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AN ANALYSIS OF MOZAMBIQUE'S POLITICAL AND ECONOMIC NETWORKS[1]

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Abstract

This paper analyses the social networks existing among politicians and economists in contemporary Mozambique, using the SNA-Social Networks Analysis method to identify the links between these individuals, to discern their relationships and to measure both the density and the centrality of the political-business network. Mozambique's political and business elite is thus identified. A network sociogram is presented identifying the individual position in the network and the linkages among these individuals and several positional metrics of the individuals in the network are estimated, allowing identifying each individual and its influence in the network. As this network is resource accumulation driven, this exercise permits to identify the main political and economic individual active in Mozambique economy. President Guebuza define the major network centre and other individuals, Joaquim Chissano, the former president, and Graça Machel, the widow of another former president. Policy implications are derived and the links between them displayed, allowing for an accurate view of Mozambique's political and business world.

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ÍNDICE

1. INTRODUCTION

This paper analyses Mozambique's social networks and political power using SNA-Social Network Analysis. SNA is a subfield of graph theory and is used for analysing relational data[2]. With the aid of graphs, SNA describes the network and seeks to understand how important, or how central, the different actors are in the network, as well as to discover how concentrated the network is. The paper therefore presents a graph plotting the network of relationships observed between political actors and economic actors in Mozambique, and then it presents metrics relating to the network. SNA research in the field of sociology includes studies of elites[3].

The motivation for the present research is as follows: firstly, although there is some research in Mozambique[4], the relationship between political power and economic power is similar to those found in other contemporary countries, and therefore it is interesting to discover who the prominent individuals are and what role they play in the network; secondly, although there has been some research conducted into Mozambican politics and business[5], the SNA methodology has so far not been used to describe Mozambique. Finally, the paper also seeks to measure both the centrality and the density of this network.

The paper is organised as follows: in the next section, the contextual setting is presented; Section 3 consists of a literature survey; in Section 4, the methodology is explained; Section 5 contains the data and the empirical specification; the results are presented in Section 6; finally we make our concluding remarks in Section 7.

2 Prell, C. Social Network Analysis: History, Theory & Methodology. (Thousand Oaks, CA: Sage Publications Ltd. 2012).
3 Laumann, E. and Pappi, F. "New Directions in the study of Elites". American Sociology Review, (1973) pp. 38, 212-230; Burt, R. (1982) "Toward a Structural Theory of Action". New York, Academic Press; Granoveter, M. "Economic Action and Social Structure: The problem of Embeddness". American Journal of Sociology, 91 (1985), 481-510; Gil-Mendieta, J. and Schmidt, S. "The political network in Mexico". Social Networks, 18 (1996), 355-381.
4 Hamar, A. "Ambivalent mobilities: Zimbabwean commercial farmers in Mozambique". Journal of Southern African Studies, 36, 2 (2010), 395-416; Cramer, R. "Privatisation and adjustment in Mozambique: A Hospital Pass?" Journal of Southern African Studies, 27, 1 (2010), 79-103; Sender, J. and Oya, C. and Cramer, C. "Women working for wages: Putting flesh on the bones of a rural labour market survey in Mozambique". Journal of Southern African Studies, 32, 2 (2006), pp. 313-333; Cramer, Christopher and Oya, Carlos and Sender, John. "Lifting the Blinkers: A New View of Power, Diversity and Poverty in Mozambican Rural Labour Market". Journal of Modern African Studies, 46, 3 (2008), pp. 361-392; Vines, A. "Disarmament in Mozambique". Journal of Southern African studies, 24, 1 (1998),191-205.
5 Mira, F.J.B (2005). Les élites et les entreprises au Mozambique: Globalisation, systèmes de pouvoir et reclassements sociaux (1987-1999). PhD thesis on comparative research on development (EHESS/PARIS) and the economic sociology of organizations, (2005), ISEG/UTL.

2. BACKGROUND

Mozambique achieved independence from Portugal in 1975, only to become immediately engulfed in a civil war that lasted from 1976 to 1992. In recent years, the Mozambican economy has been characterised by a growth rate in GDP of 7%, despite showing a heavy concentration in the extractive sector, which is dominated by capital-intensive mega-projects that benefit from fiscal incentives, without upstream and downstream linkages, and have little impact on the economy as a whole[6]. Nearly 90% of the workforce earns their survival income in the informal sector, while the small formal sector is dominated by a few powerful economic groups and actors, most of whom benefit from their connections with the dominant political party, Frelimo. Most business people in Mozambique are members of the CTA-Confederation of Mozambican Business Associations, an organisation that clearly enjoys close relations with the ruling party. According to Pitcher[7], "rather than constituting an autonomous sphere independent of the government, CTA and the government were interwoven. CTA's member associations in banking, tourism, commerce, and manufacturing contained powerful supporters of the party."

To understand the link between politics and business in Mozambique after independence, it is important to go back to the beginning of the construction of the new state and the consolidation of the Frelimo coalition. In 1977, Frelimo held its third congress, at which it declared itself to be a Marxist-Leninist party, and one of the main implications of this decision was that thereafter the economy began to be managed through central planning in a typically socialist fashion. The second feature emanating from the congress was a coercive modernisation project involving communal villages, consumption cooperatives and state farms. During this period, opposing political parties were not allowed to exist and the private sector was either residual or non-existent. The state became confused with the Frelimo party itself and vice-versa, and decision-makers believed that industrialisation could take place in 10 years, under the scope of a programme entitled "Plano Prospectivo Indicativo" and commonly referred to as PPI.

