## The Trials and Tribulations of Applied Triangulation: Weighing Different Data Sources

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#### Abstract

Triangulation is employed to increase the validity of inference in qualitative and quantitative research. Leuffen, Shikano, and Walter have presented guidance as to which strategies to use when triangulating data sources. In this paper, I ask: how can their findings be translated for practical research purposes? I offer an illustrative application concentrating on the political power of traditional political authorities in Uganda and Tanzania. I analyze the status quo of political power and the preferred political power of traditional leaders. To triangulate, I use three sources: (1) constitutional-legal texts; (2) the Afrobarometer survey; and (3) in-depth interviews. I shed light on possible problems and analytical strategies for triangulation in practice, with a specific focus on convergence and divergence of sources.

Keywords triangulation, aggregation, divergence, traditional political authorities, Sub-Saharan Africa

#### 7.975 words

<u>Acknowledgments</u>: This study has been partially funded by the German Academic Exchange Service and the German Foundation for Peace Research (Grant No. PA 003/11-Nr. 005/12-2010). I thank Federica Genovese, Katharina Holzinger, Daniela Kromrey, Rob Johns, Dirk Leuffen, and the anonymous referees for their invaluable critique and comments. I am indebted to Marius Bayer and our project assistants for their support in the collection of the interview data. The Center on Democracy, Development, and the Rule of Law (CDDRL) and the Department of Political Science at Stanford University provided an inspiring environment for this research.

# The Trials and Tribulations of Applied Triangulation: Weighing Different Data Sources

#### Abstract

Researchers employ triangulation to increase the validity of inference in qualitative and quantitative research. Leuffen, Shikano, and Walter have presented guidance as to which strategies to use when triangulating data sources. In this paper, I ask: how can their findings be translated for practical research purposes? I offer an illustrative application concentrating on the political power of traditional political authorities in Uganda and Tanzania. I analyze the status quo of political power and the preferred political power of traditional leaders. To triangulate, I use three sources: (1) constitutional-legal texts; (2) the Afrobarometer survey; and (3) in-depth interviews. I shed light on possible problems and analytical strategies for triangulation in practice, with a specific focus on convergence and divergence of sources. Triangulation is a strategy in qualitative and quantitative research to increase the validity of inference by combining "varieties of data, investigators, theories, as well as methodologies" in the study of the same phenomena (Denzin, 1978, 295).<sup>1</sup> Further, triangulation may reveal both convergence and divergence of different measures, and thereby strengthens the understanding of a variable of interest (Hesse-Biber, 2010). The idea of triangulation is not new to the social sciences (see e.g. Blaikie, 1991; Denzin, 1978; Jick, 1979; King, Keohane, & Verba, 1995; Tarrow, 1995). However, especially with the more recent increased focus on mixed-methods approaches, triangulation has re-gained attention in academic fora (see Archibald, 2015; Howe, 2012; Denzin 2012; Johnson, Onwuegbuzie, & Turner, 2007). To date, though, practical advice on how to triangulate is scarce.

Recently, Leuffen, Shikano, and Walter (2013) have offered guidance by comparing the inferential leverage of five different strategies of triangulation. The authors show that

collecting more information and using all of this information, weighted by the quality of the source typically leads to better measurement results. However, this only holds under the assumption that the sources are not systematically biased. (p. 49)

Yet, their results are drawn from computer simulations. Those of us evaluating more unstructured data sources may wonder how in practice to weight and triangulate data from very different sources such as surveys, in-depth interviews, and texts. In this paper, I take the suggestions from Leuffen et al. (2013) and ask: how can their advice be implemented? And what are related potentials and challenges?

Therefore, I offer an illustrative application of Leuffen et al. (2013), using my own research into the political power of traditional political authorities (TPA) in Uganda and Tanzania. I focus on two types of concepts related to the analysis of preferences – the status quo of political power and the preferred level of political power of TPA. To triangulate, I use three data sources: (1) constitutional and legal texts, (2) the Afrobarometer survey (2009),<sup>2</sup> and (3) in-depth interviews with actors and experts I conducted in 2012/13. I show that, to produce valid inference, when triangulating scholars need to assess both convergence *and* divergence of different sources.

In the following, I first review the academic discussion on triangulation, and outline the argument of Leuffen et al. (2013). Second, I describe how I test the identified strategies of triangulation. Then, I describe the three data sources and measure the two variables for each source on a common scale. Subsequently, I discuss the practical process of triangulation, assessing the applicability of the guidance from Leuffen et al. (2013) and others. Finally, I summarize the findings in the conclusion.

