argue that the material infrastructure of a mission should be seen as production facilities: the mission camps are production facilities in which mission activities are planned, equipment maintained, troops accommodated and more. Parts of the camps, such as repair shops, kitchen, and dining facilities, are sub-production facilities operated either by mission personnel or local contractors. Offices within the camps are populated with mission personnel from different departments (such as the Director Mission Support (DMS) and UN agencies (such as WFP). Infrastructures as production facilities are combined and re-combined with products to produce utility. E.g., the Kabul ring road, built by the UNOPS (Bachmann and Schouten, 2018), is hence a production unit in which trucks (a product) transport goods, produces the output of mobility, which again results in the outcome of time and place utility.

Resources can be more or less generic. The more specialised a resource is, the higher value it has for its primary use and primary actors, but the less value in other constellations. Hence, developing the optimal resource combination for a mission would have implications for its after-use. Which is to say that an infrastructure optimally designed for the mission could improve the mission effectiveness and efficiency, but on the expense of its value for the HN after mission draw-down. This is in line with (Jahre & Fabbes-Costes, 2005, p.146) who claims that adaptations to a specific supply chain can make the resource less useful in other applications. The more adapted a resource is, the more difficult it may be to change and adapt to a new context.

Following the logic of the ARA framework, resources tie across organisational borders. Torissi (2009), when discussing different aspects of infrastructure, applied infrastructure properties to infer about differences in economic activities between the northern and southern parts of Italy. Our context is however not restricted to one country or to one economic system. Rather, the infrastructures of PSOs are connected across two distinct networks: the infrastructures of the UN mission, and the infrastructures of the Host Nation. Resources within the UN system have ties also to resources in the host nation. When viewing infrastructures as resources, we acknowledge that the various types of infrastructures within the UN realm is linked to, and

interdependent on the infrastructures of the host nation. To understand what effects the mission infrastructure has on the host nation we therefore must understand the ties between the institutional, material, and social infrastructures of the UN mission, as well as the ties between these infrastructures and the corresponding infrastructures of the host nation (Figure 3):

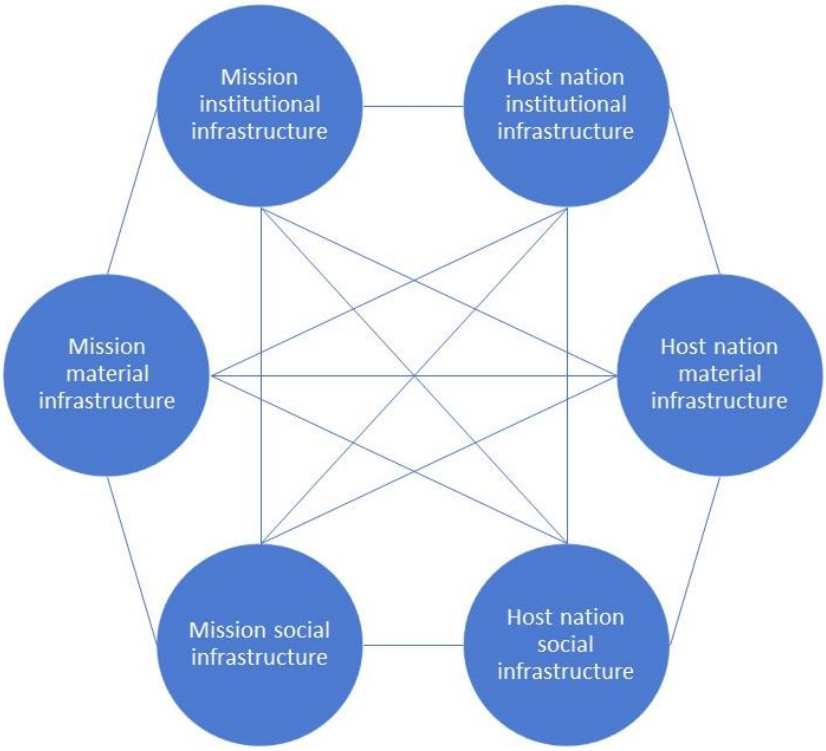


*Figure 3: A network of infrastructures*

Although one can identify resource ties between all these infrastructures, we will concentrate on material infrastructures and their importance for PSO logistics and the uniformed personnel.

