www.business-systems-review.org Business Systems Review ISSN: 2280-3866
Volume 1 – Issue 1

"Ranking-based Ties" Social Networks. An illustration based on a system of Fashion Capital Cities in the world

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Presented at the First Business Systems Laboratory Discussion Meeting – 10-11 September 2012 – University of Palermo - Italy / revised November3 / accepted November 13 / published online November 14, 2012. DOI: 10.7350/BSR.A16.2012 – URL: http://dx.medra.org/10.7350/BSR.A16.2012

ABSTRACT
Our paper aims to apply a non-conventional Social Network Analysis to a network generated from an initial sorting of data with mere order. The aim is to test whether and how one relationship set "conveniently" generated by the ranking is able to provide a coherent system of interactions with possible practical and theoretical utility. We consider a system of city distributions where we focus on "Ranking-Based Ties" social networks, considering a system of "objects" of the same class that would be able to interact. The objects in question are ordered according to their "performance" in a particular ranking. According to a survey developed by Global Language Monitor, there is a ranked number for every capital that could be considered important among the world's most fashionable cities. Using the rank of scoring average we construct a fashion cities network in order to analyze the dynamics and the topology of the system following a gradual process of clustering or densification of relationships consistent with key network statistics analysis.

Keywords: Fashion cities, Fashion Capitals, Social Networks, SNA, Ranking-based Ties, System of cities.

1. INTRODUCTION

Our purpose is to offer the beginnings of a new line of inquiry into social networks, to apply a social network analysis to the core group of global fashion cities. The question motivating our inquiry is whether and how social network effects have spillovers and connect each other; we are going to consider a system of cities distribution where we focus on "Ranking-based ties" social networks.

In our paper we would start a discussion which is still "ongoing". We consider a system of "objects" of the same class that would be able to interact. The objects in question are ordered according to their "performance" in a particular ranking. That "performance" will be, ultimately and therefore this ranking, which is cause-effect and reason-consequence, the root of all relationships that would exist among them.

These relationships are realized through mechanisms such as competition, imitation, leadership, monitoring, differentiation, etc. These are mechanisms all of which can be at least partially driven by this ranking.

Let be $S = < E, \mathbb{R} >$ an ordered system with a set of individual E, $E=\{e_1,e_2,\ldots,e_n\}$ and a totally order relationship $\mathbb{R}$ with the usual properties, that means being reflexive, anti-symmetric and transitive .

Over this structure we consider the ranking function R as a map from the set E to the Real Space,

$$R : R: E \rightarrow \mathbb{R} \;/\; R(e_i) = R_i$$

with:

$$\forall i : R_i \in \mathbb{Q} \text{ being } \mathbb{Q}, \text{ the Set of rational numbers,}$$

$$R_i > R_j \Leftrightarrow e_i \text{ precedes } e_j \text{ by the order } \mathbb{R} \text{ ,}$$

$$\max\{ R_i\} \leq N \text{ and } \min \{ R_i\} \geq 0$$

On such structures may induce a binary relation between each two of the elements E, so that both link according to some criterion consistent with the relationship.

226 The ultimate goal and purpose of our work is to see whether it is possible to extract a set of viewable and analyzable interactions with SNA resources, from a initial sort of order, so as to facilitate research in areas where it is conceivable that this order relation is capable of generating interactive behaviors of interest. Several examples of these situations could be the following: the presence of various firms in the same market segment; the competition between election candidates; competition between countries, regions, or even companies in the market of a product; organization of events; and supremacy at commercial, sports, economic or military environment.

This will be the goal in the case study in which we get a binary relationship that grows with some measure of the discrepancy between the two orders of the two elements of E considered, and it is also growing with some measure of relevance or importance of both.

We want to analyze a particular case, the relationships of influence among fashion cities or capitals (The Global Fashion Capitals). We get a triennial ranking from The Global Language Monitor (GLM) which is an Austin, Texas-based company that collectively documents, analyzes and tracks trends (*www.languagemonitor.com* and *en.wikipedia.org/wiki/Fashion_capital*).

From these raw data we would establish different relationships meaning competitiveness, gravitation, emulation, imitation, differentiation, leadership, servility, etc. We want to check if these relationships that determine the ranking can be useful to explain which fashion-city network works from a linkage perspective. We assume as work methodology that ranking and network relationships mutually define, or codetermine, each other.

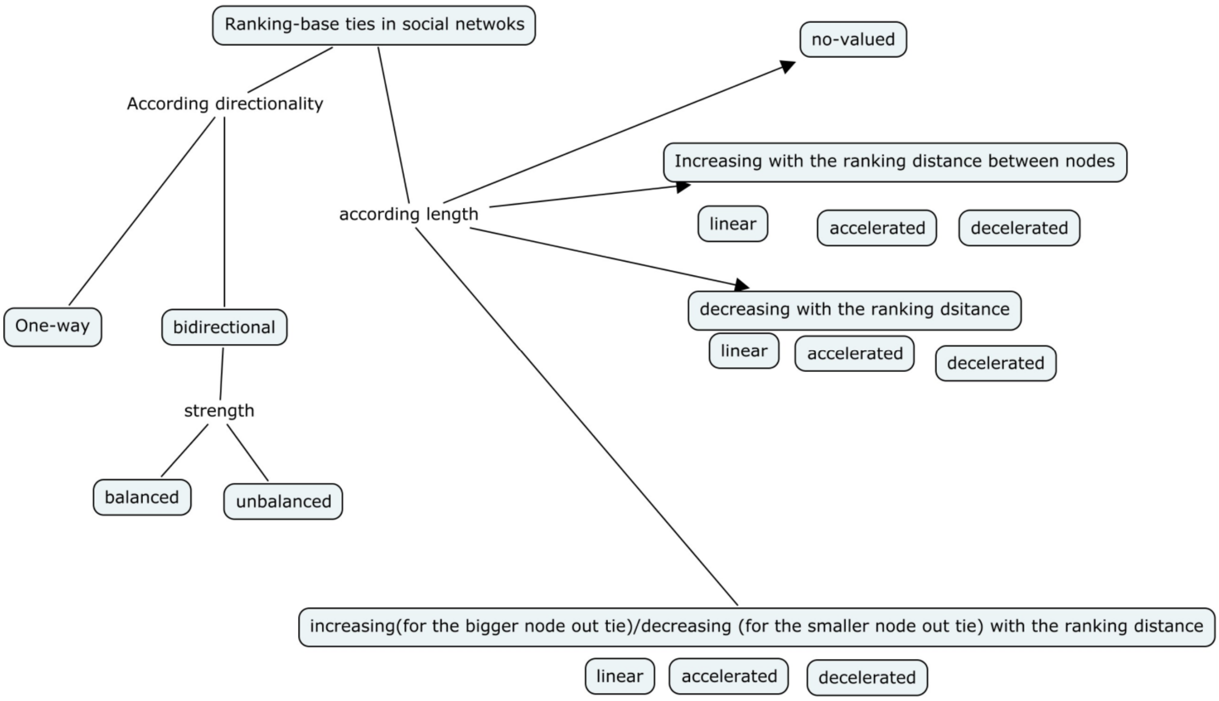
Any ranking is based on the best-worst performance of individuals or nodes on a set of values, traits, attributes, variables, etc. Furthermore consideration of dynamics or structure interactions (at a given time) of the system comprising the set of individuals would let us to consider a quite different set of relationships among those individuals who in one way or another are induced or have been the cause of this sort.