## Triangulation: Concept, Purpose, and Practice

## The concept and purpose of triangulation

Some authors define triangulation narrowly as the combination of qualitative and quantitative methodology (see e.g. Tarrow 1995; Erzberger & Prein 1997). Yet, more generally, triangulation entails the analysis of the same event, concept, or variable *by combining several different angles or perspectives* (King et al., 1995; Marks, 2007). Denzin (1978, p. 295ff.) distinguishes four categories of triangulation, of which two are of particular importance for the analysis below: (1) *data triangulation*, as I combine text, survey, and interview data; and (2) *methodological triangulation*, as I combine text analysis, descriptive survey measures, and software-based qualitative inference.<sup>3</sup> Denzin further subdivides data triangulation as combining analytical angles across time, space, or person, while methodological triangulation is subdivided into within-method and betweenmethod triangulation. In addition, Morse (1991, 2010) further distinguishes two types of methodological triangulation – simultaneous and sequential. In the former, two methods are used at the same time; in the latter the inference gained from one method informs the use of a second method (see also Johnson & Onwuegbuzie, 2004).

While some are critical about its potentials (Blaikie 1991; Jick, 1978), triangulation embraces the idea that a combination of perspectives will (a) enhance the understanding of the variable of interest, and/or (b) increase the validity of the overall findings, even if each angle comes with a different bias (Stoker, 2011). As Marks (2007) points out, if measurements from several perspectives are considered jointly, and if the measurement techniques are differently biased, this lessens systematic measurement error (2007; see similar in Stoker, 2011; Turner & Turner, 2009). Thus, when more sources of information are used to measure the same phenomenon, convergence of the different measurements on the same value can be said to approximate the true value of a variable of interest (Fielding, 2012; King et al., 1995).

## The practice of triangulation

Triangulation itself does not guarantee convergence of measurements. Different angles may show considerable variance in evaluating the same phenomenon. As Moran-Ellis et al. (2006) point out, some authors attribute this divergence to invalid measurement. Others emphasize the gain in conceptual understanding of the variable of interest when triangulated sources diverge – even if variance in measurement may mean reformulation of concepts and/or repetition of measurement (see similar in Hesse-Biber, 2010). Divergence can also be amplified through triangulation in case of varying "epistemological stances" of triangulating investigators (cf. Archibald, 2015, 16). Yet, the disagreement and debating about a measurement of a variable of interest may at least help reduce the range of possible values wherein to find a "true" value. To capture both convergence and divergence, it is all the more important to practice triangulation according to clear and reproducible rules (Denzin, 2010; Johnstone 2007).

#### Five aggregation strategies for triangulation

Leuffen et al. (2013) provide practical guidance by discussing the strategies of triangulation. They assess which approaches perform best under which conditions. The authors distinguish five strategies for aggregating information when triangulating three hypothetical sources: (1) *random selection*, in which the value provided by one of the sources is taken arbitrarily to measure the variable of interest; (2) *arithmetic mean*, in which the values provided by all sources are averaged to measure the variable of interest; (3) *majority strategy*, in which the value that the majority of sources agree on is taken to measure the variable of interest; (4) *weighted average*, in which the values provided by all sources are averaged and weighted by the quality of each source's information to measure the variable of interest; and (5) *winner takes it all*, in which only the most reliable source is taken to measure the variable of interest.

Employing computer-simulations, the authors show that using maximum infor-

mation through the 'weighted average' strategy generally leads to the most accurate findings. If the sources are all systematically biased in the same direction, the 'winner takes it all' strategy is the most accurate. In sum, the choice for triangulation strategies relies on "the number of sources, their respective trustworthiness, and their level of independence" (Leuffen et al., 2013, p. 49). The authors offer one of the few explicit evaluations of different triangulation techniques and identify best-performing strategies. Scholars may potentially use the authors' findings as heuristic guidance of their own applied triangulation. Yet, Leuffen et al. (2013) do not explain how to calculate an average (weighted or not) over different sources stemming from, for instance, survey data, in-depth interviews, and text data. Thus, below I provide an extension of the authors' argument, showing how to weigh data sources for triangulation in applied mixed methods research.

## **Applied Triangulation in Preference Analysis**

## **Research design**

In order to apply the five types of aggregation mechanism for data triangulation, I use the measurement of concepts related to political preferences (in analogy to Leuffen et al., 2013). More specifically, I concentrate on the topic of political power of traditional political authorities (TPA) in contemporary Uganda and Tanzania. TPA are, for example, chiefs, elders, and headmen: that is, community leaders whose authority is understood and validated through narratives or procedures deemed "traditional" by constituents. The term "traditional" is not equivalent to ancient here, but refers to a mode of legitimization of authorities. In many countries in Sub-Saharan Africa, TPA still play an important role in domestic politics – locally and, in some cases, nationally (Baldwin, 2013; Holzinger,

Kern, & Kromrey, 2016; Logan, 2013). Because the politics involving TPA are often informal, data on the topic are sparse and often of poor quality. Thus, data triangulation is especially useful in studying TPA, allowing the validation of information gathered using field research and the limited additional data available.

In many of the communities in which TPA are still important, there is a tension between the actual political power of traditional leaders on the ground and the level of power that various actors – whether constituents, state actors or the TPA themselves – would like these traditional leaders to wield. Therefore, I triangulate different data sources to assess both assessments of the status quo (the level of political power currently held by TPA) and preferences (about the level of political power that TPA should hold) in Uganda and Tanzania. Given that the purpose of this paper is to make a methodological point about the practice of triangulation, I solely focus on the *scaling* and *measurement* of the status quo and preference. Holzinger, Kern, and Kromrey (2015) provide an in-depth analysis of TPA in Uganda and Tanzania.