According to Harrison[8], the expansion of Frelimo's control over the economy can only be explained as a reaction to the crisis that had created a heated environment in the country immediately after independence. By 1978, 50% of all businesses were already under state control, and, by 1981, 65% of industrial production, 85% of the transport sector and 90% of the construction sector were positioned inside the state sector. This suggests that Frelimo's aim was to increase state control and consolidate itself as the

6 Castel-Branco, Nuno. Dependência de Ajuda Externa, Acumulação e Ownership. Cadernos IESE n° 7/2011, (2011). Maputo: IESE.
7 Pitcher, M.A. Party Politics and Economic Reform in Africa's Democracy. (USA: Cambridge University Press, 2012), p.182.
8 Harrison, G. "Corruption as 'boundary politics': the state, democratization, and Mozambique's unstable liberation". Third World Quarterly, 20:3, (2010), 537–550

central elite governing Mozambique's political economy. The absence of economic power is viewed by this author as the second motive that encouraged the party to expand its economic power through the state and not through the promotion of private interests, which were practically non-existent.

Although some literature speaks about the absence of a private sector in Mozambique, Pitcher[9] argues that enterprises such as "Banco Standard Totta de Moçambique", "Companhia de Moçambique" (including "Entreposto"), "João Ferreira dos Santos" and "Grupo Madal" were not nationalised or interfered with because of "the government's lack of will or its incapacity to extend its control to all enterprises". The author says that it was precisely "the existence of a residual private sector during the socialist period [that] had the simultaneous effect of saving and undermining the transformative project of the Frelimo government. Without the support of the private sector, it is likely that the consequences of social engineering would have been worse."

After the fourth Congress in 1983, the first steps were taken to open up the market, but the decisive moment was the fifth Congress in 1989, which effectively allowed Frelimo members to enrich themselves. Thus, "as the congress authorised the Frelimo members to participate in the private sector, this afforded the party the power to re-express the nature of its support, while also giving its members control over state enterprises." In the privatisation process, the internal groups saw an opportunity to get rich. Therefore, the elites used their power to benefit from privatisation, and, through a process that Pitcher describes as 'transformative preservation', the first attempts were made to establish a support base composed of members of the elites from the private sector, a move that allowed them to hold on to political power[10].

Pitcher's view is confirmed by Harrison when he argues that the stabilisation and structural adjustment programme legitimised the acquisitive spirit that had been strongly condemned in the name of socialism. This led to a situation in which everyone, at all levels of society, tried to pillage public funds for the accumulation of their own personal wealth or simply for survival purposes. As the privatisations that were introduced were not transparent, this made it possible for those with good political connections to benefit from them. As an example, Pitcher speaks about 'inside knowledge' of the privatisation process, saying that political networks may have distorted prices and information, favouring individuals or interest groups. In such a context, top officials used their public position to gain an advantage in the turbulent and growing arena of private enterprise.

Effectively, despite certain distributional conflicts during the course of the privatisation of state enterprises, the discipline and experience of the ruling party (operating within a system of two-party stability) proved strong enough for it to maintain

9 Pitcher, M.A. "Sobreviver à transição: o legado das antigas empresas coloniais em Moçambique". Análise Social, Vol. XXXVIII, 168 (2003), 793-820, p. 797 and 798.
10 Pitcher, M.A. "Sobreviver à transição: o legado das antigas empresas coloniais em Moçambique". Análise Social, Vol. XXXVIII, 168 (2003), 793-820, p. 807 and 808.

its support. Patronage, corruption and a lack of accountability were some of the features of this strategy, including both the plea made by the leadership for loyalty within the party and the appeasement of its rank and file members through the provision of club goods. In fact, the government used the privatisation process to strengthen the social network existing within the ruling party. Frelimo took advantage of the process to further its members' interests by investing in the private sector[11].

Pitcher says that those domestic investors that had close connections with Frelimo were either given or bought enterprises whose business ranged from tourism to finance, which meant that members of the party moved from politics to business or, like the current president of Mozambique, used their network in the political arena to further their expansion into the market economy. In the case of the country's presidents, there was a long list of politically well-connected entrepreneurs, including ex-first ladies, former prime ministers, members of the army, etc. The centralised state control over the privatisation process guaranteed that the ruling party was able to enjoy substantial influence over the way in which enterprises were sold and to whom. The government used its authority to favour the party's interests and to divide control of these enterprises among the loyal members of the party. Additional legislation was created to strengthen the state's presence and to ensure continued favouritism for party members, even after having already created the necessary institutions for a market economy. In order to explain this logic, Harrison suggests that the unstable liberalisation process to which Mozambique was subjected created conditions for corruption, making this process a key element in the country's democratic politics and leading to an erosion of the state and the legitimisation of a political elite.

