United States Investment into Sub-Saharan African Development: A Technological Barrier?

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Some ethicists agree it is the responsibility of highly developed states to provide international aid and investments in order to bolster and meet the needs of unsupported states; however, more 'developed' states are not necessarily capable of efficiently providing the aid needed. In 2022, the United States was responsible for a staggering $58.5 billion investment into international aid with the intention to develop other nations and forge reliable bonds. This amount was $5.5 billion more than the year before, indicating a prioritization by the US government to focus on international development. (U.S. State Department, 2022). International aid, as provided by the US, is defined as the "tangible and intangible forms of assistance to other countries." International aid is a tool by which the US is capable of projecting international influence and power unto recipients because this aid in the form of money, investments, and technology increases the number of connections and strengthens the relationship between the US and a recipient state (Morgenstern & Brown, 2022). To maintain this position of influence and power, the United States must reflect upon what methodologies of aid are failing and what are successful in order to continuously outcompete rivals.

Of the $58.5 billion in aid provided by the US in FY2022, the overwhelming majority of which was invested into small-scale projects meant to affect an isolated community or problem. $48.22 billion of this aid was provided through the United States Agency for International Development, a further 17.62% of these funds went directly into Sub-Saharan Africa. (USAID, 2021). This small-scale project investment style is highly technology-centric, which can lead to miscommunication and a discontinuation of the project after the US leaves, inevitably leading to a higher likelihood of long term failure of the project (USAID, 2021). To combat this failure, this

research paper aims to identify, through Actor Network Theory analysis, how the relationships behind US developmental aid are creating barriers to successful development and to strategize ways to improve and outcompete rivals in Sub-Saharan Africa.

Research Question and Methods

The research question is "how does technology impact U.S. developmental aid in Sub-Saharan Africa?" To explore this question, Actor Network Theory (ANT) is used to analyze the role of technology within various developmental aid networks. This tool highlights the ways in which technology, as an actor, may contribute or detract from the success of a project and enable the US to gain increased influence within affected communities. For this network analysis, standard ANT terms and processes are used to construct the networks. ANT analysis must begin by acknowledging the forums and arenas in which the network exists (Latour, 2013). Once the forum has been established, translation should begin to identify the forces actors apply to each other within the network. The first step of translation is problematization, or the identification of the problem an actor faces or acts upon. With these problems identified, the second step is interessement, or the analysis of how actors are bound to these problems and the extent to which they are affected by them-binding roles within the network to actors. The third step is enrollment, enrollment is examining the relationship between actors and other roles. And finally, the lasts step is mobilization, which is determining if actors are correctly represented by the roles and groupings of actors bound together (Callon, 1984). Two significant terms to translation are intermediaries and mediators. Both these terms describe human and non-human actors that serve as connection between actors. The difference between the two terms lies in how they impact, or project force, on other actors or the system. Intermediaries do not impact the network while mediators are able to shape, magnify, or reduce forces between actors. The output of mediators

cannot be predicted by the input; therefore, this paper seeks to study technology as a mediator within developmental aid networks to discover its impact upon the success of aid (Latour, 2005).

Supportive Background Information

In the past, the US has used foreign aid as a tool to win "hearts and minds" on the global stage. However, this tool has been applied selectively based on whether the recipient is a "frontline state or forgotten-state" in which higher priority (frontline) states receive a greater level of aid. Historical US aid has been used in various ways to include: natural disaster recovery, infrastructure development, educational investments, and civil-military support (Wilder, 2010). To identify the relationships behind US aid, technology, and recipients, it is important to understand the challenges and failures that this aid struggles to overcome when applied. This paper should highlight how aid can create power dynamics that can be exploited and potentially drive conflict, technology as a divider between donator and recipient, and how other countries, such as China, are a approaching the task of foreign development and power projection. These points can then be used to indicate and investigate the relationship between actors behind US developmental aid and what downsides exist.