In our paper we approach this relationship by using the conceptual and methodological apparatus of Social Network Analysis (SNA). According to SNA standpoint methodology, ties among individuals induced by a ranking may be:

- Uni-directional or bidirectional (Oriented-Not oriented)
- Valued or not valued

Figure 1 shows an outline:

Figure 1: Typology of Networks



On the other hand if we consider the case valued and the strength associated with the links and how can depend (be caused / or cause) of the organization and ranking of the relative position between nodes (individuals), there would be a lot of possibilities that are summarized and shown in Table 1.
Therefore, following that line, in one-directional ranked-based network, the ties between two nodes reach values from the best to the worst one (B-W) or in the reverse direction (W-B).
Moreover, considering the strength of valued ties, the relevance of each node should play an important role that we still have not developed.
The current state of our research does not allow consideration of all cases and we only have explored some of these possibilities in the case of Fashion Cities. We have considered the classification as given, and not lose sight of that once obtained some results, perhaps it might be interesting to compare them with empirical studies that present data from the fashion industry itself, its agents and professionals, through objective economic indicators and statements of professional opinion.

Table 1. Different kinds of Ranking-based Networks

		ONE WAY		BIDIRECTIONAL
		B-W	W-B	
NON-VALUED		Leadership Prevailing position	Followship Subordinating	Not-Significant
VALUED	Creasing	Imitated / Emulated by Inspiring	Imitation / Emulation to Be inspired by	Watchfulness Competition Cooperation
	Decreasing	Differentiation from Looking for own way	Competition for the best position	Gravitation. (each other) Consideration
	Creasing/ Decreasing	An integrated set of relations	An integrated set of relations	An integrated set of not valued relations

2. THE SYSTEM OF THE TOP FASHION CAPITAL CITIES IN THE WORLD

According to a survey developed by Global Language Monitor, there is a ranked number for every capital that could be consider important among the world's most fashionable cities. Global Language Monitor, or GLM, is a media analytics company that documents, analyzes and tracks cultural trends in language the world over, with a particular emphasis upon Global English (http://www.languagemonitor.com).

GLM's main services include Narrative Tracker which is based on global discourse, providing a real-time, accurate picture about any topic, at any point in time. Narrative Tracker analyzes the Internet, blogosphere, the top 75,000 print and electronic global media, as well as new social media sources as they emerge (*en.wikipedia.org/wiki/Global_Language_Monitor*).

We can define fashion capital as a city which is a major center for the fashion industry and in which many activities including the production and retailing of fashion products, fashion important events (such as fashion weeks and awards) and fashion related trade fairs generate quite significant economic output.

A fashion capital will generally show an active, vivid, strong and unique subculture, an environment capable of inspiring not only fashion professionals, but also the citizens of the whole city, turning its street style and street culture into essential characteristics to consider.

A fashion capital will also usually have a broad mix of business, entertainment, culture, and leisure activities and be internationally recognized for having a unique and peculiar identity.

There are currently widely regarded as being four principal fashion capitals in the world, known as "the big four": London, Milan, New York City and Paris. An annual ranking of the leading fashion capitals is produced by Global Language Monitor. Berlin and Singapore broke in 2011 into the Top Ten, which is the core whole reference (*www.languagemonitor.com/fashion/london-overtakes-new-york-as-top-global-fashion-capital*). In 2010 world fashion capital moved from Europe continent to United States of America (www.languagemonitor.com/fashion/new-york-regains-fashion-capital-crown-from-milan), and in 2011 London regained this top score for Europe again, being New York the one holding longer this position in recent years.

Rank of scoring average "*Ri*" of these cities has been obtained from the fashion city annual ranking from 2009 to 2011 by subtracting 50 from the average position. Table 2 (in Appendix) shows the cities ordered by ranking average.
It should be noted that some cities are labelled with "N" meaning its absence in the ranking for the considered year.

3. THE NETWORK OF FASHION CAPITAL CITIES

Considering this ranking scores we initially thought that the elements of the adjacency matrix could be:

$$A_{ii} = 0 \quad \forall i$$
$$A_{ij} = \frac{R_i}{\max(2, |R_i - R_j|)} \sqrt{\frac{R_i}{R_j}} \quad \text{in other case}$$

In this way, the ties between cities link two nodes with a strength that should be proportional to the relevance of both cities (the geometric mean) and, as well, the greater relative position between in and out nodes, the greater strength.
However, this valuation favored too much the ties between far (but not relevant) cities. This inconvenient was avoided dividing by the factor max (2, |Ri-Rj|).
Finally, the proposed network could be summarized with an adjacency matrix with:

$$A_{ii} = 0 \quad \forall i$$
$$A_{ij} = \frac{R_i}{\max(2, |R_i - R_j|)} \sqrt{\frac{R_i}{R_j}} \quad \text{in other case}$$

Figure 2 shows this final complete network, and an enlargement of the central area is displayed in Figure 3.
Blue circles represents European cities, black ones North American cities, gray ones are Asian-Pacific cities, violet ones are Latin American cities, red ones are from Middle East, deep green is the color for African cities and the light green one represents Moscow.
It is remarkable that the central position in display is in consonance with the relevance of each city.
Central core is compound by the constellation of the great four London, Paris, Milan and New York; including as well, Los Angeles and Hong Kong, with some more additional cities surrounding the main ones.

4. PROCESSING ALL INFLUENCES AND CONNECTIONS AMONG EACH OTHER FASHION CAPITALS

We have selected the resulting networks of consider only intensity ratios exceeding decreasing values. In this way we would be able to visualize how influences are configured according to a particular topology, in order to provide several relevant clues about how transmission of innovations, guidelines, criteria, styles, etc. works in the fashion world connecting all different centres of influence.

Considering only the relations with values of strength greater than 23 network, we reach the maximum intensity network where we are able to find only the five major world capitals of fashion, although comprising only incomplete connectivity influences as from New York to Paris, Milan and London, and London to Hong Kong (this one perhaps because of post-colonial continuity as a potential explanation). This first step is shown in Figure 4 (in Appendix).
When decreasing the influence intensity threshold up to 20 (Aij>20), we find that the "core constellation" of fashion capitals constitutes a highly connected network. Even if it is still an incomplete network, we get a very high density connected network. Only connections in both directions from New York to the cities of Los Angeles and Hong Kong fall below the threshold (Figure 5, in Appendix).
Only by lowering the threshold to 19 (Aij> 19), is when the first links between cities of second level cluster may be shown (Figure 6). Specifically we can appreciate the influence of Sydney over Barcelona and of Barcelona on Tokyo (interestingly, the main cluster connectivity is not increased).
As we reduce the threshold of significance, it seems that more cities or fashion capitals are incorporated into this second-level cluster network; but pretty slowly (well, with a threshold of 18, only Rome and Shanghai are influenced by Tokyo) and after that the process gets more speed (Figure 7).
Upon reaching a minimum intensity of 13 (Aij>13) (Figure 8, in Appendix), the network shows two clearly differentiated clusters with high degree of connectivity, although not complete, in neither of both cases.
If we consider a somewhat lower level of intensity as the threshold we get a third cluster of axial arrangement around the core emerging fashion city of Mexico. This third cluster contains only two-way interactions, Mexico-Mumbai and Mexico-Bali. In addition it is remarkable that the two main clusters interact for the first time through the influences of Los Angeles and Hong Kong in direction to Sydney (which recreates the Pacific Connection) (Figure 9, in Appendix).
Related to the third cluster which appears at this level of strength, it is not reasonable to consider that it matches relations of an actual imitation, emulation, differentiation, cronyism, etc. and looks more like a sub-net spuriously generated by its own (by the relative position and variations thereof in these three years considered).
Interestingly, despite the fact that we have simply assumed that the order of the ranking of cities should be consistent with the set of relations of influence really produced, until we get to this level, all the relationships that had been appearing were intuitively quite realistic.
Going down to an intensity level of 7 (Aij> 7), we get a fourth cluster of interconnected cities with medium density which constitutes another group of fashion cities competing in a lower division or league. There we find some important cities economically relevant at a regional or even global level (as Chicago) but without so much tradition in the fashion industry that only recently have started to look for presence in the fashion world.
Moreover, in this level of intensity the basic framework of the very most relevant fashion capitals (the mean core) is already built thanks to the emergence of new influences between primary and secondary constellation; as influences between Paris and London to Sydney, or Los Angeles and Hong Kong to Barcelona (Figure 10, in Appendix).
Upon reaching the threshold intensity 5, there is not any isolated cluster found any more. The global network of fashion capitals is already constituted as such. However there are some isolated nodes, not integrated in any network, that are identified as the cities of Atlanta, Caracas, Medellin, Frankfurt, Krakow, Antwerp and Abu Dhabi (Figure 11, in Appendix).