3. LITERATURE SURVEY

African social capital and social networks are a theme that has attracted some research in the past[12]. However, in recent years, SNA has emerged as a research paradigm in the social sciences[13], being used to arrive at a description of social networks[14]. For

11 Pitcher, M.A. Party Politics and Economic Reform in Africa's Democracy. (USA: Cambridge University Press, 2012).
12Meagher, K. "Social capital, social liabilities and political capital: Social networks and informal manufacturing in Nigeria". African Affairs, 105, 421, (2006), 553-582; Bräutigam. "Close encounters: Chinese business networks as industrial catalysts in sub-Saharan Africa". African Affairs, 102, 408 (2003), 447-467; Donge, J.K.V. "Waluguru traders in Dar Es Salaam: An analysis of the social construction of economic life". African Affairs, 91, 363, (1992), 181-205.
13Córten, R. (2011) "Visualisation of social networks in Stata using multidimensional scaling". Stata Journal, 11,1, 52-63; Miura, H. (2011) "Network analysis for directed or undirected networks with no weights". Paper submitted to the Stata Journal.
14 Wasserman, S. and K. Faust. Social Network Analysis: Methods and Applications. (Cambridge: Cambridge University Press, 1994); Scott, N., Baggio, R. and Cooper, C. "Network analysis and tourism: From theory to practice". Clevedon, UK: Channel View, 2008); Newman, M., Barabási, A.-L. and Watts, D. (eds.) The Structure and Dynamics of Networks. (Princeton, NJ: Princeton University Press, 2006).

example, Mistrulli[15] analysed bank failures in Italy as part of a social network process. Other applications of SNA have also been made in the field of management[16], in the field of sociology[17], in tourism[18] and politics[19].

4. METHODOLOGY

Social network analysis (SNA) studies the different patterns of interaction among social entities[20]. Network visualisation is concerned with showing binary relations between entities. Adopting the terminology of graph theory, these entities are given the name of nodes or vertices. Relations between nodes may be considered to be directed if they can be understood as flowing from one node to another, or they may be considered to be non-directed if no such flow can be identified. Directed relations are referred to as arcs and non-directed relations are referred to as edges[21].

A graph model representing a network G = (V; E) consists of a set of nodes V and a set of arcs E. Vj equals the number of nodes and Ej equals the number of arcs. An arc is defined as a link between two vertices i and j (not necessarily distinct) that has node i at one end and node j at the other end. There are several types of nodes: (i) isolated nodes – nodes that are not attached to any arc; (ii) parallel arcs – two or more arcs that connect the same pair of nodes; (iii) self-loop – an arc connecting node i to itself; and (iv) a zero or negative-weighted arc[22].

A typical representation of a network of relations is an adjacency matrix. In this matrix, every cell represents a relation from one node (row) to another node (column); for non-directed networks, this matrix is symmetrical. Nodes that have no edges or arcs are called isolates. The number of edges connected to a node is known as the degree of

15 Mistrulli, P.M. "Assessing financial contagion in the interbank market: Maximum entropy versus observed interbank lending patterns". Journal of Banking and Finance, 35, (2011), 1114–1127; Tichy, N., Tushman, M. and Fombrun, C. "Social network analysis for organizations". The Academy of Management Review, 4, (1979), 507–519.
16 Tichy, N., Tushman, M. and Fombrun, C. "Social network analysis for organizations". The Academy of Management Review, 4, (1979), 507–519; Cross, R., Parker, A., and Borgatti, S.P. 2002. "Making Invisible Work Visible: Using Social Network Analysis to Support Strategic Collaboration". California Management Review. 44(2): 25-46.
17 Laumann, E. and Pappi, F. "New Directions in the study of Elites". American Sociology Review, 38, (1973) 212-230; Burt, R. (1982) "Toward a Structural Theory of Action". New York, Academic Press; Granoveter, M. (1985). "Economic Action and Social Structure: The problem of Embeddedness". American Journal of Sociology, 91, 481-510.
18 Bággio, R.; Scott, N. e Cooper, C. (2010) " Network Science: A review focused in tourism". Annals of Tourism Research, 37, 3, 802-827;
19 Gil-Mendieta, J. and Schmidt, S. "The political network in Mexico". Social Networks, 18, (1996), 355-381.
20 Wasserman, S. and K. Faust. Social Network Analysis: Methods and Applications. (Cambridge: Cambridge University Press, 1994); Scott, J. Social Network Analysis: A Handbook. (2nd ed.). (London: Sage Publications Ltd, 2000).
21 Córten, R. (2011) "Visualisation of social networks in Stata using multidimensional scaling". Stata Journal, 11,1, 52-63.
22 Miura, H. (2011). "Network analysis for directed or undirected networks with no weights". Paper submitted to the Stata Journal.

the node, which is a measure of node centrality. Lastly, the distance between two nodes is defined as the shortest path between them. If there is no path between two isolates, the distance between them is said to be infinite[23].

The main task to be performed in a network analysis is the visualisation of the relationships between the players and it is important to determine the positions of the vertices in a (typically two-dimensional) graphical layout. Obviously, the optimal placement of vertices depends on the purpose of the analysis; however, it is often desirable to centrally locate in the graph those vertices that have a central position in the SNA and to represent a larger distance in the network by a larger distance in the two-dimensional graph[24].

The network graph measured with the adjacency matrix describes the network, but additional measurements can describe the network more accurately. Two measurements are central, the measurement of centrality and the measurement of density. Degree centrality measures the importance of a node by the number of connections that the node has if the network is unweighted, and by the aggregate of the weights of edges that are connected to the node if the network is weighted[25].