#### The variables of interest: status quo and preferred power

Several authors argue that to maximize the benefit from triangulation sources should be triangulated against the same theoretical or empirical construct (cf. Denzin, 1978; Stoker, 2011). While it is arguably difficult to produce exactly equivalent measures from different data sources (cf. Fielding, 2012), the measure should be constructed so as to serve as a triangulation target from many different angles. Hence, I construct a simple scale to measure the status quo and the preferred level of political power of TPA in both countries. The scale bears strong similarities to the one used in the Afrobarometer survey

(Round 4, see below). Panel A and panel B in Figure 1 show the scales for the two variables of interest.

#### Figure 1 about here.

The ordinal steps of the scale are defined as follows: The political power of TPA in a country is "none" if TPA have no political leverage whatsoever; "small" power refers to cultural recognition of TPA only, without any political influence – cultural here refers to rituals, ceremonies, or the maintenance of heritage; "some" power signifies that there is not only cultural influence but also a political role played by TPA, e.g. responsibilities for land or dispute management on the local level, as well as influence in shaping electoral outcomes; finally, "large" power indicates a major political role in the country, e.g. with TPA occupying national level institutions or taking over classic state activities such as the provision of public goods.

As Figure 2 shows for three hypothetical Sources A, B, and C, all three different data sources will be triangulated against this scale to measure the variables of interest. If sources cannot be scaled to a unique point with certainty, I add a "–" or "+"-sign for the scaling, indicating a tendency to a lower or higher scaling (illustrated by the directional 'flags'). One illustrative example in Figure 2 shows three sources converging on the value "some" (line arrows). However, Figure 2 also shows a scenario without convergence: Source C is scaled as "large–", and Source A is scaled as "none" (dotted arrows). Especially for the divergent scenarios, weighting the different sources becomes important.

Figure 2 about here.

#### **Data Sources**

#### Data source 1: Constitutional and legal texts

I examine present constitutions and specific legal acts in order to identify rules that give TPA political power. To be sure, these texts can only be used to assess the status quo, because preferences are not expressed in these documents. Table A.1 in the appendix lists the constitutional and legal texts by country. In Uganda, Chapter 6, 16, and article 178 of the current 1995 constitution define the role of TPA. Chapter 6 (Art. 80) disgualifies recognized traditional leaders from becoming members of parliament. Chapter 16 recognizes TPA as community leaders. Still, the document establishes the primacy of state authority over TPA (Art. 246 (4)). The "Institution of Traditional and Cultural Leaders Act" of 2011 acknowledges the traditional selection procedures of TPA by the constituency. New appointments of TPA must be reported to the ministry. Traditional leaders shall ensure the cultural preservation and development of their community (Art. 9). They are allowed to resolve disputes in their own community, but do "not have or exercise any administrative, legislative or executive powers of Government or local government" (Art. 12). They cannot participate in party politics, unless they give up their traditional mandate and the benefits coming with that position (e.g. official cars or tuition scholarships for natural children). Given these constitutional provisions and the subsequent 2011 Act, I scale TPA as having "some" power in Ugandan politics.

For Tanzania, I scale the status quo of political power of TPA as "none". The "Local Government Ordinance (Amendment) Act" (1962), the "African Chiefs Ordinance (Repeal) Act" (1963), and the "African Chiefs Act" (1969) abolished all powers of TPA. The 1977 constitution mentions TPA only indirectly, emphasizing that lineage or tradition are not to give any advantage to an individual (§29.-1). The Tanzanian "Village Land Act" (1999) refers to TPA but only in that a past agreement on land use between two villages reached by traditional leaders can be adopted as a joint land use agreement (§11.-(1)). This effectively reduces the power of TPA and transfers authority to the administrative village land councils. Similar to the constitution, the 2002 "Courts (Land Disputes Settlement) Act" does not mention TPA and refers back to the 1999 act.

#### **Data source 2: Afrobarometer survey**

I draw on data from the fourth round of the Afrobarometer collected in 2008/2009 in 19 countries, as it is the only round with a series of questions evaluating the political powers of TPA and including data for Uganda and Tanzania. Regarding the status quo of political power of TPA, Table 1 summarizes the responses to the question "How much influence do traditional leaders currently have in governing your local community?". The columns show the aggregate country-level shares for each response category for Uganda and Tanzania.

## Table 1 about here.

Regarding Tanzania, over 60 percent of respondents assess the political power of TPA as either small or none. Of all countries surveyed, Tanzania displays the largest proportion of respondents indicating no influence of TPA. Still, a fifth of respondents rate the influence as "some" or higher. Thus, I scale the status quo of political power of TPA as "small-".

In Uganda, a larger share of the respondents than in Tanzania state that TPA have "some" or "a great deal" of political influence. A slightly larger share of 46 percent sees no or only a small influence. Yet additional Afrobarometer data show that 61 percent of respondents express that they trust traditional leaders somewhat or even "a lot". I there-fore scale the status quo political power of TPA in Uganda as "some-".