Now, we have got a network not only consolidated or quite compact, but also because of the density of the relationships, that has been increased considerably. By the other hand, remains a higher density of connections within the initial clusters, more than among the different clusters.
If we reach a threshold of 3, the entire network has been established; Caracas and Krakow are the only cities which remain as isolated nodes. The primary and more important two clusters have already formed a compact and high density core of relationships (Figure 12, in Appendix).
The hierarchy gets dissolved almost reaching this level of quite reduced level of influence. It is important to remark that a ranking is a hierarchy. And a hierarchy is an absolutely linear network, nothing heavy or dense. If the hierarchy of fashion cities creates dense relationships is because it is something dynamic and competitive.
Finally, considering the intensity threshold of 1 (Aij>1), we have already completed the network of relationships with relevant or important influence that we had initially considered. We reach the whole network in which Caracas is also incorporated. The network has clearly two areas of maximum density relationships (the two main clusters) which are also highly related between them (Figure 13, in Appendix). As we will see, this gradual process of clustering or densification of relationships is consistent with the key network statistics analysis.

5. GEOGRAPHICAL ANALYSIS OF FASHION-CITIES NETWORK

The relations among the different cities in the network display a typical performance of interaction in a globalized world. However, strong polarizations towards privileged regional areas could be verified in the graphic above (Figure 14, in Appendix) which shows the mean intensity of all ties between cities of each geographical area to each other.

Influences, from and to, North America and West Europe are clearly greater than the rest. And a lesser relevance of African cities is also evident.
Relations among cities of different geographical areas are reproducing a globalized world with very distinct polarizations which can be identified in the average values of the intensities of these influences:
If we only consider the ties with relevant strength, the geographical analysis would be more illustrative. In fact, considering the number of main interactions, the number of interactions with strength greater than one, as it is shown in the following figure, some conclusions could be obtained:

- The maximum number of main interactions is between cities groups from West Europe and Asia-Pacific (21 and 15, in one and the other direction).
- These two regions, jointly with North America, constitute a triad that becomes the fundamental core of the fashion-cities main relations with a number of 79 (21+15+11+15+12+5) relations, while the other areas hold many fewer relations and Africa has none.

The following graph (Figure 15, in Appendix) shows the number of relevant intensity influences (greater than 1) among the various geographical areas.

6. STATISTICAL ANALYSIS OF THE MAIN NETWORK NODES

In this section we carry out a global analysis of fundamental features for nodes (fashion capital cities) in the network considering ties of strength superior than one and extending analysis to the whole network.
For each raw identifying a city, Table 3 (in Appendix) displays its regional attributes: area, country, cultural tradition, as well as the principal indicators of the fundamental network features as neighbourhood, closeness and between-ness.
"Degree" of a node is the number of links that involve this node, so it indicates the cardinality of neighbourhood nodes. Obviously the greater degree the more relevant the node is. Maximum value of degree is "n-1", being "n" total number nodes being minimum value as 0 (when node is absolutely isolate). Initially being n=53; by excluding the impact relationships below 1, the number of "important nodes" becomes n= 47 and the maximum 46.
Between-ness of a node is the number of paths among different nodes that pass through that node. This indicator informs us about how important the node is. It means intermediation as a measure of how easily a node can connect with other nodes.
Finally, "closeness" is a reciprocal measure of the (harmonic) mean distance between the considering node and all the rest. Being *l (i,j)* the distance between the nodes *i* and *j*, the number of links we can found across the shortest path that ties i with j, the (harmonic) closeness of the node *i* is:

$$\delta_i = \frac{n-1}{\sum_{i \neq j} l(i,j)}$$

At the final results table, we see how the degree is descending from the maximum value (46 for cities belonging to the main central cluster in orange colour), as has been described in former epigraph. Subsequently, a second best value appears for Barcelona and Sydney with a degree of 43, constituting a transition from the former group to the second cluster (pink colour), with a degree of 42, with an epigone group integrated by Dubai, Moscow and Rio de Janeiro. From here it is shown a smoothing descendent degree for several cities from Buenos Aires to Frankfurt. Finally, the last cities have no important relations (strength ≥ 1) and so their degree has value 0.
As expected, the three centrality indicators (degree, between-ness and closeness) display similar performance for the different cities showing a hierarchical clustering of decreasing centrality or relevance. Colour layout could help to perceive it.

6.1 The degree distribution

Another usual element in the statistical analysis of networks is the degree distribution study, the analysis of the frequency distribution of the degree values and its comparison with standard significant distributions.
Typically interest is focused to the possibility of fitting a Pareto or Poisson distribution. Poisson distribution is the performance that should show a merely random network. On the other extreme, a potential Pareto distribution is the typical scale-free distribution with an accelerated decreasing frequency (in potential way) with the increasing degree.
Figure 16 shows the degree distribution of the cities degree. Comparing with the Poisson and standard Pareto distributions graphics (Figure 17 and Figure 18 in Appendix) we can clearly conclude that the distribution is so far from one as from the other, so its performance is not stochastic but is not scaling-free.

Kolmogorov-Smirnov tests results (Table 4, in Appendix) show an evident misfit to Poisson or Normal distributions; and misfit to Pareto distribution is obvious since the distributions graph. Differing from the scaling-free distribution indicates that this structure lacks "strategic points" and also indicates that is remarkably distributed spite of having been generated by an ordinal relation. In fact, it indicates now a high degree of intercommunication.