5. THEORETICAL BACKGROUND

The theoretical background of the present research is the embeddedness concept[26]. Embeddedness is the degree to which individuals or organisations are enmeshed in a social network and it involves the overlap between social and economic ties within and between organisations. The concept refers both to the effects of social relationships (trust and cohesion) on economic outcomes and to the inertial tendency to repeat transactions over time. Job embeddedness is considered to be a good predictor of an employee's tendency to stay in a job despite an external shock that might otherwise cause him to quit[27]. By analogy, social embeddedness is the persistence of the social structures analysed in this context.

23 Córten, R. (2011) "Visualisation of social networks in Stata using multidimensional scaling". Stata Journal, 11,1, 52-63.
24 Córten, R. (2011) "Visualisation of social networks in Stata using multidimensional scaling". Stata Journal, 11,1, 52-63.
25 Freeman, L. C. (1978). "Centrality in social networks: Conceptual clarification". Social Networks 1, 215-239.
26 Granoveter, M. "Economic Action and Social Structure: The problem of Embeddedness". American Journal of Sociology, 91, (1985), 481-510.
27 Allen, N. J. and Meyer, J. P. "Affective, continuance, and normative commitment to the organization: An examination of construct validity". Journal of Vocational Behaviour, 49, (1996), 252–276; Crossley, C. D. and Stanton, J. M. "Negative affect and job search: Further examination of the reverse causation hypothesis". Journal of Vocational Behaviour, 66, (2005), 549–560.

6. DATA AND RESULTS

The data set consists of qualitative information on the networks existing between the Mozambican politicians and economic players described in the table 1 below. The data were obtained from the website of the Maputo Centre for Public Integrity[28]. The data describe relationships among individuals, which are by their very nature directed between two individuals. Such a network is a network of k relations, there is a $k \times 2$ data matrix in which every row represents an arc (if the network is directed) between two nodes defined by the names of individual people. The use of edge lists and arc lists often provides a more economical way of storing network data than an adjacency matrix.

Table 1: Names of the Mozambique Political and Business Network

Number of observations	Names of the Mozambique network	Military	Frelimo member	Business
1	Abdul Cadre I. Cassamo	0	1	1
2	Abdul Carimo M. Issa	0	1	1
3	Abdul Magid Osman	0	1	1
4	Adriano F. Sumbana	0	1	1
5	Aiuba Cuareneia	0	1	1
6	Albertina Miguel Pascoal	0	1	0
7	Alberto J. Chipande	1	1	1
8	Alberto Zaqueu Jamice	0	1	0
9	Américo Magaia	0	1	1
10	Angelo Azarias Chichava	0	1	1
11	António A. Matos	0	0	1
12	António C. F. Sumbana	0	1	1
13	Apolinário Panguene	0	1	1
14	Armando Guebuza	0	1	1
15	Aurêlio Zilhão	0	1	1
16	Benjamin Faduco	0	1	1
17	Bernardo Gabriel Dava	0	1	1
18	Bonifácio Gruveta	1	1	1
19	Cadmiel F. Muthemba	0	1	1
20	Carvalho Muaria	0	1	0
21	Casimiro Huate	0	1	1
22	Celso Ismael Correia	0	1	1
23	Daúde Nhaca Guebuza	0	1	1

28 http://www.cip.org.mz/cipsrcdb/index.asp

24	Domingos Fondo	1	1	0
25	Eduardo Arão	0	1	0
26	Eduardo Filipe Magaia	0	1	1
27	Egas Mussanhane	0	1	1
28	Egidio Leite	0	1	1
29	Elias Jaime Zimba	0	0	1
30	Elisio J. Z. Langa	0	1	0
31	Félix Júlio Massingue	0	1	1
32	Fernando Manuel P. Costa	0	0	1
33	Fernando Sumbana Jr	0	1	1
34	Graça Simbine Machel	0	1	1
35	Henrique J. Macuácua	0	1	1
36	Hermenegildo Gamito	0	1	1
37	Isidora Faztudo	0	1	1
38	Jacinto Soares Veloso	1	1	1
39	Jesus Joaquim C. Gomes	0	0	1
40	João Américo Mfumo	1	1	1
41	Joaquim Chissano	0	1	1
42	José A. Tomo Psico	0	1	1
43	José Eduardo Dai	0	1	1
44	José Ferreira Songane	0	1	0
45	José Luis da Costa Virott	0	0	1
46	José Mateus Kathupa	0	1	1
47	José Solomone Cossa	0	1	1
48	Josina Ziyaya Machel	0	1	1
49	Judite Tembe Mutaca	0	1	0
50	Luis Magaço Junior	0	0	1
51	Malengane D. Machel	0	1	1
52	Manuel C. F. Sumbana	0	1	1
53	Manuel F. Arede	0	0	1
54	Manuel Jorge Tomé	0	1	1
55	Manuel M. P. Braga	0	0	1
56	Mariano Matsinha	1	1	1
57	Matias Zefanias Mboa	0	1	1
58	Miguel Nhaca Guebuza	0	1	1
59	Modesta Daniel	0	1	1
60	Moises R. Massinga	0	1	1
61	Mussumbuluko Guebuza	0	1	1