Within the UN system the institutional infrastructure determines the process leading to the mission mandate, the force generation process, and the negotiations between UN and the P/TCCs. These are processes that forms the basis for the size and composition of the force, its equipment, its Rules of Engagement and the CONOPS; all factors that influence what material infrastructure to develop in the Area of Responsibility. The mission social infrastructure would cover factors such as the quality, values and competence of the personnel assigned to the mission from the P/TCCs. A well-functioning social infrastructure is thus an important enabler for a well-functioning material infrastructure.

The ties between Mission institutional infrastructure and Host Nation institutional infrastructure manifest themselves in the negotiations between UN and the HN leading to the acceptance of a PSO, the MOUs between the HN and the UN / TCCs and the formation of the mission mandate.

The Mission material infrastructure's dependency on the host nation institutional infrastructure is highly relevant. Since PSOs often are deployed in fragile states, the politics of the host nation encompass both the central government, local authorities, and different opposing parties that

the mission is supposed to calm down. The DPO and DOS (Department of Operational Support) thus must navigate through white waters to get access to land, roads, harbours etc. Likewise, the economic structure of a fragile state poses some challenges related e.g. to black markets, corruption, and trafficking. The informal economy of such states is an important factor to take into consideration. Thus, Mission material infrastructure is a consequence of enabling and inhibiting factors in both the Mission institutional infrastructure and the HN institutional infrastructure.

Some of the ties between the mission material infrastructure and the host nation material infrastructure are rather obvious, such as mutual dependencies on the same harbours, roads, and rail systems. Building new roads or improving existing roads would benefit both the mission and the host nation. Utilising mission resources in infrastructure projects for the local communities is generally thought of as beneficial both to the mission and the host nation (Schouten and Bachmann, 2017). Finally, the ties between the mission material infrastructure and the host nation social infrastructure can be exemplified by hiring local labour to build infrastructure, and to train local labour in skills to build and maintain infrastructure. As such, the mission material infrastructure can have long-term effects on the HN social infrastructure.

## Operationalising the infrastructures of PSOs

### *Institutional infrastructure*

*The Mission institutional infrastructure* encompasses the political and economic processes in and from the UN headquarters in New York. The UNHQ decides the standards to be followed both for vertical and horizontal infrastructures and for equipment. The political processes in the UNHQ and in the P/TCCs impact the efficient use of mission infrastructure. For instance, (Maertens and Shoshan, 2020, p. 22) refer to a study from 2013 showing that TCCs were suspicious of equipment standardization projects. Some member states opposed to environmental standards since their national producers would not be competitive enough on the international market, which would violate the UN procurement objective of fair, equal, and geographically equitable treatment of potential vendors.

The TCCs willingness or ability to keep their promises to the UN is also highlighted as a concern in the Secretary General reports to the UN Security Council. E.g., (S/2007/563) voices worries about missing transport and aviation assets. There was a shortfall of two medium transport COYs, three medium utility helicopter units, a light helicopter unit that were defined in the MOUs but not delivered. Further, in 2008, some police/FPUs did not have the logistical capabilities to fulfil their mandated tasks. Deployment was delayed as only five of 17 load lists were submitted by TCCs. These are assets promised by TCCs but of various reasons not made available for the UNAMID mission.

As for the economic and administrative routines within the UN system, the timing of mandate and budget for the mission are not always synchronised. According to UNAMID personnel, there were two or more budget cycles in which plans were made, but where the mandate changed. Supplies and equipment was ordered based on approved plans, and thus in pipeline, but not needed when they arrived. In the same vein it was mentioned that activities are measured as % of budget, not impact of spending, even though donors want to know what impact their

contribution gives. This is not a good way of working and does not reflect good practice from the private sector. Finally, in UNAMID there were some communication challenges between NY and Darfur regarding HR vacancies. Since the Government of Sudan (before the revolution in 2019) purposefully delayed the visa process, qualified personnel could not enter Sudan to fill their positions. As one of our informants in UNAMID explained, he met at the airport in his homeland every Friday for a half year to deploy to Sudan. Each time he had to go home again because his visa was still not approved. Hence, he could not fill his position. Since positions were vacant for a long period of time, the HQ in NY withdrew positions without investigating why they were not filled.