Substantial research on historical methods of aid indicates it is not clear if aid increases or decreases the level of conflict and violence (Mary, 2022). However, some researchers suggest aid acts as a driver of civil conflict (Zurcher, 2017). Regardless of whether aid drives conflict, it is clear that technology-based aid is responsible for propagating power dynamics that could be exploited. One such example where technology propagates power dynamics is the rising use of autonomous technology within aid efforts in which there are rising concerns over the "loss of dignity" regarding less human-to-human interactions, lacking informational transparency, and the acknowledged but not accounted for risk to human behavior (Van Wynsberghe, 2020). The

introduction of another technological barrier between human-to-human contact within aid can lead to a perceived sense of power and impact the level of effective aid administered. Another such example is the employment of communications and feedback technology to relief aid in the 2013 Haiyan typhoon. In this situation, cellphone-based surveys enabled feedback collection from over 130 aid workers and affected people which was intended to indicate the level of success-not to provide evidence for how the aid could be improved (Madianou, 2016). This separation of the technology from the aid beneficiary developed a one-sided relationship in which relief aid workers had an idealized internal image of the extent to which aid was applied that highly contrasted with the affected people. Furthermore, this relevant power asymmetry derived from technology makes it clear that a misallocation of "intellectual capital", or amount expertise whilst using a technology, will lead to a decreased level of effective aid applied (Wood & Sullivan, 2015).

With the idea of how aid can struggle when highly reliant on technology-based efforts more fully developed, it is important to evaluate other approaches to international aid-specifically the People's Republic of China, the United States' closest competitor. China is uniquely positioned to be the highest spending investor in foreign countries and is rapidly increasing after investing up to $30 billion to Africa in 2016 and then $43.39 billion into Sub-Saharan Africa in 2020. These investments primarily take the form of a loan with the establishment of over 32699 foreign invested enterprises (FIEs) in 2019 (Ministry of Commerce of The People's Republic of China, 2021). China's massive investments directly into attempting to develop a beneficiary's economy with FIEs has benefitted the nation by showing rapid short term financial growth and entanglement of economies between China and the beneficiary-a resource for international power and exploitation (Wilson-Andoh, 2022). The most notable

investment made by China in the last few years has been the Belt and Road Initiative (BRI). The BRI is a global infrastructure development program valued at $59.5 billion in 144 countries, $45.6 billion of which was loans to foreign governments in 2019. 43 of the countries in which China is financing infrastructure projects are in Sub-Saharan Africa (Nedopil, 2022). The aim of this project is for China to become the regional financer and thus leading power within Sub Saharan Africa. These loans come at extremely high interest rates which may allow China to seize properties developed on defaulted loans, further increasing the grasp on regional assets (Wilson-Andoh, 2022). In order to remain the primary influence in Sub-Saharan Africa, the US must revise its methodology for foreign investment and indicate Sub-Saharan Africa as a "frontline" region to outcompete China's rapid regional gains.

STS Framework

The framework that is used for analysis of how the US fails to competitively invest in Sub-Saharan Africa is Actor Network Theory (ANT). This framework enables identification of how technology is creating barriers to successful American foreign development and strategize ways to improve and outcompete rivals. Technology is centric to humanitarian and developmental international aid as primary actions take a technology dependent form (ReliefWeb, 2021). However, it is important to distinguish the bounds for how far technology can be integrated into aid to prevent further divides between the provider and beneficiary. The subject of US aid fits neatly within the field of STS because of this integral relationship between technology and aid. Without technology, aid (such as water treatment, providing nutrient rich food, and housing) cannot be conducted. Through this relationship one can begin to understand the necessity to have a wholistic understanding of the actor network that exists behind providing aid.

ANT is the method by which actors (humans, objects, processes, et cetera) can be identified and have their network of interactions analyzed. Each actor plays an integral role in the growth and stability of the network as each action imparts an effect on other actors within proximity (Valverde, 2007). Developed by Michel Callon, Madelein Akrich, and Bruno Latour, ANT is agreed to be capable of constructing a "material-semiotic" map in which material things are tied to concepts and vice versa (Latour, 2013). Through this construction, ANT is capable of revealing the internal machinations of a system, illuminating all elements (Latour, 1999). This broad definition of a system created by ANT is most applicable to the diverse system of US-based foreign aid in Sub-Saharan Africa because of the extremely variation between aid cases.