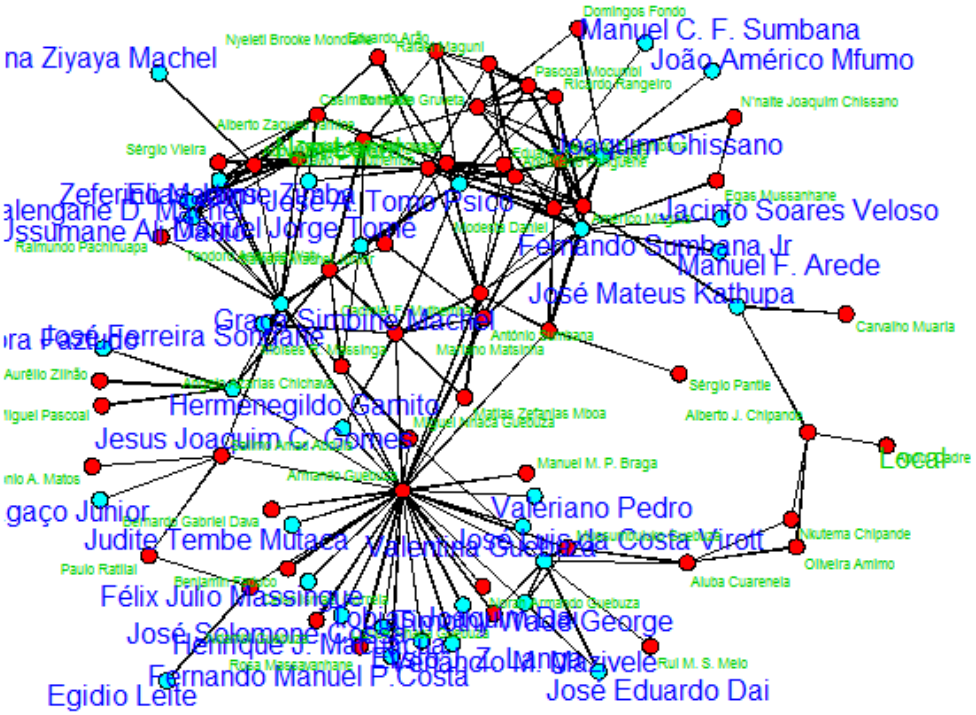
62	Ndambi Guebuza	0	1	1
63	Nkutema Chipande	0	1	1
64	N'naite Joaquim Chissano	0	1	1
65	Norah Armando Guebuza	0	1	1
66	Nyeleti Brooke Mondlane	0	1	1
67	Octavio F. Muthemba	0	1	1
68	Oliveira Amimo	0	1	1
69	Pascoal Mocumbi	0	1	1
70	Paulo Ratilal	0	1	1
71	Rafael Maguni	0	1	1
72	Raimundo Pachinuapa	1	1	1
73	Ricardo Rangeiro	0	0	1
74	Rosa Massavanhane	0	1	0
75	Rui M. S. Melo	0	0	1
76	Salimo Amad Abdula	0	1	1
77	Samora Machel Júnior	0	1	1
78	Sérgio Pantie	0	1	1
79	Sérgio Vieira	0	1	1
80	Teodato M. S. Hunguana	0	1	1
81	Teodoro Andrade Waty	0	1	1
82	Timothy Wade George	0	0	1
83	Tobias Joaquim Dai	1	1	1
84	Ussumane Ali Dauto	0	1	1
85	Valentina Guebuza	0	1	1
86	Valeriano Pedro	0	1	1
87	Venâncio M. Mazivele	0	1	1
88	Zeferino Martins	0	1	1
	Mean	0.090	0.875	0.897

From Table 1, it can be concluded that military personnel account for 9% of the sample, while Frelimo party members account for 87.5% Many of the latter are also business-oriented, which means that overall 89.7% of the sample is business-oriented. Political and business orientations are very frequently combined in Mozambique, thereby justifying the present research.

6.1. Empirical Results

The analysis consists of two sequential stages: firstly, the network is visualised with the aim of identifying each player's position within it, in the form of a sociogram in which the data are represented as a list of nodes and links[29]; secondly, the network metrics are calculated in order to measure the centrality and density of the networks[30]. Figure 1 presents the sociogram of the Mozambique network.

Figure 1: Sociogram of the Mozambique network



In analysing the sociogram, the first thing to be observed is that it identifies specific nodes in the network, adding individual name labels to the plot using the label option. Focusing on the inner nodes first of all, it can be seen that there are two main inner nodes, defined by political individuals who organise the network. The first centre is headed by the Mozambique President Armando Guebuza and the second by the former president Joaquim Chissano. Therefore the leading position belongs to two major political individuals in the network. Another less concentrated centre is headed by Graça Machel, the wife of another former president. Business personnel have outlying positions, signifying that the leading role is played by politicians and not by business people (e.g.

29 Córten, R. (2011) "Visualisation of social networks in Stata using multidimensional scaling". Stata Journal, 11,1, 52-63.
30 Miura, H. "Network analysis for directed or undirected networks with no weights". Paper submitted to the Stata Journal, 2011.

Salimo Abdula and Celso Correia from Intelec Holding, whose public visibility derives from the new presidency of Armando Guebuza, with whom the company has links). Figure 1 therefore confirms the importance of the political and business network in Mozambique.

At a second stage in the results, some networks are estimated for each node. Because of the high number of edges, the metrics are displayed for the initial 10 edges. This information is presented in Table 2 below.