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APPENDIX

Table 2: Ranking of fashion capitals

RANKING FASHION CAPITALS	Ranking 2011	Ranking 2010	Ranking 2009	Ranking average score R_i
New York	2	1	2	48,33
London	1	3	5	47
Paris	3	4	3	46,67
Milan	4	6	1	46,33
Los Angeles	5	5	4	45,33
Hong Kong	6	2	7	45
Sydney	11	7	9	41
Barcelona	7	9	14	40
Tokyo	9	14	12	38,33
Shanghai	14	12	14	36,67
Rome	13	22	6	36,33
Las Vegas	16	16	10	36
Singapore	8	15	20	35,67
Madrid	12	10	21	35,67
Monaco	15	N	N	35
Sao Paulo	25	13	8	34,67
Berlin	10	18	19	34,33
Miami	26	8	13	34,33
Melbourne	17	11	25	32,33
Amsterdam	19	17	N	32
Dubai	27	21	11	30,33
Moscow	18	20	22	30
Rio de Janeiro	23	19	20	29,33
Buenos Aires	20	24	24	27,33
Bali	21	32	N	23,5
Mexico City	22	29	31	22,67
Mumbai	24	28	30	22,67
Florence	31	N	N	19
Vienna	35	27	N	19
Copenhagen	29	34	N	18,5
Johannesburg	41	25	N	17
Santiago	30	31	39	16,67
Stockholm	28	33	40	16,33
Prague	48	26	29	15,67
Warsaw	33	36	N	15,5
Cape Town	46	23	N	15,5
Toronto	34	38	N	14

Bangkok	32	35	42	13,67
Chicago	36	37	N	13,5
New Delhi	39	30	43	12,67
San Francisco	38	N	N	12
Dallas	37	40	N	11,5
Austin	40	N	N	10
Abu Dhabi	42	N	N	8
Antwerp	44	41	N	7,5
Atlanta	45	40	N	7,5
Frankfurt	43	43	N	7
Medellin	N	44	N	6
Seoul	N	45	N	5
Krakow	47	39	50	4,67
Caracas	50	42	N	4
Montreal	49	N	N	1

Table 3: Regional attributes and fundamental network features of fashion cities

City	Regional Area	Culture tradition	Country	Degree	Betweenness	Closeness	Harmonic Closeness
New_York	N_America	Ang-Saxon	USA	46	29,415	358	46
London	European Union	Ang-Saxon	UK	46	29,415	358	46
Milan	European Union	Italian	Italy	46	29,415	358	46
Paris	European Union	French	France	46	29,415	358	46
Hong_Kong	Asia-Pacific	Asian	China	46	29,415	358	46
Los_Angeles	N_America	AngSaxon	USA	46	29,415	358	46
Barcelona	European Union	Hispanic	Spain	43	9,915	361	44,5
Sydney	Asia-Pacific	AngSaxon	Australia	43	9,915	361	44,5
Amsterdam	European Union	Eur	Holland	42	5,54	362	44
Berlin	European Union	Eur	Germany	42	5,54	362	44
Las_Vegas	N_America	AngSaxon	USA	42	5,54	362	44
Madrid	European Union	Hispanic	Spain	42	5,54	362	44
Melbourne	Asia-Pacific	AngSaxon	Australia	42	5,54	362	44
Miami	N_America	AngSaxon	USA	42	5,54	362	44
Monaco	European Union	French	Monaco	42	5,54	362	44
Rome	European Union	Italian	Italy	42	5,54	362	44
Sao_Paulo	Latin America	Hispan	Brasil	42	5,54	362	44
Shanghai	Asia-Pacific	Asian	China	42	5,54	362	44
Singapur	Asia-Pacific	Asian	Singapur	42	5,54	362	44
Tokyo	Asia-Pacific	Asian	Japan	42	5,54	362	44
Dubai	Middle East	Muslim	Dubai	41	4,44	363	43,5
Moscow	East Europe	Eur	Russia	41	4,44	363	43,5
Rio_de_Janeiro	Latin America	Hispan	Brasil	41	4,44	363	43,5
Buenos_Aires	Latin America	Hispan	Argentina	40	3,657	364	43
Bali	Asia-Pacific	Asian	Indonesia	38	2,365	366	42
Mexico City	Latin America	Hispanic	Mexico	36	1,365	368	41

Mumbai	Asia-Pacific	Asian	India	36	1,365	368	41
Florence	European Union	Italian	Italy	31	0,069	373	38,5
Vienna	European Union	Eur	Austria	31	0,069	373	38,5
Copenhaguen	European Union	Eur	Denmark	30	0	374	38
Johannesburg	Africa	AngSax	SAfrica	30	0	374	38
Santiago	Latin America	Hispan	Chile	29	0	375	37,5
Cape_Town	Africa	AngSax	SAfrica	27	0	377	36,5
Stockholm	European Union	Eur	Sweden	27	0	377	36,5
Prague	European Union	Eur	Czech Rep	27	0	377	36,5
Toronto	N_America	AngSax	Canada	27	0	377	36,5
Warsaw	European Union	Eur	Poland	27	0	377	36,5
Bangkok	Asia-Pacific	Asian	Tailhand	25	0	379	35,5
Chicago	N_America	AngSax	USA	25	0	379	35,5
New_Delhi	Asia-Pacific	Asian	India	24	0	380	35
San_Francisco	N_America	AngSax	USA	24	0	380	35
Dallas	N_America	AngSax	USA	23	0	381	34,5
Austin	N_America	AngSax	USA	20	0	384	33
Abu_Dhabi	Middle East	Muslim	Abu Dhabi	8	0	396	27
Antwerpen	European Union	Eur	Holland	6	0	398	26
Atlanta	N_America	AngSaxon	USA	6	0	398	26
Frankfurt	European Union	Eur	Germany	6	0	398	26
Caracas	Latin America	Hispanic	Venezuela	0	0	2704	0
Krakow	European Union	Eur	Poland	0	0	2704	0
Medellin	Latin America	Hispanic	Colombia	0	0	2704	0
Montreal	N_America	French	Canada	0	0	2704	0
Seoul	Asia-Pacific	Asian	SCorea	0	0	2704	0

Table 4: Kolmogorov Smirnov's goodness-of-fit tests

Kolmogorov-Smirnov test for
DEGREE DISTRIBUTION

FIT TO NORMAL DISTRIBUTION		degree
N		52
Normal Parameters	mean	30,6154
	Standard deviation	14,82731
EXTREME DIFERENCES	Absolute	,200
	Positive	,150
	Negative	-,200
Kolmogorov-Smirnov Z		1,446
Asymptotic significance. (bilateral)		,031

FIT TO POISSON DISTRIBUTION		degree
N		52
Poisson parameters	mean	30,6154
EXTREME DIFERENCES	Absolute	,403
	Positive	,173
	Negative	-,403
Kolmogorov-Smirnov Z		2,904
Asymptotic significance. (bilateral)		,000