However, ANT has flaws that are important to recognize prior to analysis. ANT disregards personal and situational agency and decision making as it is a descriptive analysis method (Woolgar, 1988). Because of this broad analysis, ANT simplifies the beliefs of human actors and the variance in systems that restrict the potential application of ANT only predictable outcomes. In the case of US-based foreign aid in Sub-Saharan Africa, it is important to acknowledge the idea that the network is not be all-encompassing but rather an average of each actor within the network; limiting the extent to which the ANT is capable of influencing large-scale decisions.

Framing the Analysis

Technology is arguably the most important actor in our day to day lives. It enables our survival and ability to grow as a society. Furthermore, technology is also something that can be used to act upon others' lives and affect them in various ways. Regarding U.S. developmental aid, technology is a significant actor that can determine the success or failure of a project. The role of technology as an actor is heavily reliant about how the network around it is constructed.

Actor Network Theory analysis indicates that technology is a tool in aid projects, but can also serve as a distraction, it depends on how the technology is applied. In the cases outlined below a project fails because it is centered around promoting a singular technology without the necessary network support and enrollment of other actors. In another case, a project finds immense success through controlled application of technology as a tool rather than an end state goal. This methodology enabled the donor actors to bind with beneficiary actors through the technology as a mediator, ensuring full enrollment and mobilization of actors within the network. When compared to other developmental projects from near peer competitors, such as China's BRI, it can be found that money is an extremely powerful actor within the Sub-Saharan Network. The US should seek to implement larger scaled, high value, projects that apply technology as a tool instead of the solution. This implementation will enable the US to gain further regional purchase as it becomes more engrained within the various Sub-Saharan networks.

Creating the Forum:

The first step when performing ANT analysis is to acknowledge the forum and to begin to structure the network. To structure the network, one must recognize the arenas in which the forum takes place: Sub-Saharan Africa or various listed countries, United States, and China. While the context of these arenas was largely developed with the background information earlier in this essay, it is important to realize these arenas as intermediaries within the network and place limitations on the analysis. These intermediaries are non-human entities that do not contribute to the network because they exist as the physical location in which actors act and have no impact beyond geographic separation. For the sake of simplicity, the network analysis largely ignores the cultural differences between these locations as a reason for certain actions from actors. These

arenas are listed as broad locations to properly encompass its average actor, minimizing minority perspective and opinions within the analysis.

Human and Non-Human Actors:

From each arena there are various human and non-human actors, these are listed below:

Sub-Saharan Africa

- Beneficiary governments, several cases are from various counties and countries.
- Beneficiary individuals (towns, cities, people)

United States

- Government action organizations (USAID, State Department, Millennium Challenge Corporation, Department of Defense, investments into the United Nations, etc.)
- Private non-profit organizations leading international aid projects.
- Technology-based aid projects (vaccination programs, providing computer labs for schools, mobile phone applications to make farming more digital, etc.)
- Public opinion, investors, and volunteerism

China

- Chinese Communist Party
- State-controlled businesses and assets
- Public opinion, investors, and volunteerism
- Belt and Road Initiative and other infrastructure projects
- Investments into resource extraction

There are more actors beyond those listed above; however, the purpose of this ANT analysis is to perform a brief overview of how technology impacts US developmental aid in Sub-Saharan Africa and how it can be improved to increase competitiveness.

Intermediaries and Mediators:

Of these human and non-human actors, several can be considered negligible intermediaries due to the limited impact they can have on the network and interactions with other actors. These intermediaries serve as proponents of another actor and have limited ability to challenge the status quo on their own.

Within the Sub-Saharan arena, the intermediaries are the people within smaller towns who have limited representation. Many Sub-Saharan African nations, such as Tanzania and Kenya, organize their government down to the county level who develop Local Action and Local Development Plans through the Open Government Partnership (Action Plan Cycle - Open Government Partnership, 2023). Therefore, the common man within one of these countries has less leverage unless they are a member of the county government and therefore are considered an intermediary within this network. However, these people are often the direct beneficiaries of US-based aid projects and are therefore the end segment of the network. Minimal to no impactful effort is made to collect feedback from these beneficiaries to enable them to transfer and multiply force within the network (Madianou et al., 2015).

Intermediaries within the China arena are the state-controlled business and assets, public opinion, and volunteers or workers. The authoritarian environment within China that restricts the ability for individuals to invest and execute upon their own desires makes it one of the least free countries in the world (Freedom House, 2021). In this analysis, these actors are considered to be

intermediaries as they serve as the path through which the government and CCP are able to project force.