Table 2: Network metrics

		Degree centrality			**Closeness centrality**	**Betweenness centrality**	**Eigen vector centrality**
Number of observations	**Names**	**In-degree**	**Total degree**	**Out-degree**	**–**	**–**	
1	Abdul Cadre I. Cassamo	49	91	42	0.659	47.737	0.104
2	Abdul Carimo M. Issa	41	89	48	0.690	47.317	0.118
3	Abdul Magid Osman	49	94	45	0.674	54.233	0.110
4	Adriano F. Sumbana	44	77	33	0.617	37.032	0.081
5	Aiuba Cuareneia	40	83	43	0.664	39.628	0.107
6	Albertina Miguel Pascoal	38	76	38	0.639	31.702	0.089
7	Alberto J. Chipande	42	87	45	0.674	42.730	0.108
8	Alberto Zaqueu Jamice	48	89	41	0.654	49.359	0.102
9	Américo Magaia	42	82	40	0.649	38.959	0.098
10	Angelo Azarias Chichava	42	94	52	0.713	51.284	0.128
11	António A. Matos	43	72	29	0.600	28.356	0.069
12	António C.F. Sumbana	45	92	47	0.685	49.694	0.114
13	Apolinário Panguene	48	86	38	0.639	43.951	0.094
14	Armando Guebuza	41	84	43	0.664	41.680	0.106
15	Aurêlio Zilhão	54	97	43	0.664	51.355	0.106
16	Benjamin Faduco	43	91	48	0.690	47.015	0.116
17	Bernardo Gabriel Dava	48	86	38	0.639	45.369	0.092
18	Bonifácio Gruveta	46	91	45	0.674	49.113	0.112
19	Cadmiel F. Muthemba	43	85	42	0.659	41.646	0.100
20	Carvalho Muaria	46	90	44	0.669	45.922	0.108
21	Casimiro Huate	48	94	46	0.679	52.321	0.115
22	Celso Ismael Correia	50	97	47	0.685	58.499	0.115
23	Daúde Nhaca Guebuza	41	95	54	0.725	54.269	0.133

24	Domingos Fondo	40	75	35	0.625	32.835	0.084
25	Eduardo Arão	41	83	42	0.659	39.659	0.101
26	Eduardo Filipe Magaia	43	92	49	0.696	47.844	0.121
27	Egas Mussanhane	42	92	50	0.701	48.464	0.121
28	Egidio Leite	36	76	40	0.649	32.905	0.097
29	Elias Jaime Zimba	52	92	40	0.649	49.507	0.098
30	Elisio J. Z. Langa	48	96	48	0.690	52.208	0.115
31	Félix Júlio Massingue	45	89	44	0.669	47.412	0.107
32	Fernando Manuel P. Costa	49	85	36	0.630	38.863	0.090
33	Fernando Sumbana Jr	46	92	46	0.679	51.512	0.111
34	Graça Simbine Machel	37	83	46	0.679	39.132	0.111
35	Henrique J. Macuácua	38	78	40	0.649	38.511	0.098
36	Hermenegildo Gamito	41	80	39	0.644	37.793	0.097
37	Isidora Faztudo	50	90	40	0.649	46.732	0.098
38	Jacinto Soares Veloso	35	81	46	0.679	37.911	0.111
39	Jesus Joaquim C. Gomes	38	86	48	0.690	44.394	0.117
40	João Américo Mfumo	44	85	41	0.654	39.760	0.100
41	Joaquim Chissano	46	83	37	0.635	41.504	0.090
42	José A. Tomo Psico	48	96	48	0.690	55.270	0.118
43	José Eduardo Dai	48	93	45	0.674	53.911	0.111
44	José Ferreira Songane	45	94	49	0.696	49.823	0.120
45	José Luis da Costa Virott	45	87	42	0.659	45.641	0.103
46	José Mateus Kathupa	42	78	36	0.630	33.690	0.090
47	José Solomone Cossa	46	84	38	0.639	42.150	0.093
48	Josina Ziyaya Machel	45	93	48	0.690	52.985	0.116
49	Judite Tembe Mutaca	40	82	42	0.659	39.726	0.103
50	Luis Magaço Junior	41	87	46	0.679	45.072	0.114
51	Malengane D. Machel	45	88	43	0.664	46.981	0.105
52	Manuel C. F. Sumbana	41	85	44	0.669	44.231	0.107
53	Manuel F. Arede	41	78	37	0.639	34.742	0.090
54	Manuel Jorge Tomé	40	81	41	0.654	39.153	0.098
55	Manuel M. P. Braga	36	85	49	0.696	40.344	0.122
56	Mariano Matsinha	43	76	33	0.617	30.607	0.080
57	Matias Zefanias Mboa	44	81	37	0.635	40.839	0.091
58	Miguel Nhaca Guebuza	49	88	39	0.644	43.459	0.099
59	Modesta Daniel	42	87	45	0.674	44.398	0.109
60	Moises R. Massinga	40	84	44	0.669	41.066	0.108
61	Mussumbuluko Guebuza	48	79	31	0.608	35.663	0.076