*The Host Nation institutional infrastructure* also has significant influence on the mission infrastructure. Powers are unevenly distributed throughout the host nation, following the conflict lines that necessitated the PSO. Taking UNAMID as an example, operating in Darfur with a reluctant government added some additional challenges to logistics and mission support such as carjacking, looting of supplies, access denial, administrative delays, and delays in issuing visa to logistics personnel. E.g., during 2007, 154 vehicles were taken from international organisations (S/2008/98). By April 2008, 73 vehicles were hijacked, incl. 3 UNAMID vehicles and 45 WFP trucks. About 23 drivers were reported missing. Deployment of additional troops and FPUs were hampered by significant logistical challenges. Port Sudan, the gateway to the Main Supply Routes to Darfur was for a long time a major bottleneck. Delays by central government in granting customs clearances and permission for UN-contracted vessels to disembark Port Sudan slowed movement of critical equipment into Darfur and resulted in more than $1 million in demurrage charges to the United Nations. S/2008/98 reports on a 7-week delay in transport of equipment from Port Sudan, preventing Bangladesh FPU from becoming operational. Equipment for Nepal FPU arrived Port Sudan 18. February, and was still in transit by May. After three months, only 11% of their equipment had reached Nyala (S/2008/400). Some containers spent up to three years sitting in customs. In addition to delaying deployment of forces, the equipment inside the containers became obsolete.

A peculiar issue related to the institutional infrastructure in Sudan was that the mission deployed without a peace agreement to protect. In addition, the revolution in 2019 apparently changed the political structure in the country. Whereas the old Bashir regime was reluctant to let UN enter in the first place, the new regime signalled good will to cooperate with the mission. Our informants pointed out, however, the long political distance from Khartoum to Darfur. Still after the strong political signals of cooperation, convoys were denied access to areas in Darfur. A denial that either was a result of poor communication from the central to the local authorities, or a result of diverting political interests in the region.

### *Mission material infrastructure*

The mission material infrastructure depends on both the Mission and HN institutional infrastructures. The CONOPS and Rules of Engagement (and in some cases also the national caveats; go / no-go restrictions from a troop's national political and military level), and the geographical conditions on the ground, determine what infrastructure needs to be established. These decisions could be rather pragmatic; "it is often dependent on what the Government is willing to give us, what is available in the locations where we need to have a presence, the state of existing infrastructure, or what we can lease on the open market. Because there are so many

unknowns, it tends to be a matter of judgement that is often based on operational rather than infrastructural priorities" (informant from DPO).

Following the categorisation of material infrastructure presented by (Torrisi, 2009, p. 13), we propose a generic taxonomy of material infrastructure for the uniformed personnel, as depicted in Table 1.

*Table 1: Material infrastructure for Force Units (FU) and Formed Police Units (FPU) Adapted from Torissi (2009)*

| ***Utility*** | ***Infrastructure output*** | ***Material infrastructure*** |
|---|---|---|
| **Physical requirements** | | |
| Water | Drinking water, water for washing/cleaning etc | Reservoirs, wells, pipelines |
| Comfortable temperature and light | Electricity, oil, diesel, petrol, solar power | Power lines, fuel tanks, generators, solar panels |
| Health | Medical care, food, waste disposal | Hospitals, sewage system, waste disposal capacities, kitchen, dining facilities |
| Protection against nature | Accommodation, working places, flood protection, sun protection, insect/wildlife protection | Houses, buildings, ditches, levees, ground preparation |
| **Social requirements** | | |
| Security | Force protection, judiciary, legislation (ROE, MoU) | Outer perimeter, checkpoints, shelters, MP facilities, detention buildings |
| Information | Usage of telephones, radios, internet, written documents | Telephone lines, data cables, Wi-Fi net, satellites, printing facilities |
| Education / training | Knowledge of ROEs, local culture, driving skills, soldier / police skills | Shooting ranges, classrooms, meeting rooms, conference rooms, gyms |
| Mobility | Usage of cars, trucks, aircrafts, helicopters, ship, trains | Roads, airstrips, helipads, rail tracks, ports, terminal buildings, train stations |
| Environmental protection | Clean air and water | Water / air purification filters, waterworks |