Principle mediators within this analysis are twofold: the BRI used by China and the array of technologies used by the US for international aid. These non-human actors serve as a path through which other actors are able to project force, but they amplify or modify said force, and thus a mediator (Latour, 2005). In the case of the BRI, this actor itself is a foreign investment program designed by the CCP to recreate the $900 billion new Silk Road for China in the form of infrastructure projects outside of China (Organisation for Economic Co-operation and Development, 2018). This project has benefited Sub-Saharan Africa with the development of billions of dollars in the form of ports, railways, and highway systems (Lokanathan, 2020). However, the BRI becomes a mediator by also applying a monetary debt to beneficiaries that can further benefit its creators through quasi-extortion, thus amplifying the initial forces within the China arena (Wilson-Andoh, 2022). In the case of the array of various technologies used by the US in international aid projects, they serve as a mediator by serving as the method of delivery for strategic goals from the US government. Varying from the BRI in that it further restricts how the development of the beneficiary can change over time. With US-based development, beneficiaries are restricted to the context of the technology itself whilst the BRI enables beneficiaries to use the infrastructure systems built to advance more diverse goals. Therefore, these US aid technologies serve as a mediator by changing how the US strategic development goals are employed and mitigating long term effects. The relationship between actors as they relate to technology-based aid is further analyzed below.

Translation:

When performing ANT analysis, actors must be viewed through the steps of translation: problematization, interessement, enrollment, and mobilization. The primary actor that is analyzed is technology-based aid from the US compared to the BRI from China. Two examples of aid programs are dissected to conclude the role of technology within the program and the network of actors briefly developed above. The case study programs and technologies are listed below:

- The One Laptop Per Child Program (OLPC) centered around providing laptops to school children in Ethiopia (One Laptop Per Child, 2013).
- Akazi Kanoze Youth Livelihoods Project (AKYL) in Rwanda, which used vocational training based on technologies, such as computers, to improve youth employment opportunities (USAID, 2016).
- The Belt and Road Initiative, primarily in Kenya, serves as another case within the network that largely differs from the two cases above.

These three cases are all examples of global development projects taking place in Sub-Saharan Africa.

Problematization in the Cases:

Problematization is the identification of the problem that a specific actor associates with; within each case, these are:

OLPC: The primary problem the One Laptop Per Child program was meant to address is access to technology for educational purposes by providing laptops for kids around the globe. Within Sub-Saharan Africa, OLPC was meant to empower the younger generation in a

technological world and enable countries like Ethiopia, Uganda, Mozambique, and Kenya, to enter the digitized world within one generation (One Laptop Per Child, 2013). The secondary problem the OLPC was meant to address was to complete a "social transformation" of the global marketplace to become inclusive of underrepresented nations (About OLPC, 2005). OLPC seeks to achieve this goal by solving the primary problem and providing access to technology for all.

AKYL: This USAID and DOD project was a series of educational lessons intended to solve the problem of limited availability of technologically skilled labor within Rwanda. The secondary goal the Akazi Kanoze Youth Livelihoods project meant to address was prompting the youth to kickstart their own income-generating activities through advancing the percentage of skilled laborers in Rwanda (USAID, 2016) from 2011 to 2019.

BRI: This Chinese program was intended to enable China to recreate the Silk Road and become the principal exporter across Europe, Asia, and Africa. The secondary outcome of this goal would be increased global dependence on China and therefore further influence as more countries fall within the CCP's sphere of influence (Lindley, 2022).