Figure 2. The complete network

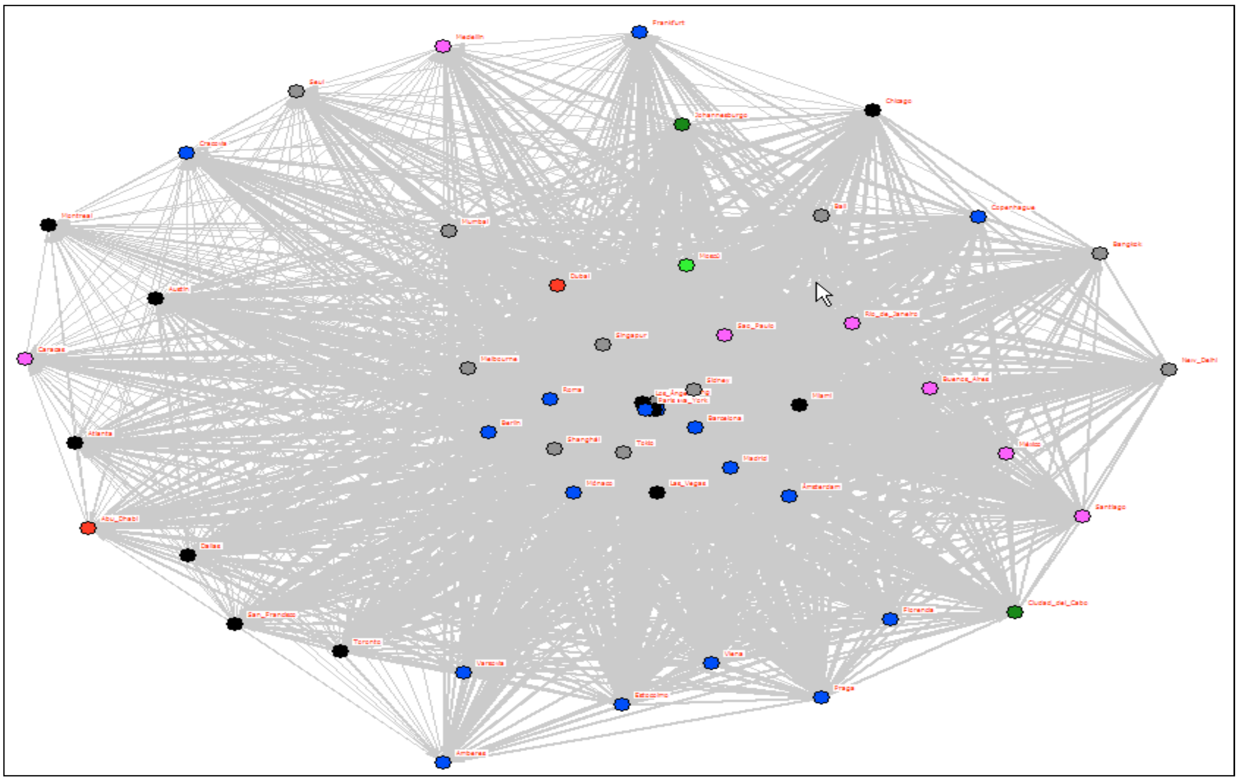

Figure 3. Enlargement of central area of the network

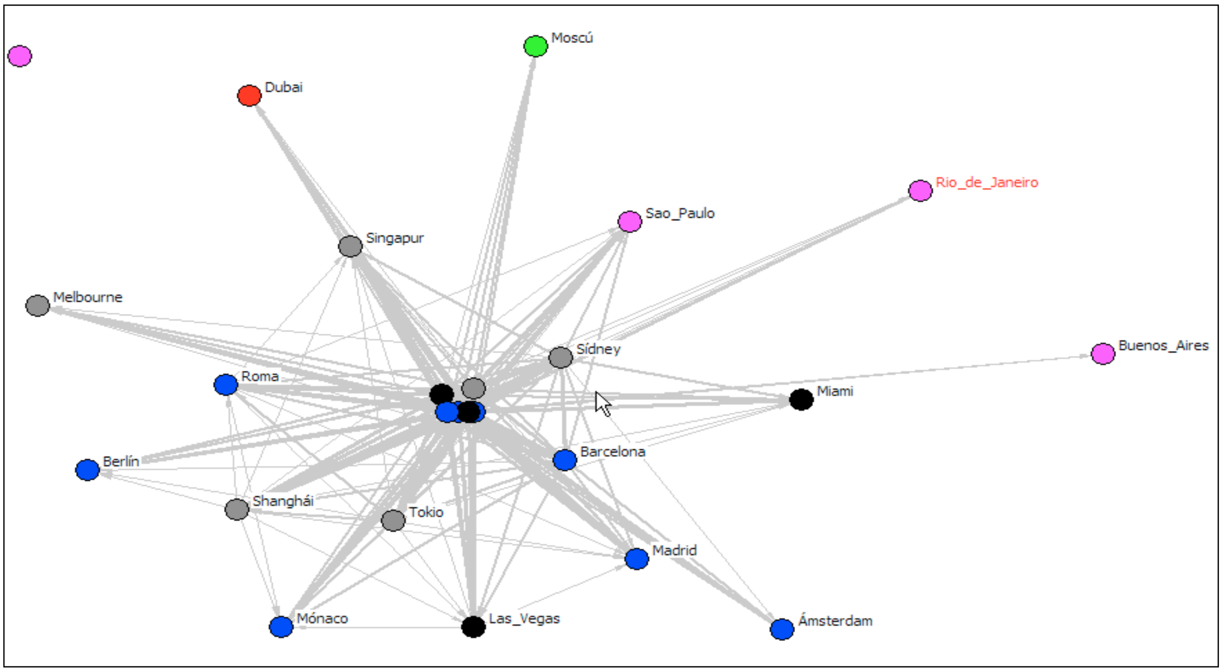

Figure 4. Five major world capitals of fashion, maximum intensity network

Figure 5. Influence intensity threshold up to 20 cities

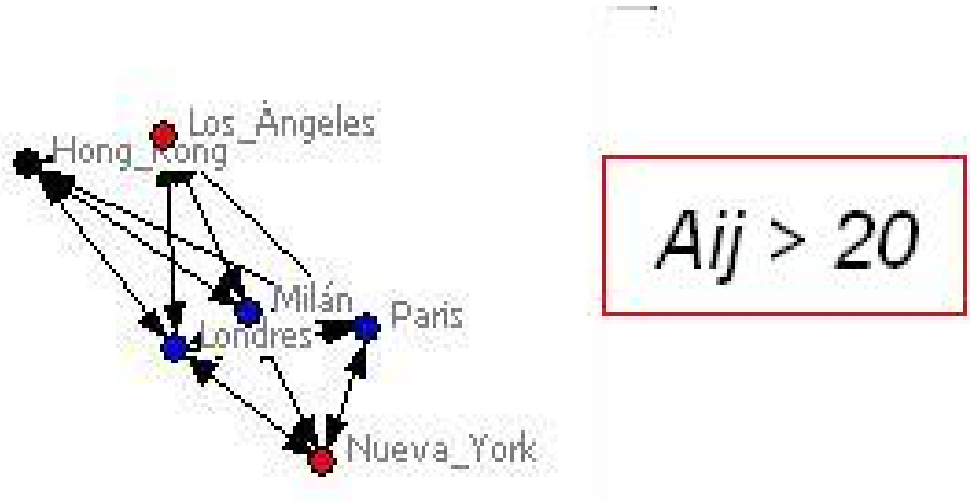

Figure 6. Lowering the threshold to 19 (Aij> 19)

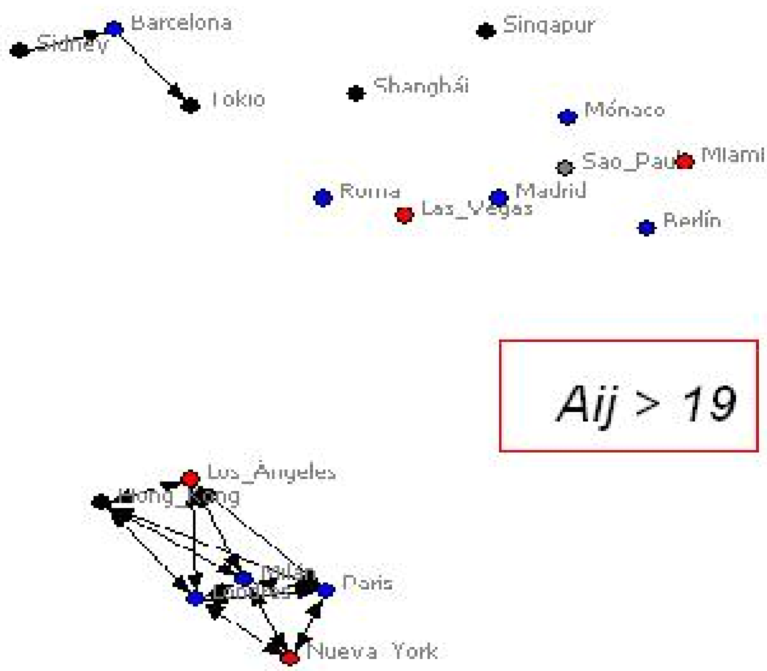

Figure 7. With a threshold of 18 (Aij> 18)