Regarding the preferred level of political power of TPA, I juxtapose shares of responses to the question "Do you think that the amount of influence traditional leaders have in governing your local community should increase, stay the same, or decrease?" (Q2) to the response shares of the previous question (Q1) (see cross-tabulations in Table A.2 in the appendix). For Uganda, a majority of 59 percent wants the political influence of TPA to increase at least somewhat or a lot. Furthermore, a quarter of Ugandan respondents assess the status quo influence of TPA as "none" and prefer this to "stay the same". However, a large majority of those indicating the status quo as small or higher prefer to see the political influence of TPA increase. Having previously scaled the status quo of political power of TPA as "some-", I scale the preferred level of political power of TPA in Uganda as "large-".

For Tanzania, for Q2 35 percent prefer the governing influence of traditional leaders to increase, while only 37 percent prefer a decrease or the status quo. A sum of 55 percent of those Tanzanians who designate the status quo as "none" prefer that state of affairs o or would like political influence somehow to decrease further. 42 percent of those who assess the status quo influence as "small" would like it to stay that way or to decrease. As the majority of those who answered "some" or "great" for the status quo prefer political power to stay the same or increase, and having previously determined the

status quo as "small-", I scale the preferred level of political power of TPA in Tanzania as "small+".

#### **Data source 3: In-depth interviews**

In 2012/2013, I conducted a series of qualitative interviews on issues involving TPA in Uganda and Tanzania. The respondents were actors such as state authorities and TPA, e.g. a former prime minister of Uganda or traditional chiefs. Furthermore, I interviewed experts, civil society actors, and members of the population with knowledge of the political significance of TPA for a larger collaborative project on the political power of TPA. Overall, I conducted 66 interviews – 35 in Uganda and 31 in Tanzania. Table 2 summarizes the total number of interviews by country and respondent categories – state actors ( $act_s$ ), traditional actors ( $act_r$ ), and experts/civil society (exp).

## Table 2 about here.

In each country the interviews focused on two ethnic groups with a view to measuring whether the form of the traditional polity's organization affects the significance of TPA. For Uganda, we selected the Baganda, whose polity is organized as a kingdom, and the Iteso, who traditionally organize in more horizontal clan systems; for Tanzania, we selected the Sukuma, who organize in decentralized chiefdoms, and the Maasai, who organize based on an age-set system (see Table A.3 in the appendix for respondents by country and group association).

#### Interview approach and data analysis

To measure the status quo of political power of TPA we asked each respondent: "How

significant do you think are traditional leaders in today's politics in [COUNTRY]?", and the follow-up item "Please name the most significant areas." Further questions provide complementary information – e.g on the relations between TPA and the state. As for the preferred level of political power of TPA, we asked for knowledge about the constitutional-legal context of TPA: "Have traditional leaders been granted legal rights by the state?/In which areas?". Then, a follow-up item asked "If yes/no, should these rights be increased, stay the same, or be decreased?/In which areas?/Why?". In explaining their reasoning, respondents expressed what level of power they would like TPA to have in their country.

I categorized responses according to the four-step scale using the R-package RQDA (*R-based Qualitative Data Analysis*, Huang, 2012). Thick description in the interviews makes scaling into distinct categories more difficult, but the "-/+"-scaling provides some flexibility. Table A.4 and A.5.1-4 (see Appendix) give typical examples for the scaling of statements by respondent group for each country.

### Source scaling

For Uganda, I scale the state actors' status quo position as "some" and the preferred political power of TPA as "small". State respondents frequently explain that the cultural role of TPA as defined by the Ugandan constitution does not match the actual role that TPA play in shaping local politics. State actors claim that TPA heavily influence politics and demand obedience from constituents. Moreover, state actors would prefer TPA to retain a small influence as custodians of culture only, without them holding substantial administrative powers – although they admit that TPA might be useful in mobilization for government policies.

I scale the traditional actors' perceived status quo position as "small+", and the preferred political power as "some+". Both Buganda Kingdom and Iteso Cultural Union (ICU) authorities express that the constitution determines their powers to be only cultural. Then again, Iteso clan leaders and Buganda authorities claim to provide a number of small-scale services (e.g. dispute resolution). Yet their financial leverage is small, hampering the implementation of larger policies. As for the preferred position, the Buganda authorities in particular emphasize their wish for a federal arrangement in which the Buganda administration would take over governing powers. Iteso leaders would like to see more funding and administrative powers flowing from the state to TPA, and claim that the Buganda Kingdom's position is driving other traditional leaders' preference for an increased administrative role.

I scale the experts' position regarding the status quo of TPA political power as "some-". Most experts point to the cultural role of TPA and emphasize the dominant position of the Buganda Kingdom, as well as the local role of TPA in service provision (e.g. land management, dispute resolution). However, experts underline that, while influential, the elites of the Baganda and Iteso do not play a role in functional service provision. According to the interviewed experts, political authority for TPA should be more formalized in areas where they have real expertise. None of the experts expressed a preference for TPA to hold either no power at all or major administrative power. I therefore scale the preferred level of political power for experts as "some+".