Interessement, Enrollment, and Mobilization:

Interessement is the binding of actors to roles within the network as they attempt to solve the problem. Enrollment is the definition and relationship between these roles and other actors. Mobilization is ensuring all actors with roles are properly representative of the members within their network (Callon, 1984). The interessement and enrollment of the cases followed by a mobilization evaluation is detailed below:

OLPC: Regarding the One Laptop Per Child Project as a non-human actor, it is largely considered to have made no noticeable impact on improving education in the global south and

widely considered a failure. This failure was due to the lack of assimilation and modification of the laptops into the beneficiary country (Shah, 2015). In the case of Ethiopian communities, recipients were uninterested in using the laptops funded by OLPC, with less than 7,000 laptops provided to the country. The only country within Sub-Saharan Africa to accept more than 7,000 laptops was Rwanda, accepting a staggering 213,760 laptops (About OLPC, 2005). The key reasons identified for why all other communities failed to accept these laptops was the lack of a teacher interface and repair support (Keating, 2009). OLPC failed to provide the foundation upon which the laptops could be used for an extended period. Teachers often lacked the skills or refused to instruct students on how to use the computers. Furthermore, whenever the computers broke there were no systems in place to repair the computer, according to a virtual wiki page providing feedback about OLPC (One Laptop Per Child, 2013). OLPC provided computers less than a tenth of the value of the average computer in 2009, virtually guaranteeing rapid hardware failure (Robertson, 2018). Meaning that after four years of funding, in 2009 OLPC was considered a failure, with less than 0.08% target laptops delivered (Stross, 2010). The prominent social worker Marthe Dansokho considered "misplaced priorities" as the reason for why the OLPC project was a failure, instead advocating for the building of physical infrastructure for educational purposes (News Paper Port, 2014). The OLPC project was sponsored by the UN and was funded by many nations, but the US was a plurality of the funding, beginning at MIT (United Nations Funding by Country in One Chart, 2020). These aspects heavily bind the OLPC project to the United States, specifically through the UN ambassadorship to the United States, a delegate of the executive branch. OLPC failed to bind its beneficiaries into its actions, meaning that the stakeholders within the US were unable to bind with beneficiary actors through the OLPC network due to misuse of a technological asset. OLPC attempted to directly connect to the

average global north citizens, particularly American, by advertising a $400 deal to buy one computer for oneself and a second would be donated to a child “in need” (Gohring, 2007). This outreach was relatively successful, raising over $35 million (OLPC’s Future, 2008). This action indicates that the OLPC project and actions could bind themselves to actors on the donor’s side such as the executive branch, UN, and many American Citizens. However, the employment of the technology was shortsighted, delivering less than 0.08% of computers, and shows how the OLPC project was unable to strengthen relations with any beneficiary actors, creating a heterogenous network. The aspirational hopes created by OLPC to promote childhood education through advanced technology employment were unrealistic and undesired by the target audience. In the case of the OLPC project, a hyperfocus on the employment of a technology left key beneficiary actors disenfranchised in the decision making and eventually led to the total failure of the project. Based on these arguments, the OLPC project did not mobilize, or align, the members of its network by failing to enable the beneficiaries in Sub-Saharan Africa to retain power in its relationship with the donors and technology.

AKYL: As an actor within the forum, the Akazi Kanoze Youth Livelihoods program takes a different approach to problem solving than the OLPC project which had a significant impact on how it was able to bind with both donors and beneficiaries. Performance reports conducted for USAID by the Dexis Consulting Group found that 63.4% of teens who participated in AKYL found new or improved employment as a direct result of the program. Furthermore, the report found that 43.3% (±4%) of program graduates started their own business with 60-70% of participants being women (USAID, 2019). These staggering gains towards a skilled and diverse workforce were realized through the unique role of technology within AKYL. In the program, technologies served as tools rather than the primary focus of the program (unlike

OLPC). For example, the program created and utilized virtual training accessible via mobile devices, online job application portals, computer literacy classes, and video conferencing for distance learning (History Akazi Kanoze Access, 2015). These technologies enabled the actors within the project to connect directly to the Rwandan populace and served as non-human intermediaries through which the project was able to achieve its desired goals of training youth for the workplace. The project was staunchly supported by donor actors within the State Department and USAID through annual reports and updates to the program, enabling it to adapt to the culture within Rwandan communities year-by-year (McLellan & Bamwesigye, 2012). Overall, the actors of AKYL bound, enrolled, and aligned all members of its immediate network to achieve mission success. The technological agents present within the AKYL program's network enable a high level of empowerment for both donor and beneficiary actors. Members of the network are properly represented within their network.