62	Ndambi Guebuza	35	77	42	0.659	35.288	0.103
63	Nkutema Chipande	46	93	47	0.685	49.511	0.116
64	N'naite Joaquim Chissano	39	83	44	0.669	38.898	0.106
65	Norah Armando Guebuza	46	88	42	0.659	44.231	0.103
66	Nyeleti Brooke Mondlane	43	89	46	0.679	46.369	0.113
67	Octavio F. Muthemba	43	93	50	0.701	49.534	0.119
68	Oliveira Amimo	39	84	45	0.674	42.391	0.110
69	Pascoal Mocumbi	44	98	54	0.725	57.108	0.131
70	Paulo Ratilal	44	90	46	0.679	49.791	0.114
71	Rafael Maguni	51	97	46	0.679	55.181	0.112
72	Raimundo Pachinuapa	43	88	45	0.674	44.152	0.111
73	Ricardo Rangeiro	36	76	40	0.649	33.148	0.098
74	Rosa Massavanhane	39	82	43	0.664	37.129	0.106
75	Rui M. S. Melo	44	93	49	0.696	51.476	0.121
76	Salimo Amad Abdula	43	87	44	0.669	42.278	0.108
77	Samora Machel Júnior	36	82	46	0.679	37.763	0.111
78	Sérgio Pantie	40	89	49	0.696	47.707	0.119
79	Sérgio Vieira	42	91	49	0.696	49.384	0.119
80	Teodato M.S. Hunguana	43	84	41	0.654	42.381	0.101
81	Teodoro Andrade Waty	43	84	41	0.654	42.589	0.102
82	Timothy Wade George	40	81	41	0.654	38. 452	0.103
83	Tobias Joaquim Dai	47	92	45	0.674	52.324	0.111
84	Ussumane Ali Dauto	35	78	43	0.664	35.595	0.103
85	Valentina Guebuza	35	83	48	0.690	41.081	0.116
86	Valeriano Pedro	42	83	41	0.654	41.895	0.100
87	Venâncio M. Mazivele	42	81	39	0.644	38.401	0.096
88	Zeferino Martins	46	82	36	0.630	39.024	0.088

Distinct central measures are presented, displaying a high level of centrality that varies from one individual node to another. The first and most common network metric is the degree. The degree measure of centrality is a directional measure of the number of links a person has[31]. As it is a directional measure, it is broken down into "in-degree", which is the number of individual inward connections, and "out-degree", which is the number of individual outward connections. The highest centrality is obtained by Pascoal Mocumbi with an index of 98, and this centrality is more outside-oriented (54) than inside-oriented (44). Leading positions in terms of centrality are held by Aurélio Zilhão, who is more outside–oriented, and Celso Ismael Correia and Rafael Maguni[32], who are more inside-oriented. The central individuals in Figure 1 occupy a middle position, with the President Armando Guebuza reaching a score of 84, Joaquim Chissano reaching 83, and Graça Machel also reaching 83. Therefore centrality in the network is not achieved by the centrally placed persons, but rather by individuals that are very active in the network.

The closeness measure of centrality measures how close one node is to all other nodes in the set of nodes[33]. The above values display an average degree of closeness. The highest closeness is recorded by Pascoal Mocumbi with a score of 0.725, followed by Daúde Nhaca Guebuza with the same score of 0.725 and by Angelo Azarias Chichava with a score of 0.713. Graça Machel scores 0.679, the President Armando Guebuza 0.664 and Joaquim Chissano 0.635.

"Betweenness" measures the extent to which a particular node lies between the various other nodes in the set of nodes[34]. The betweenness centrality of a node is the sum of node i-estimated probabilities of standing along any geodesic that includes all nodes, and it is therefore an inherently asymmetrical measure of centrality. A node with a high level of betweenness centrality can potentially influence the spread of information throughout the network, by facilitating, hindering or altering communication between other nodes[35]. The highest level of betweenness centrality is reached by Timothy Wade George with a score of 58.452, followed by Celso Ismael Correia with 58.499 and Pascoal Mocumbi with a score of 57.108. Again the leading individuals have lower scores, with Armando Guebuza recording only 41.680, Joaquim Chissano 41.504, and Graça Machel 39.132.

Eigenvector centrality is a simple raw score that also measures centrality in the network, but this measure is less affected by sampling characteristics, namely zeros, since these are preserved. When calculated as a simple raw score, eigenvector centrality may

31 Freeman, L. C., 1978. Centrality in social networks: Conceptual clarification. Social Networks 1, 215-239. Freeman,L.C. Roeder,D. and Mulholland, R.R. (1980) Centrality in social networks: II. Experimental results. Social Networks, 2, 119-141.
32 He died in a car accident. Despite this, we consider that it is important to mention the name of this person in order to provide a better understanding of the various members of this network.
33 Wasserman, S. and K. Faust. Social Network Analysis: Methods and Applications. (Cambridge: Cambridge University Press, 1994).
34 Scott, J. (2000). Social Network Analysis: A Handbook. 2nd ed. (London: Sage Publications Ltd, 2000).
35 Freeman, L.C. (1979) Social Network Analysis: Methods and Applications. Cambridge: Cambridge University Press.

indicate that it is the preferred centrality measure when the network data are incomplete, which is not the case in the present research. The highest level of eigenvector centrality is reached by Daúde Nhaca Guebuza with 0.133, followed by Pascoal Mocumbi with 0.131 and Angelo Azarias Chichava[36] with 0.128. Again the leading individuals in Figure 1 have a lower position, with Graça Machel scoring 0.111, Armando Guebuza 0.106, and Joaquim Chissano 0.09.