For Tanzania, I scale the state actors' status quo position as "small-" and the pre-

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ferred political power of TPA as "none". State actors pointed to how insignificant TPA have become since the abolition in the 1960s. However, regarding the rural level, respondents admitted that, for policies to be effective, TPA where they exist can be used as intermediaries. The majority of state respondents also feared that a stronger influence of TPA may create a culture of tribalism. Respondents preferred the legal status quo where-by TPA hold no political power.

The traditional actors' perceived status quo position was scaled as "small", and the preferred political power as "some-". For the Sukuma, traditional leaders defined their own role as "cultural", i.e. maintaining rituals and cultural activities. TPA described their minimal powers, e.g. in advising state administrators about land distribution. The interviewees admitted that constituents turn to the state for service provision. Yet, Sukuma TPA expressed their wish to be recognized for the services they *could* provide given their local knowledge.

The position of experts is scaled as "none+" for both the status quo and the preferred level of TPA power. In almost all of the interviews, respondents expressed that TPA are simply insignificant in today's Tanzanian politics. While a minimum role as cultural custodians may be desirable, experts mostly rejected the idea of increasing the powers of TPA.

Finally, the Maasai were described as exceptional in Tanzania. Because of their pastoralist lifestyle, the formal abolition of TPA powers does not seem to have had any strong effects on the political role of Maasai traditional leaders. Maasai leaders seemed content with their cooperation with local state institutions. In the light of their small pop-

ulation share (about 1 percent), I decide to treat the Maasai as an outlier when measuring the overall political power of TPA in Tanzania – albeit an important one e.g. with regard to conflicts between pastoralists and farmers in Northern Tanzania.

#### From scaled sources to triangulated measures

## Table 3 about here.

Table 3 and Figure A.1 (see Appendix) summarize the scalings described above. Figure A.1 shows the measurement for all three data sources by country on the scales termed *S*. I now proceed to discuss how to triangulate the gathered information with the aggregation strategies suggested by Leuffen et al. (2013). In Figure A.1, triangulated values are projected on the *M*-scale (for "measurement", as in Leuffen et al., 2013, p. 42).

## On aggregation strategies and convergence in triangulation

#### Strategy 1: Random Selection (RS)

If a source from *S* were chosen at random to project a measure on *M*, for any scale, it is highly likely that a true value would not be approximated. Granted, for the A-panels on the status quo, the variance of the scaling of the sources is relatively small, and hence random selection could produce a good estimation on *M*. However, the spread of values when it comes to the preferred level of political influence is greater. Thus, RS potentially produces biased estimates. Clearly, the picture emerging from a RS aggregation mechanism would not adequately capture the dynamics of the political power of TPA in Uganda and Tanzania.

#### Strategy 2 and 3: Arithmetic Mean (AM) and Weighted Average (WA)

Because the *S*-scale is ordinal, an arithmetic mean cannot be calculated. However, for conceptual purposes we can imagine taking the sum of the scalings from the different sources and dividing them by the number of sources used for each scale. The AM strategy presumes either that the researcher is convinced that all sources' measurements are of equal quality and weight, or that a confident measure of source quality cannot be generated. If the quality of the sources varies, the WA strategy can be used by attaching different quality weights to each source.

#### Assessing source quality

Yet, for these kinds of data, the "quality" of the measurement of each source can be assessed in various ways. Some reasonable differentiations in terms of data quality can be put forward. For instance, on the aggregate level, the Afrobarometer data has the advantage of being based on a large-N sample. This should minimize random error. Is the quality of the Afrobarometer data the highest because it is based on the largest number of respondents? When disaggregating the data (Table A.6, see Appendix) we see that, for example, for Tanzania the Afrobarometer samples only five Maasai. However, while making up only one percent of the population, the in-depth interviews have shown that the Maasai are of central importance as an outlier when studying the political influence of TPA in Tanzania.

Are then qualitative interviews most valid because they provide detailed information? One the plus side, the expert assessment is presumably less biased than the state and traditional actors' responses, given that the latter two groups have a greater stake in what the true value is. For example, traditional actors may understate the status quo because their preference is for TPA to have more influence. The reverse is true of state actors. Further, the experts should be more reliable than the constitutional-legal text because they take account of informal dynamics. Still, one problem here is the representativeness of the interview sample, which focuses on rather small numbers of experts and state and traditional actors.

Should we therefore weigh the constitutional-legal texts as most reliable because they are formalized, and most likely the result of a discursive process between political authorities? This is problematic because both the Afrobarometer and the interview data show that there is more to the power of TPA on the ground than the constitutional-legal texts suggest. These considerations suggest that assessments of source quality may also depend on whether the empirical interest is more in qualitative depth or representative width. When studying the overall contemporary political power of TPA in Uganda and Tanzania on a national level, the Afrobarometer would be the better source given its representativeness. Yet, if one is interested in the causal processes on the local level, one might want to rely more on the qualitative interviews.