BRI: The impact of the BRI within its network is complex and multifaceted, it would be extremely difficult to break down every single interaction between actors. Within Sub-Saharan Africa, the BRI has been used to finance ports, railroads, and other forms of infrastructure. A unique non-human actor in the BRI network is money and it is likely the central mediator to all aspects of the network. Money is the motivator, the reward, and the tool by which the BRI operates with other actors. Actors that are motivated by this money, such as local county governments, see the BRI investments as a method for improving the quality of life for the immediate area by providing jobs, infrastructure, and future opportunities (The Economist, 2022). Actors that are threatened by this money are near peer competitors such as the United States or private businesses seeking to invest in the region. Massive Chinese loans through the BRI enable the CCP to outcompete all other regional actors and gain the favor of local county

governments within Sub-Saharan Africa, specifically along the east coast in Kenya and Tanzania (Wilson-Andoh, 2022). Actors that are rewarded by this money are BRI project managers and successful entrepreneurs within Sub-Saharan Africa. These human actors see money as the means to gain further power over the advancement of the BRI and thus future investments within the region, gaining access to more future capital (Wilson-Andoh, 2022). Actors that are manipulated by this money are often these same human actors, who may be pressured into unwinnable debt traps that enable the donor (CCP and China) actors to claim defaulted loans and seize assets they build (Lu, 2021). Money is the central figure within the BRI network, not technology, enabling China to gain significant purchase and power projection through all other actors. Because the state-controlled business and assets, public opinion, and workers are intermediary agents within the China arena and BRI network, they are not represented within their network due to a lack of shared power. Furthermore, minority opinions within Sub-Saharan African beneficiary nations and most Western actors are also not aligned within the BRI network, due to viewing the initiative as a debt-trap or a way to gain malicious influence within the region. However, the sheer influence gained by the massive investments in the BRI marginalizes opposition forces within the network, portraying a homogenous appearance for actors interacting with the BRI.

Limitations and Future Work:

Regarding the network analysis above, there are several limitations that degrade the quality of research. As mentioned earlier, there are many assumptions made to generalize actors within each arena for the sake of simplicity. For the purposes of this paper, it would be impossible to describe every single actor within all Sub-Saharan countries; therefore, it was decided that three case studies would be used to give the best general idea possible.

Second, a noticeable limitation of the information collected about the One Laptop Per Child project was that several sources were pulled from the OLPC wiki-page, which was created and written by the organization. This source potentially detracted from the trustworthiness of information collected. However, it was determined that this limitation was negligible because the organization was open about its past failures and is now attempting to learn from them to restart the project and become successful.

Third, a limitation of the information collected about the Akazi Kanoze Youth Livelihoods program was the limited information from primary sources or students who participated. Most of the information collected was sourced from planning, midterm, or after-action report documents. This sourcing meant that the data was potentially skewed to support the success of the project. To nullify this skew as much as possible, the documents were used primarily to understand the doctrine rather than the statistical success or failure of the program.

Fourth, I believe there was a limitation due to my personal bias about the Belt and Road Initiative. I have been reading about the program for years which made it extremely difficult to analyze with minimal bias. This limitation was negated to the best of my abilities.

Finally, future research should explore more primary source accounts of how technological projects were used within Sub-Saharan Africa. Primary sources would enable the research to gain a better understanding of how technologies serve as actors across the incredibly diverse communities within Sub-Saharan Africa. Furthermore, this change will steer network analysis away from the issues of generalization and allow for a more complete conclusion to be drawn.

Conclusion:

The tools provided by Actor Network Theory for analysis indicates the role of technology within a Sub-Saharan developmental aid context. In some circumstances technology can degrade the effectiveness, or cause failure, of a project due to hyperfocus leading to an inability to bind with beneficiary actors, as seen in the One Laptop Per Child Project. However, when used as an appropriate tool, technology is able to align followers within a network and realize success, as seen in the Akazi Kanoze Youth Livelihoods program. In tandem with massive investments like the BRI, technology can be a powerful tool for development in Sub-Saharan Africa. The US actors should seek to change their small-project aid model to be more like the large-project model used by China in the BRI. If the US actors were to implement massive projects using technology to achieve goals and attract beneficiaries, they would likely create stable networks and guarantee successful project completion. And therefore, these hypothetical projects would assist the US in achieving the overall goal of gaining regional influence through further integration and dependence within the network.

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