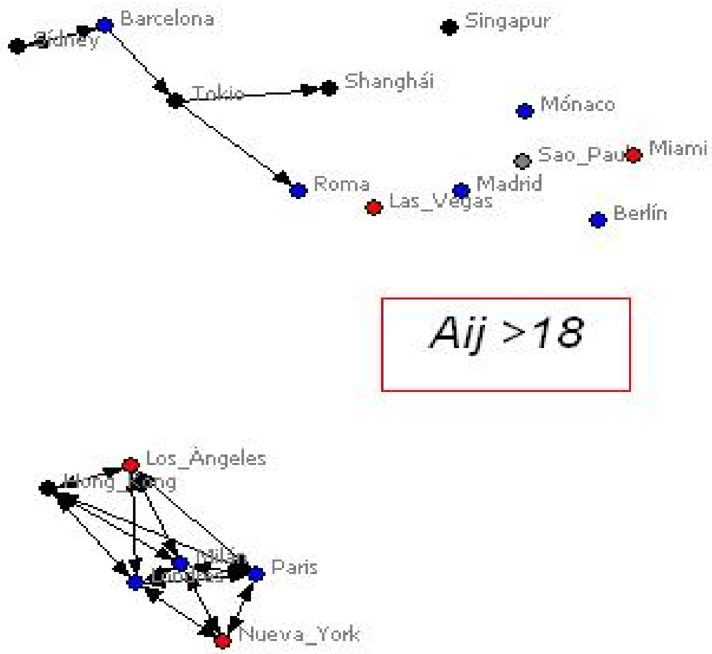

Figure 8. With a threshold of 13 (Aij> 13)

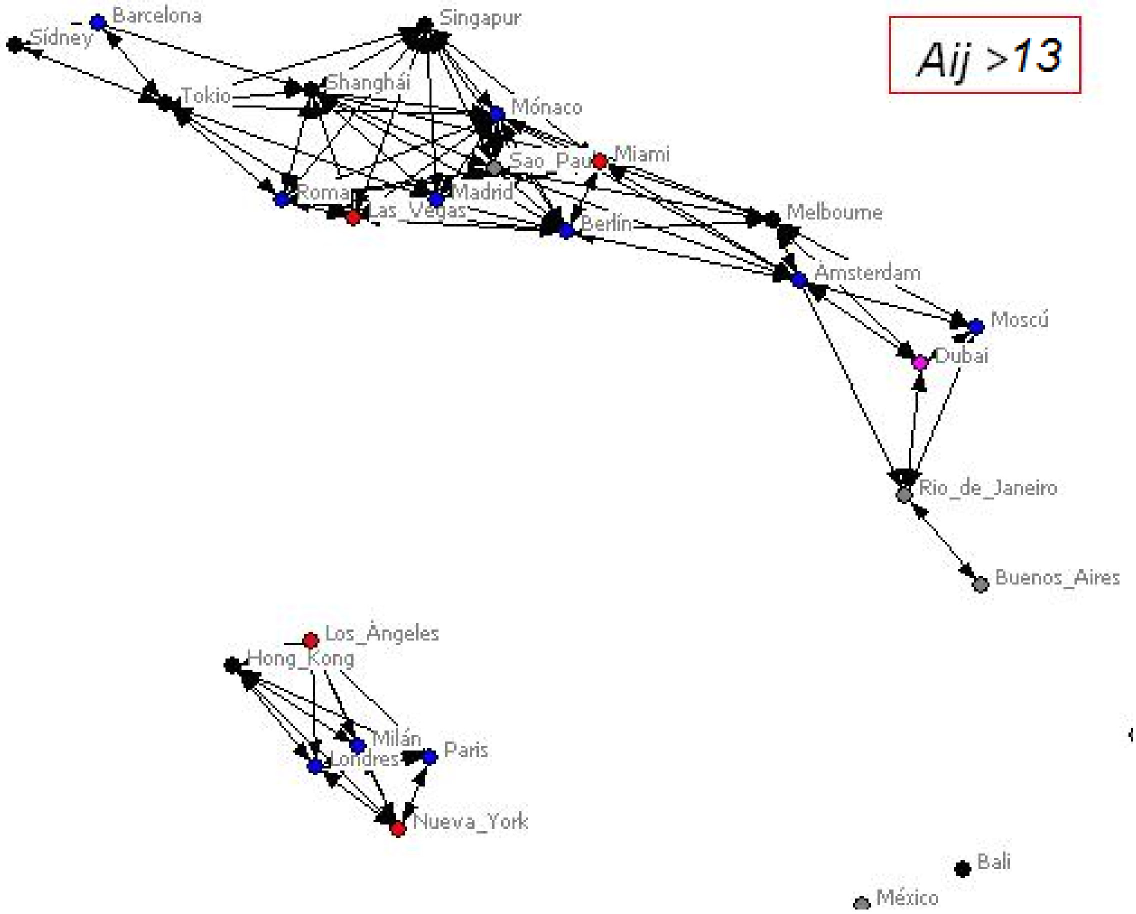

Figure 9. Third cluster appears while the first two ones interact through the Pacific Connection