#### Source measurement

Assuming that we do not have information on source quality, or that all sources are of equal weight, measurement with the AM strategy by triangulating all sources on *S* would yield AM-measures in the interval shown on the *M*-scales in Figure A.1. Comparing AM-values across countries, this points to two conclusions. First, in Uganda, the status quo and the preferred level of political power of TPA are higher than in Tanzania. Second,

there is a discrepancy in Uganda between the status quo ("some-") and a higher level of preferred political power of TPA ("some+"), whereas in Tanzania the status quo and preferred level are alike ("small-"). These AM-ranges provide a glimpse into the comparative dynamics of the two countries but they also obscure intrinsic political dynamics.

#### Comparing source quality

If the quality of the sources varies, the WA-strategy can be used by attaching different quality weights to each source. Here, it is important to note that weighting requires a decision not just about the relative quality of each source but also about the magnitude of that difference. For reasons of simplicity, Leuffen et al. (2013) in their simulations assume that one source is twice as revealing as each of the other two. For their three sources and a dichotomous variable of interest, this produces results that show the primacy of WA over other strategies.

In the case of the political power of TPA, magnitude assignment seems somewhat arbitrary – are the experts twice or three times as accurate as the Afrobarometer data, or vice versa? What if there are more than three sources to be triangulated? A reasonable solution for this problem might be to compare the generated AM ranges on the *M*-scale with the sources that are assumed to be of higher weight than others, and make a qualitative statement about such weights. For example, if one assumes that expert interviews and Afrobarometer data should be of equal importance but given greater weighting than other sources, the preferred level of political power of TPA in Uganda would be slightly higher than the AM-value (WA > "some-"). The status quo in Tanzania would be assessed as less than the AM-value (WA < "small-"). For the status quo in Uganda, the

AM-value and the WA would be virtually the same, because the AM range already corresponds to the experts' and the Afrobarometer values (WA  $\approx$  "some-"). Finally, the preferred level for Tanzania is trickier to interpret, because Afrobarometer and expert data "pull" in different directions. Yet, because the expert value is further away from the AMrange, it pulls the WA value to a slightly lower scaling.

If one can confidently assess the quality of the data and weight the sources accordingly, the WA provides a more pronounced and possibly more valid aggregated measure on *M*. For the two cases, a weighted interpretation of the sources via the WA should allow for more valid qualitative statements about the dynamics of interest. For example, in comparison to the AM, with the WA we should be more confident in stating that in Uganda there is a disparity between the status quo and preferences – which might lead to political tensions. Moreover, we could be more assertive in our interpretation that TPA are a less salient political issue in Tanzania than in Uganda, because the status quo matches the preferred level of political power of TPA.

## Strategy 4: Majority Strategy (MS)

If an MS is used to triangulate then we again assume that all sources are of equal weight. I use three sources with four to five different values depending on the scale. While a modal value might exist, it is theoretically possible that there is no majority. There could even be a multimodal sample of sources.

#### Source measurement

For instance, regarding Panel A.1 for Uganda, we find that two sources were scaled as

"some" and two were scaled as "some-". Taking the average value of the modes would only make sense where they are very proximate in value – otherwise, where modes are fairly distant, this would obstruct valid inference. Alternatively, for this particular scale, we could simply transform values to the original four-step scaling, which would treat the majority opinion as "some". Figure A.1 shows the MS-values generated in this way.

It becomes apparent that considering the MS changes the interpretation of the political power of TPA. A comparison of the MS-values for Uganda indicates that there is no discrepancy between status quo and preferred level of TPA power. In Tanzania, in turn, there is discrepancy: the preferred level of power is lower than the status quo.

A triangulation problem here might be that "a requirement [for MS] is that the sources are independent of each other" (Leuffen et al., 2013, 43) so that sources' agreement is not biased. However, for the sources at hand the interviews may not be independent of the constitutional and legal texts. The respondents refer back to these texts, and the documents were to some extent drafted by the interviewed experts and state authorities. Thus, independence among these sources can only be assumed for the Afrobarometer data.

Overall, MS appears to be a flawed strategy. It ignores the quality of sources, as well as the information that a triangulation of all sources provides. This is especially problematic for "smoking gun" evidence (Mahoney and Goertz, 2006), if one important source of information can potentially alter the inference. Using MS could force the researcher to ignore such important information.

#### Strategy 5: Winner Takes It All (WTIA)

WTIA involves weighting the sources to identify the one of highest quality. This strategy somewhat resembles finding the aforementioned "smoking gun" – in terms of the *content* and the *quality* of information.

Leuffen et al. (2013) describe WTIA as focusing on the most reliable and consistent source. The Afrobarometer provides a good starting point to identify reliable values. To generate a measure via triangulation, the Afrobarometer values (ab) would be projected on the *M*-scale. Yet, the Afrobarometer also ignores important qualitative information, as indicated by the small sample of Maasai in Tanzania. Then again, some of the qualitative interviews with actors and experts offer rare and reliable insights. For example, one interviewee held a central position in the Ugandan federal government for over a decade, and in that role participated in the negotiation which led to the "The Institution of Traditional or Cultural Leaders Bill" of 2010. He had previously been a minister for the Buganda Kingdom. For Tanzania, several of the experts had detailed knowledge of the Maasai and the Sukuma cultures. Hence, one particular value given by one of the respondents would be projected on the *M*-scale.