### *Mission social infrastructure*

Since our focus is on the material infrastructure of PSOs and their effects on the Host Nation, we will only briefly mention the mission social infrastructure. As Torrisi outlined, access to skilled and motivate workforce is one of the aspects of this infrastructure. In the PSO system, each P/TCC nominates its personnel based on national criteria. In some nations the vetting process is based on competence of the military and police personnel, whereas in other nations more emphasis is put on seniority and years of service. The quality and motivation of the mission work force thus vary between contingents and between P/TCCs. In addition, (Maertens and Shoshan, 2020, p. 21) argue that "UN missions primarily rely on international suppliers and external logistics […] As a result, capacities and resources to maintain and support UN peace operations are imported from around the world, from modular construction systems to food and cooks".

### *Adaptation and adaptability amongst the material infrastructures*

Since the material infrastructure is what will be left when a mission withdraws, we will infer about the adaptations and adaptabilities for this type of infrastructure. Adaptation of material infrastructure could be undertaken to fit better with mission composition, adaptations that potentially could reduce the infrastructure's value in other resource constellations. Furthermore, one should also take into account the politics of logistics; the mission infrastructure design will have consequences for both the social, material and institutional infrastructure of the host nation. This goes both for the infrastructure built and the infrastructure not built; efforts to minimise the impact on the host nation e.g., by accommodating troops in tent camps instead of building houses is also a political decision with its implications.

### *Mission material infrastructure*

The material infrastructure of the mission evolves as the situation on the ground and the political processes both in UN and the HN progresses. As exemplified in the EPON study of MINUSCA, many interviewees lamented problems of language barriers, inadequate cell phone network, inadequate lift capacity, a lack of drones, and poor road conditions. (Howard et al., 2020, p. 97). The same was observed in MONUSCO, where limitations created by a lack of transport infrastructure resulted in the Mission's heavy dependence on aviation for deployment to the field (Novosseloff et al., 2019, p. 82). The informants claimed that access not only depended on air assets, but also on military engineers and capacity to repair roads. Also, in AMISOM the transport infrastructure was seen as a major concern; AMISOM forces remained vulnerable along several main and alternative supply routes and in some of its more isolated Forward Operating Bases (FOBs). Securing the supply routes between the region's major population centres was seen as critical (Williams et al., 2018, p. 101).

These examples highlight some of the challenges of not being able to adapt the mission material infrastructure to the mission needs. The security infrastructure and transport infrastructure were not mutually adapted, and the cell phone network of the Central African Republic (CAR) not adapted to the needs of the mission. Whereas this lack of adaptations to the mission need had consequences for the ability to solve the mission tasks, the effects on the local communities were probably minimal. When the mission leaves, the transport infrastructure will probably not

be much affected. The less adaptation of infrastructure to mission needs, the less difference it will have for the population as the mission leaves.

In other aspects the material infrastructures do evolve over time. This is evident e.g. in Somalia, where the deteriorating security situation necessitated the physical bunkerisation of AMISOM in military bases. This created distance between the mission and local civilians (Williams et al., 2018, p. 95). The same was reported in Mali, where the insecurity in Northern and Central Mali constrained the ability of the Mission to be more "people-centred", because staff needed to be bunkerised in "supercamps" in Bamako, Timbuktu, Gao and Kidal, and confined to military bases in other locations. The balance between ensuring the safety of UN personnel and interacting with the local people was skewed towards the former due to the high-risk environment (van der Lijn et al., 2019, p. 76). In this respect we could say that the mission material infrastructure was adapted to better fit the need for protection of the mission personnel, which at the same time reduced the ability to the interact with the population.

Over time, missions evolve to streamline the mission performance. As e.g., in MINUSMA where different units where co-located in shared camps in the North of Mali. This was beneficial to Barkhane (the French follow-up mission to Operation Serval) as the use of bases guarded and supplied by UN blue helmets freed up considerable French resources, allowing Barkhane to sustain its mobile approach to combatting terrorist groups (van der Lijn et al., 2019, p. 102). And in UMISS, many humanitarian agencies continued to reside on UN bases in the less safe parts of the country (Day et al., 2019, p. 75). These co-locations are examples of adaptation of resources between different production units.