The various centrality measures usually differ greatly in scale, but they are positively correlated and are designed to confirm and improve the identification obtained in the sociogram. High values represent high centrality, which means that the individuals are positioned in the inner nodes of the sociogram, but these values allow us to distinguish between distinct inner nodes. An individual with a high betweenness centrality but a low eigenvector centrality is a central gatekeeper to a central actor. An actor with a low betweenness centrality but a high eigenvector centrality may have unique access to central actors. Therefore, these metrics confirm the above sociogram, enabling us to form an accurate picture of the Mozambican social network. Therefore, the only way to uncover these relationships is by using methods that enable us to establish the precise nature of the network. The use of individual names allows us to control the quality of the present research and to establish the accuracy of the analysis. With the use of names, subsequent validation of the network is possible, allowing us to understand each individual's role in the network.

7. DISCUSSION AND CONCLUSION

This paper presents a descriptive analysis of the network formed by the political and business elite who lead the Mozambican economy. The results validate the embeddedness theory, with President Guebuza occupying the central role in the network, as can be observed in the sociogram. Two other individuals define minor centres in the network: Joaquim Chissano, the former president, and Graça Machel, the widow of another former president. This central role is supported by other centrally placed individuals in the network, who record high scores in the different measures of centrality, namely Pascoal Mocumbi. The identification of the network by names is similar to the methodology adopted by Gil-Mendieta and Schmidt[37] and enables us to use this result accurately, since we know the lines that lead to an individual, which is regarded as a way of making contact with that individual.

This research shows that, just as happens elsewhere, Mozambique's elite is organised into a network with a leader, a second level of figures, and a third and even a fourth level composed of outliers. Identifying the individuals by name and visualising

36 Angelo Azarias Chichava (deceased) was one of the founders of SPI Holding.
37 Gil-Mendieta, J. and Schmidt, S. "The political network in Mexico". Social Networks, 18, (1996), 355-381.

their network of links is a distinct result of this study, enabling us to compare the results with the real situation. This result draws the attention of the social observer to the second and third-level players in a political and economic network, overcoming the media's tendency to focus mainly on the leader.

Seen in terms of common knowledge, the position of the president was as expected, but the position of former presidents and the widow of a former president, as well as the rankings of other first-line leaders, were not expected, since the common observer cannot actually see the network. Therefore, while some of the results were expected, others were not, and were only revealed by this research. Particularly important is the position of second-tier members in the network, some of whom frequently appear in the media and have therefore developed a public perception of their importance that is not revealed by the analysis. Therefore, this research accurately describes the political and business networks of Mozambique, with some expected results and some unexpected ones, and it should be used to observe the changes that will occur in this network over time. Of particular interest are the individuals placed centrally around the leader, who function as gatekeepers, the individuals in the middle, their family relationship and their relationship with Frelimo, and finally the outliers, who are present in the network but occupy an outside position, their function being to establish links between the network and minor provincial politicians, as well as other more general individuals outside the network. The network therefore shows the distribution of power in Mozambican society.

It is important to note that the sociogram validates the study made by Hanlon and Mosse[38], in which the authors speak about three important families, namely the Chissano family, the Guebuza family and the family of Graça Machel. They argue that, unlike Guebuza, Chissano has not been successful in business. Effectively, the sociogram shows two important groups, with Joaquim Chissano, Pascoal Mocumbi, Sérgio Vieira, Fernando Sumbana Jr., Manuel Tomé, José A. Tomo Psico and others at the top. The main feature of this first group is the absence of a centre of power which is distributed among different nodes. In the sociogram, we find President Guebuza, from whom power flows, linked to people like Miguel Nhaca Guebuza, Valentina Guebuza, José Eduardo Dai, Manuel M. P. Braga and others. At the centre, we find Graça Machel and she appears as a point of connection between the two groups.

As far as comparison with other published works is concerned, this paper is related to that of Gil-Mendieta and Schmidt[39], who analysed networks among Mexican political figures. However, no direct comparisons can be made, since the present paper specifically refers to elite political and business networkers in Mozambique. Furthermore, the present research supplements the network sociogram with metrics that are designed to complement the result. Based on the Mozambique in the African context, this paper seeks

38 Hanlon, J. and Mosse, M. "Is Mozambique's elite moving from corruption to development?" UNU-WIDER Conference on the Role of Elites in Economic Development, 12-13, (June, 2009), Helsinki, Finland.
39 Gil-Mendieta, J. and Schmidt, S. "The political network in Mexico". Social Networks, 18, (1996), 355-381.

to draw the attention of researchers in Africa to the importance of the social context in the business world and ultimately in the management of the country's economy.

What is the policy implication of this research? No clear policy implication may be derived from the Mozambican network observed here. However, the intense presence of Frelimo members in the network and the fact that Frelimo is an ethnically-based party centred upon the city of Maputo means that this network discriminates against other ethnic groups, who are present in the parliament but are not found in the business context. Therefore greater social and business openness is needed to create a more democratic society**.** More research is needed to confirm the present results, namely analysing tie and edge formation with regression models, identifying clusters within the network, using covariates to describe the network's characteristics in terms of ethnicity and family, analysing the role played by social capital in the creation of human capital in Africa based on the family and/or ethnic ties, and finally using this method to look at social exchange processes, social structure and performance in public administration and public companies.