It becomes apparent that WTIA is wasteful. The strategy ignores the information of sources ranked as less consistent. A sole concentration on the "winner" is less useful if the analytical goal is qualitative description. While keeping this weakness in mind, according to Leuffen et al. (2013), WTIA performs better than other strategies in case there is strong systematic bias in the sample of sources. As argued before, there is evidence that the sources used for studying TPA power are not independent. In addition, the snowball sampling used for the qualitative interviews is prone to create interdependent interviews.

While sole consideration of the "winner" would be detrimental for qualitative inference, being able to discriminate consistent sources will also shed light on inconsistent information. One way to identify reliable "winners" could be to introduce "quality of information" items when collecting information from sources. For instance, interviewees could be asked factual knowledge questions to assess their expertise in the aggregation process. Other factors could be the interviewee's hierarchical, or the years spent working on the topic of interest. In the aggregation and triangulation of information, particular importance should be given to the accounts of more reliable sources.

## Source Timing

Finally, the *timing* of each source may not be an issue if triangulated sources are all collected at the same time. However, all sources used here offer an assessment of the power of TPA in different time periods. The constitutions and legal acts were adopted at different times beginning in the 1960s, the Afrobarometer data was collected in 2008/2009, and the qualitative interviews gathered in 2012/2013. For a weighted aggregation of information, should one trust the source most that has existed for the longest time, therefore having the strongest effect on the power of TPA, i.e. constitutional-legal texts? Should the greatest weight be given to more recent sources, i.e. the survey and the qualitative interviews? This issue is even further complicated by some of the legal texts being adopted after the Afrobarometer survey was conducted. Ultimately, if the main research interest were in the contemporary status quo power of TPA, then a greater reliance on the recent sources would be more adequate. If the interest is in a process tracing of the power of TPA, then sources should be weighted depending on the stage of the observed process. In any case, weighting sources based on timing should go hand in hand with considerations of source quality.

#### On variation and divergence in triangulation

As much as it is desirable to aggregate details from the various sources, the actual *variation* of source information can be as informative for accurate inference (cf. Blaikie, 1991; Stoker, 2011). Divergence of source information is interesting in two ways. First, it may trigger a methodological re-assessment of the accuracy of source measurement and scaling. This is due to variation of source quality. Second, if divergence persists then this is rather due to variation of content and needs to be incorporated when conducting in-depth, thick qualitative analysis. These dynamics are not discussed by Leuffen et al. (2013) but seem equally important when discussing triangulation.

Strategies RS and MS ignore divergence of source information. WTIA considers variation of source quality, but then selects only one reliable source, ignoring variation of content. Both the arithmetic mean (AM) and the weighted average (WA) process sources that vary in terms of content, with WA additionally taking into account the sources' quality. Following this reasoning, an additional reason to prefer WA to other aggregation strategies (as suggested by Leuffen et al., 2013) is that WA incorporates both variation of source quality and content. However, both AM and WA reduce the divergence to one value. Thus, considering either of them without also including the range of values in the analysis may reduce validity of inference. Here again, the incorporation of source timing

is crucial, as divergence of content may of course be due to change over time in the measurement of a variable of interest. Ignoring these differences in the timing of measurements may impair the accuracy of triangulation.

#### Triangulation strategies and source divergence

Figure A.1 shows the variance in values of the status quo and the preferred level of political power as a dotted line on the M-scale. If anything, accounting for the variance of source scalings allows for an exclusion of irrelevant values. This should increase the validity of inference of the aggregated values. For the analysis of the political power of TPA, we can generate comparative inference within and across countries: In Uganda, the divergence of the preferred level of political power of TPA is greater than the divergence in the status quo of political power. This may point to conflictual potential of the issue in this country, with opposing interests held by various parties. In Tanzania, the opposite is the case: the divergence of the status quo is larger than the divergence of sources on the preferred influence scale, which suggests that TPA power is a less controversial issue. If we take the Afrobarometer data as indicative of the population's majority opinion, we can further extrapolate that, while the Ugandan state authorities and the population have a similar assessment of the status quo of political powers of TPA, their preferred level of such power is highly divergent, with the population close to the traditional leaders' preference. In Tanzania, the Maasai can be included in the analysis, with the weighted average measuring a relatively low status quo power of TPA in general. Interestingly, while the experts' assessment for Tanzania is mostly on the lower ends of the scaling range, the experts for Uganda are scaled on higher levels for both scales. This suggests that experts see potential for the role of TPA in Uganda, but less so for TPA in Tanzania.

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These examples of the use of divergent source information emphasize the potential complementarity of aggregation and variation for triangulation. In any case, the use of aggregated or disaggregated sources should not be an "either/or". Together they generate valid qualitative analysis pointing to central tendencies as well as contradictory dynamics for the subject of interest.