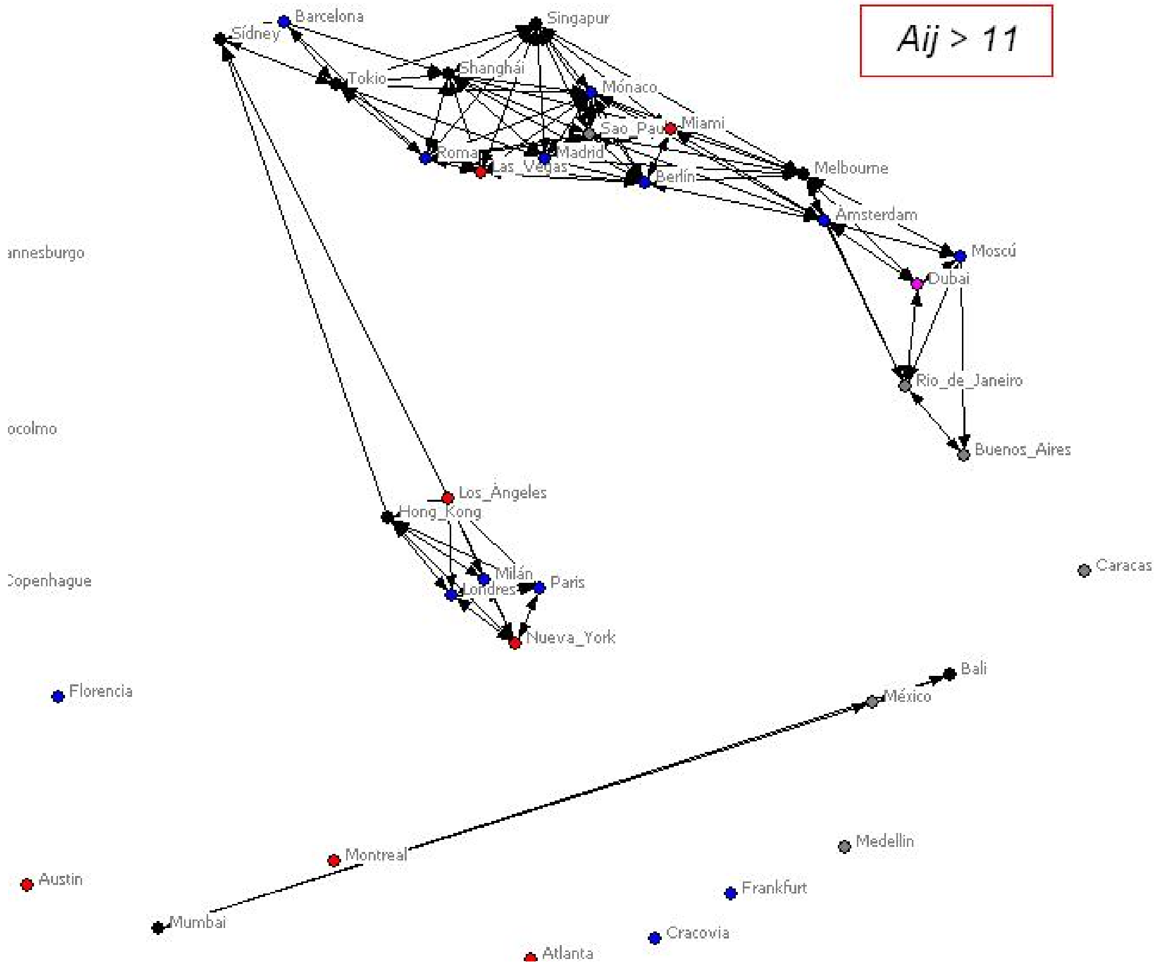

Figure 10. Level of 7 brings a fourth cluster and some relevant connections

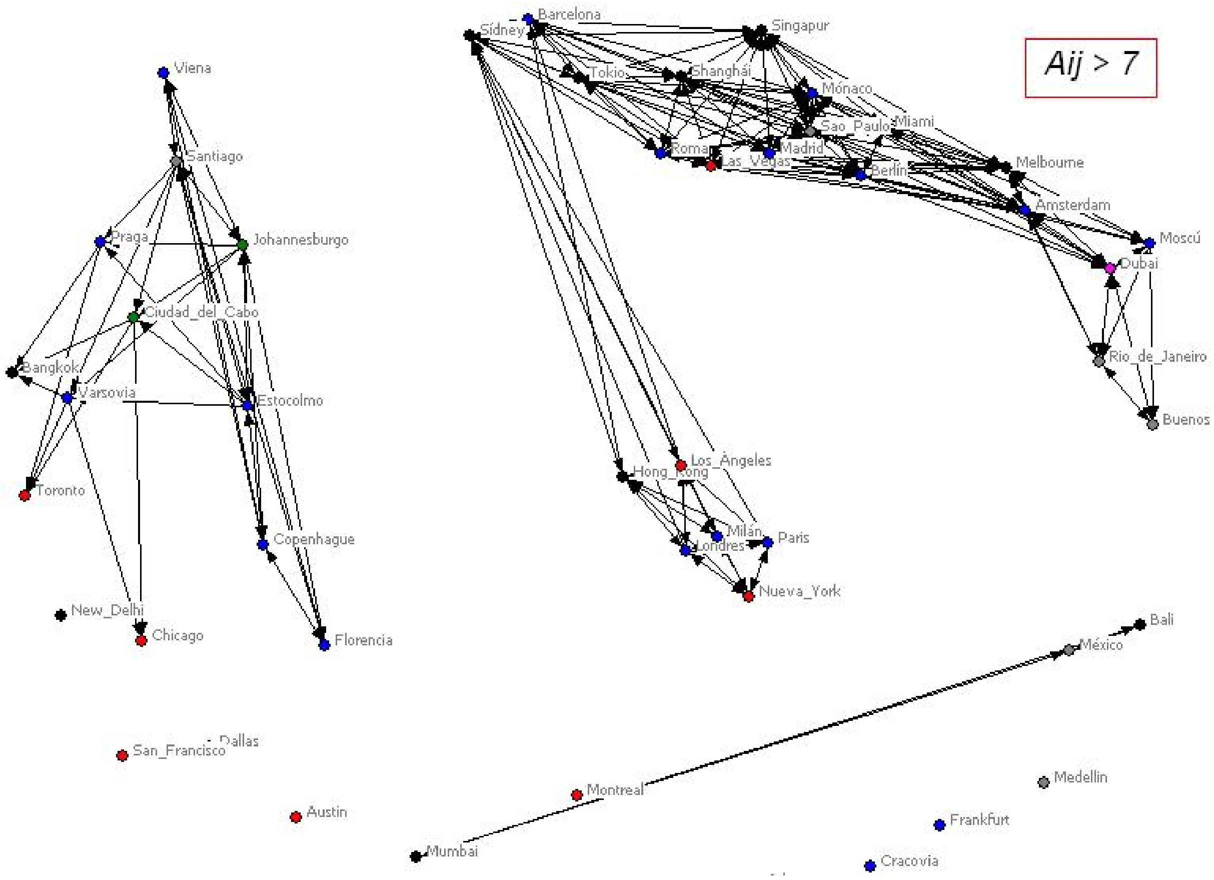

Figure 11. The global network of fashion capitals is already constituted

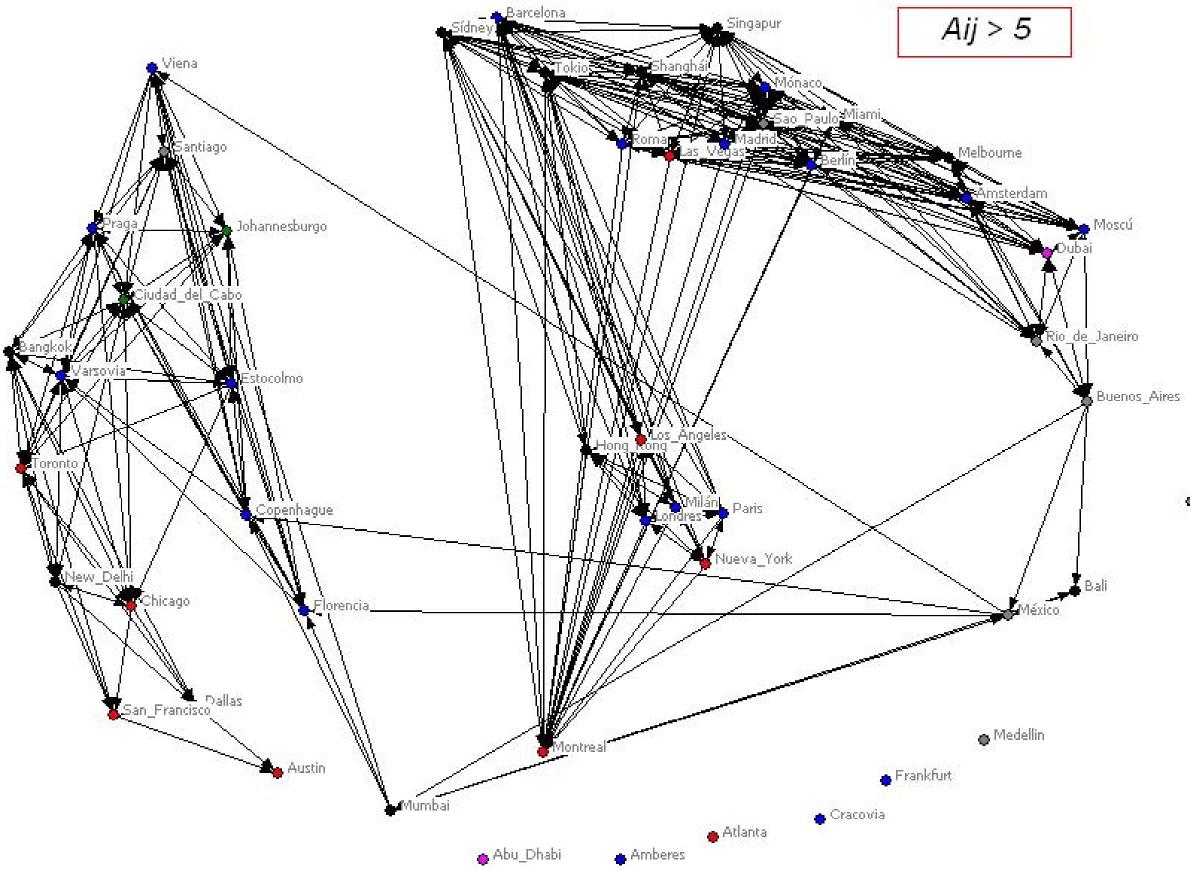