Finally, missions need to prepare for the transition phase and eventually the closure of bases. MONUSCO followed a plan to decrease its static military footprint by closing company and temporary operating bases. Static battalions were to be stationed in a smaller area near the borders with Uganda, Rwanda, and Burundi, with Rapidly Deployable Battalions deploying as needed to respond to situations outside that area. As explained by one staff member, the closure of bases was carried out without adequate alternative presence by the Mission, which left local populations without safe ground in case of attacks (Novosseloff et al., 2019). In this respect this exemplifies an adaptation of material infrastructure to improve mission effect, but with negative consequences for the locals.

### *Mission material infrastructures and HN material infrastructure*

In AMISOM, Quick Impact Projects (QIP) were undertaken usually to renovate infrastructure. Improved infrastructure was perceived to benefit both the mission and the local communities through improved accessibility (Williams et al., 2018, p. 37). The informants in AMISOM could also tell that military medical facilities continued to provide services for local civilians, providing mutual use of the health infrastructure. This infrastructure will however not be available for the local population when AMISOM terminates.

As indicated by (Schouten and Bachmann, 2017), missions frequently engage in infrastructure projects as a stabilisation effort. This is evident e.g., in MINUSCA, which from its inception was engaged in a variety of efforts to protect civilians – supporting political and peace processes, patrolling, information-sharing, policing, mediating, building state infrastructure, and facilitating the training of future civil servants (Howard et al., 2020, p. 60). This included

building or refurbishing prefecture buildings in all 16 prefectures in the country, which was an important effort to promote Rule of Law. In fact, many of the informants see building restoration as one of the most effective aspects of MINUSCA. In addition to solving the mission mandate, this also affects the social infrastructure of the host nation by educating the population about their legal rights.

The MONUSCO bolstered the FARDC's (Congolese Armed Forces) capacity to build infrastructure, including roads, bridges, and wells. These efforts were intended to normalise societies and address the root causes of conflict (Novosseloff et al., 2019, p. 60). In MINUSMA, security efforts received the largest share of the QIP budget, supporting efforts such as the construction of checkpoints, police stations, and camps for the FAMA (Malian Armed Forces). This led to some concerns among interviewees that the majority of QIPs are in support of the needs of the government, and not the people (van der Lijn et al., 2019, p. 77). The informants also tell that the Mission sometimes repairs schools, but that it is difficult to follow up as the Mission is not continuously present. According to some, MINUSMA have focused on the refurbishment of structures. While this is appreciated, there are concerns that not all the refurbishments were aligned with the national plan (van der Lijn et al., 2019, p. 92).

## Outlining a research agenda

Based on the identified theoretical framework of infrastructures and resource combining, and our observations from the field, we propose a research agenda to enhance our understanding of how mission infrastructure impacts the host nation. Our agenda builds on a logistics perspective, emphasising the need of uniformed personnel for material infrastructures to solve their tasks. We believe that the mission infrastructure will influence the host nation both during the mission and after the mission hand over infrastructure to the HN.

Although all these interdependencies represent interesting and fruitful areas for research, our focus on PSO logistics delimits our research agenda. We will not study the ties between the UN institutional infrastructure and the HN institutional infrastructure. This is a topic we leave for political science and peace & conflict studies. Secondly, we will not dig into the ties between mission social infrastructure and HN social infrastructure. This could however be interesting for Formed Police Units and their mentoring and training of local police forces, and for the non-combatant elements of the mission, e.g., to explore how to train/promote knowledge about Rule of Law and Women, Peace & Security (WPS). Thirdly, the relations between the mission institutional infrastructure and HN material infrastructure would be an interesting avenue for assessing that impact infrastructure projects have on stability and progress of the HN. However, as we see it, such projects are not primarily designed for sustaining a mission. Figure 4 outlines our streams of research and their relations to the different types of infrastructures.