In sum, I offer an illustrative application of Leuffen et al. (2013) using research into the political power of traditional political authorities (TPA) in Uganda and Tanzania. Leuffen et al. (2013) find that aggregation strategies using information that is weighted by the quality of the source provide more accurate results compared to other triangulation strategies – yet, if sources are systematically biased, researchers should focus on those sources they deem most reliable and consistent. Following the qualitative application in this paper, a similar argument can be made (Table 4 summarizes the findings for all triangulation strategies). The accuracy of a measurement of interests can gain from triangulating various sources. A strategy that mirrors a weighted average to aggregate data sources is most fruitful for generating qualitative evidence. Other strategies seem less amenable for qualitative research because they leave out information that may be central for valid inference.

## Table 4 about here

I have also discussed a second aspect of triangulation not explicated by Leuffen et al. (2013): the role of variation and divergence of data source information for the validity of inference. Without including an analysis of the range of source information, triangulation appears incomplete. I distinguish two types of variation in sources that researchers can incorporate: variation of source quality and variation of content. Both types need to be taken into account to complement aggregation strategies.

### Conclusion

Together with the aggregation strategies discussed by Leuffen et al. (2013), this paper provides systematic insights for how to triangulate. Applying both the aggregation strategies to approximate a true value of interest *and* types of source variation for the purpose of triangulation has allowed for more complete qualitative statements. Here, this combined strategy enabled a better empirical understanding of TPA in Uganda and Tanzania. As such, triangulation can indeed foster validity of inference, especially in qualitative research environments where information is scarce. Still, further structured methodological guidance is required to make triangulation more systematic.

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## Endnotes

<sup>1</sup> By increased validity of inference I mean "the increased confidence in the implied measurement outcomes of the research where there are convergent findings" (Moran-Ellis et al. 2006, 47).

<sup>2</sup> The Afrobarometer is a large public attitude survey on various socio-political issues in Sub-Saharan Africa conducted by a pan-African research network every two to three years since 1999.

<sup>3</sup> The remaining two types – investigator triangulation and theory triangulation – are left aside here, because (a) I use a common theoretical framework for all sources and hence do not triangulate between theories; (b) Leuffen et al. (2013, p. 41) explicitly focus on the triangulation of data and different methodological perspectives; and (c) investigator triangulation would arguably happen either when data is collected, or when data is evaluated, but not at the aggregation stage of data investigated by Leuffen et al. (2013).

# Tables

Response	UGANDA	TANZANIA
None	0.18	0.46
A small amount	0.28	0.15
Some	0.24	0.13
A great deal	0.16	0.07
Don't know	0.13	0.19
	N = 2,431	N = 1,208

<i>Q1</i> :	" "How much influence do traditional leaders currer	ıtly h	ave
	in governing your local community?"		

 Table 1: Status quo of governing influence (Afrobarometer 2009), relative share

	UGANDA	TANZANIA	Ν
act <sub>S</sub>	10	8	18
$act_T$	10	9	19
exp	15	14	29
Ν	35	31	66

 Table 2: Number and categories of in-depth interviews

	UGANDA		TANZANIA	
Source	status quo	preferred	status quo	preferred
Constitutional- legal texts	"some"	-	"none"	-
Afrobarometer	"some-"	"large-"	"small-"	"small+"
Interviews act <sub>s</sub>	"some"	"small"	"small-"	"none"
$act_T$	"small+"	"some+"	"small"	"small-"
exp	"some+"	"some"	"none+"	"none+"

 Table 3: Summary of scalings by source

Strategy type	Strengths	Limitations	Note on divergence	Findings on TPA
Random Selection	Reduces bias for a large number of sources (only)	With small number of sources, approx- imation of true val- ue is unlikely	Spread of values across sources is ig- nored, or random as well	Not applicable
Arithmetic Mean	Informative if dif- ferentials in source quality are not as- sessable, or sources are of the same quality	Assumption of equal source quality may be unrealistic, leads loss of infor- mation	Only spread of source content is tak- en into account	Status quo and pre- ferred power of TPA higher in UGA than TAN; discrepancy in UGA between lower status quo and higher preferred power
Weighted Average	Informative if source quality can be assessed, and if source quality var- ies; allows stronger qualitative assess- ment	Assessing source quality is complex, and requires further measurement of rel- ative source quality weights; difficult for varying types of sources	Spread of source content and source quality is taken into account	TPA less salient is- sue in TAN than in UGA; in TAN, status quo similar to pre- ferred level of power if experts and Afrobarometer weigh more
Majority Strategy	Facilitates triangula- tion of true value and comparison across sources	Sources might be multi-modal or without majority; ignores source qual- ity	Spread of values across sources is ig- nored	No discrepancy be- tween status quo and preferred level of TPI power in UGA; in TAN, preferred level is lower than status quo
Winner Takes It All	Allows detection of "smoking gun" evi- dence; informative if sources are sys- tematically biased	Wasteful; ignores information in case the goal of thick de- scription	Spread in source quality is incorpo- rated, but focuses only on the most consistent sources	Afrobarometer find- ings most consistent, but ignore crucial information, e.g. role of Maasai in TAN

# Table 4: Strengths and limitations of triangulation strategies, findings

## Figures



Figure 1: Scales of political power of TPA, (A) status quo and (B) preferred



Figure 2: Scaling example