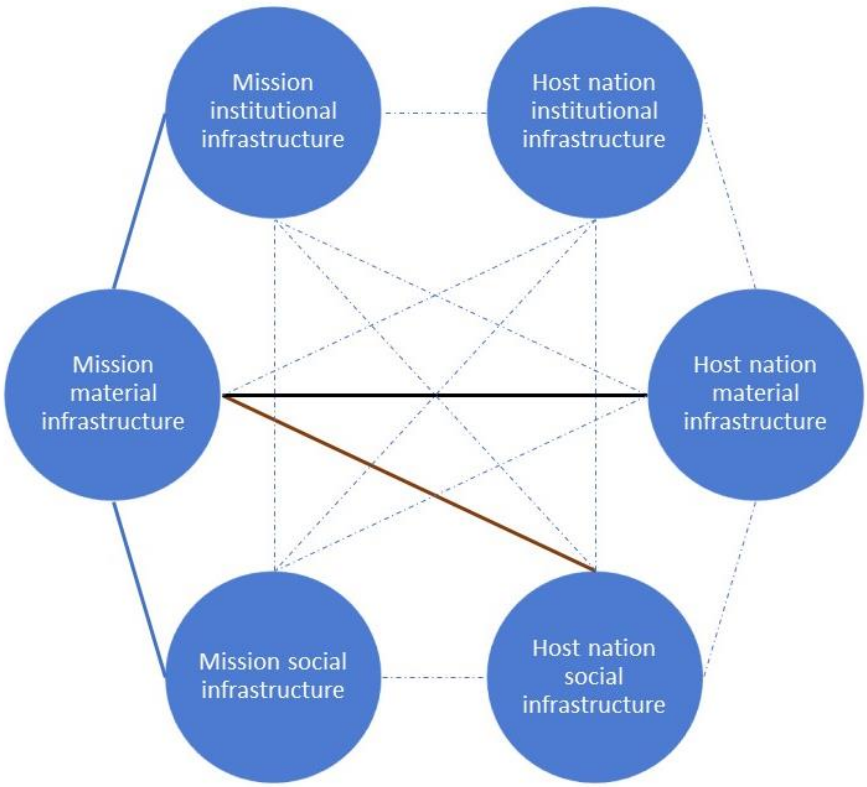


*Figure 4: Research avenues*

***Research stream A: The infrastructures of the mission.***

In this stream we will explore the political and economic processes leading up to the mission mandate. The political and economic processes in the UN determines the composition and capabilities of the deployed mission. For instance, for the first time, a UN peacekeeping operation (MINUSMA) received a direct mandate to address the environmental consequences of its activities. Since then, the Security Council has requested four other missions to consider and manage their environmental footprint: UNAMID (in 2013), the UN Support Office in Somalia (UNSOS, in 2015), MONUSCO, and MINUSCA (both in 2017)" (Maertens and Shoshan, 2020, p. 8). Still, as indicated earlier, the Sustainable Development Goals (SDGs) are debated and circumvented by some member states. Understanding the ties between mission institutional and material infrastructures would be valuable to understand the political play between UN member states and how the logistics community best can promote the logistical needs of a mission. As observed by (Maertens and Shoshan, 2020, p. 6), "peace operations are driven by political and security considerations rather than logistical or environmental ones". Related to this perspective, we also need to understand the ties between the mission material and social infrastructures, since the quality and competencies of mission personnel influences the use and development of the mission material infrastructure. (Maertens & Shoshan, 2020, p. 6) claim that "mission personnel often have little regard for the local context and are poorly trained in environmental and urban management". This stream of research will need to combine logistics / SCM knowledge with political science models.

***Research stream B: The mission material infrastructure and its ties to HN material infrastructure.***

As indicated by (Bachmann and Schouten, 2018) infrastructure projects seemingly lack (positive) effects. Since it is difficult to find effects of projects undertaken with the specific goal of stabilising a country, we acknowledge that it is equally difficult to document the effects the mission infrastructure, which at the outset was designed to sustain the mission and not the civic society, have on the host nation. Nevertheless, these effects are important to assess since material infrastructures would have the potential both to develop the HN and to cement conflict lines for a long period of time. As observed by (Maertens and Shoshan, 2020, p. 5), "The growing demand resulting from a mission's arrival challenges the capacity of local infrastructure, which is usually weak and often already overwhelmed […] military bases, camps, super-camps, airfields, headquarters, and logistics hubs are planned, constructed, and deployed by the UN inside and next to populated areas".

Thus, we will explore how material infrastructures handed over from UN missions are adapted to the existing HN material infrastructure. We will build further on the works of (Schouten and Bachmann, 2017) and their six challenges related to infrastructure in UN PSOs; doing good vs doing no harm; quick impact vs long-term transformation; local vs central capacities; specific beneficiaries vs equal access; international standards vs fit-for-purpose; and economic growth vs sustainable development. Our justification for building on their work is that we transfer these dilemmas to a new research context.

In the same way as mission material infrastructure ties with mission institutional infrastructure, HN material infrastructure ties with the HN formal and informal institutional infrastructures. In our further research we will apply a stakeholder perspective to understand resource adaptations within the mission material infrastructure from the perspectives of the FU/FPUs, the adaptability between the mission material infrastructure and the HN material infrastructure, and the political and economic context in which this resource combination takes place.

***Research stream C: The mission material infrastructure and its ties to local social infrastructure.***

The effectiveness of the mission material infrastructure is closely related to the skills and values of the personnel operating and maintaining the infrastructures. Whereas the skills and motivation of mission personnel is a consequence of P/TCC vetting processes, the employment of local resources are decided on by the mission. Access to workforce is most often not the bottleneck. Access to skilled workers however could be more challenging. Training local labour would thus have implications for the work force's skills and opportunities to find work also outside the mission or start their own business. E.g., in our talks with UNAMID personnel it was emphasised that over the years they have trained plentiful locals in various skills, and that this has resulted in the establishment of many local construction firms. Another effect on the HN social infrastructure is that El Fasher, where the mission HQ was located, grew from being a small village before UNAMID, to becoming a town "build with UN money". The mission HQ and its related activities is a major employer in the district. Establishing and maintaining the material infrastructure has undoubtedly added competence and economic development to

the local community. We need to understand how sustainable this effect is on the local community; what long-term effects the material infrastructure has on the local workforce. One mission informant in El Fasher uttered that the local employees in the camp are not interested in returning to the pastoral life they lived before being hired by the mission or working in the local economy because they have gotten used to the relative good pay and more interesting tasks in the camp.

## Conclusion

The Nyala Super Camp was looted by locals, encouraged by the local authorities (and probably also the central authorities), and even the Sudanese Police. When we visited the camp in January 2020, a month after the destruction started, the $100 million camp was reduced to rubbish. Even the trees planted were chopped down for firewood. The camp had two entries. Whereas a Formed Police Unit controlled one of the gates, the other gate was wide open (the FPU was not responsible for the security of the camp; since this now belonged to the Government of Sudan, Sudanese police would have this task. Instead, the FPU served as a back-up and reinforcement to the FPU responsible for the IDP camp in Nyala but was stationed in the Super Camp in order not to build new infrastructure). To us it seemed rather surreal that these premises that could have housed both a police academy and the local university literary was worth no more than its scrap value to the HN. Obviously, there was a mismatch between the value this specific material infrastructure had for the UN, and the value it had for the HN.

Taking Nyala Super Camp as an example, one needs to understand the ties between mission institutional infrastructure and material infrastructure to assess whether the material infrastructure could have been designed differently. Assessing the effectiveness of a PSO could benefit from analysing the ties and adaptabilities between the infrastructures to understand how the value of such a complex resource changes when the responsibility for a material infrastructure is handed over from one institutional infrastructure to another.

The UN put much money and efforts into establishing mission material infrastructures. The material infrastructure evolves and adapts both to the dynamic situation on the ground, the updated mission mandates, the geography and topology of the area of responsibility and the politics both of and in the host nation, in the UN and in the P/TCCs. Such adaptations have implications not just for the effectiveness and efficiency of the mission, but also for the infrastructure's after-use value.

We believe that understanding the different infrastructures involved and their dependencies and interdependencies would add knowledge about what creates value for the UN mission and for the Host Nation.

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