Figure 12. The entire network has been established with a threshold of 3

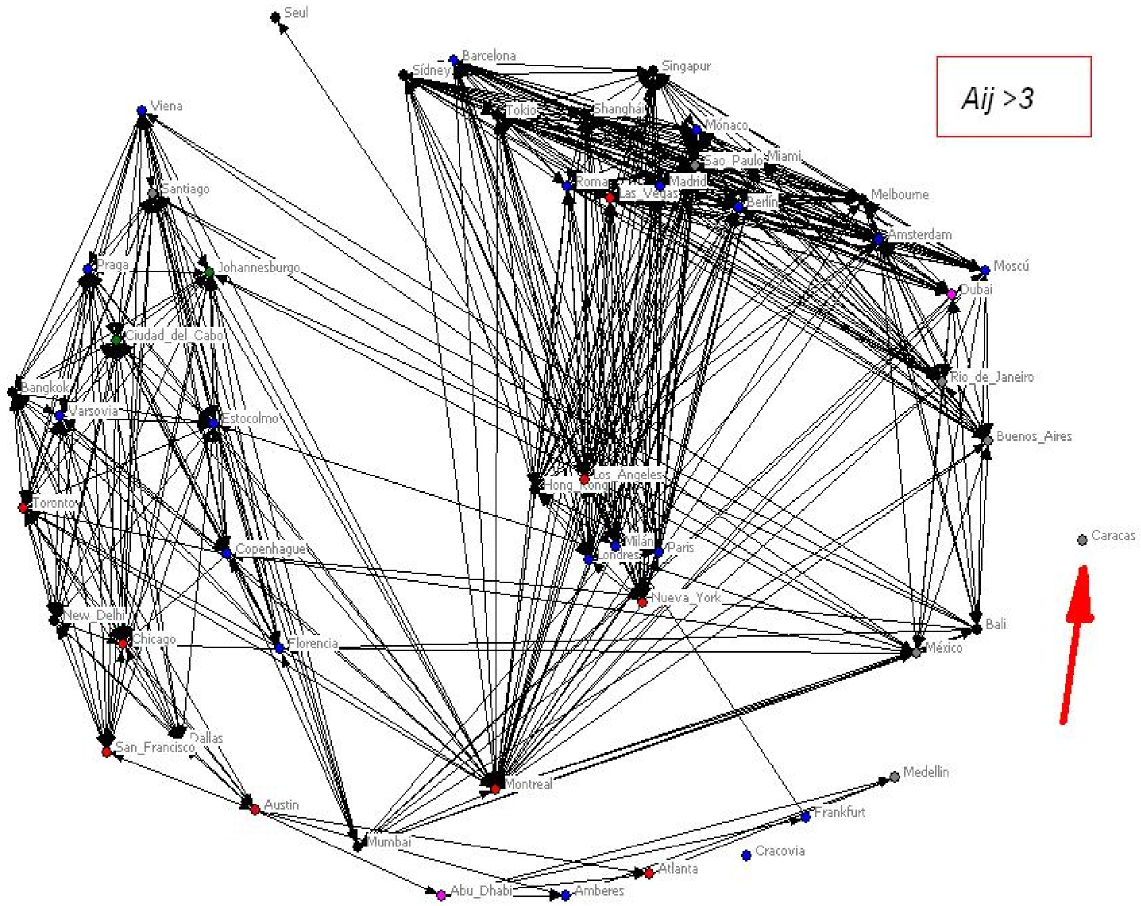

Figure 13. The global network with two main clusters defined

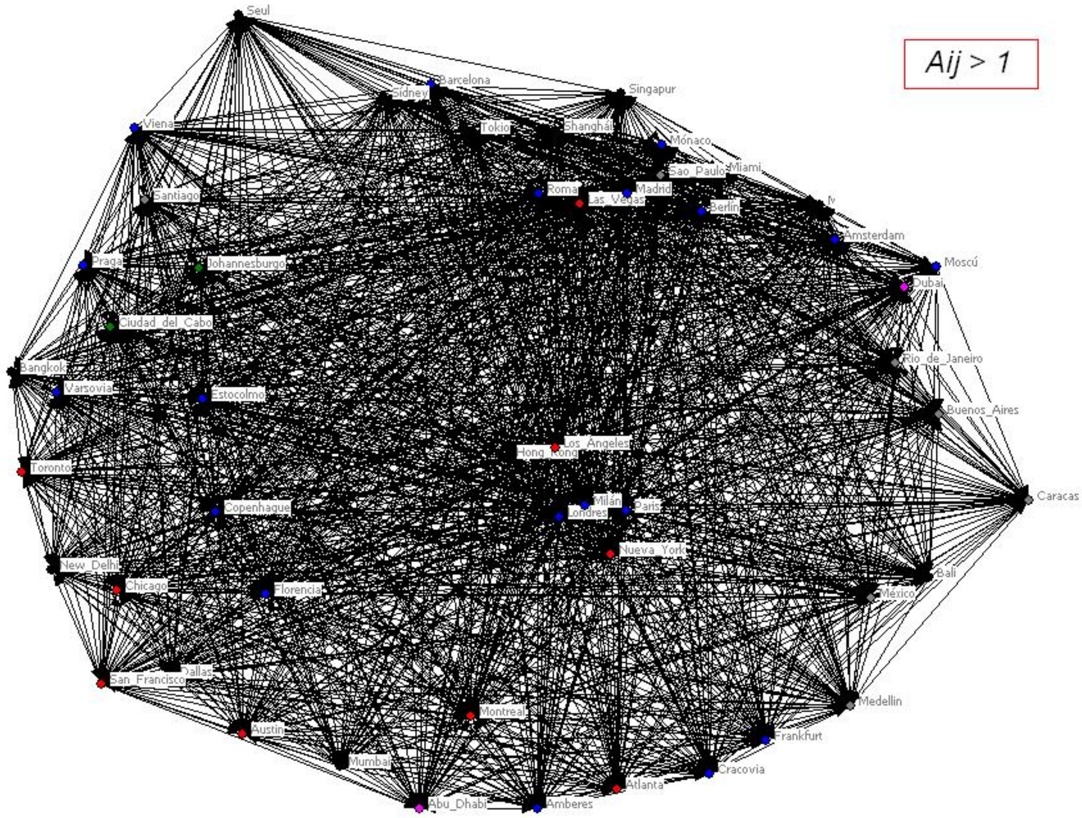

Figure 14. Mean intensity links between geographical areas

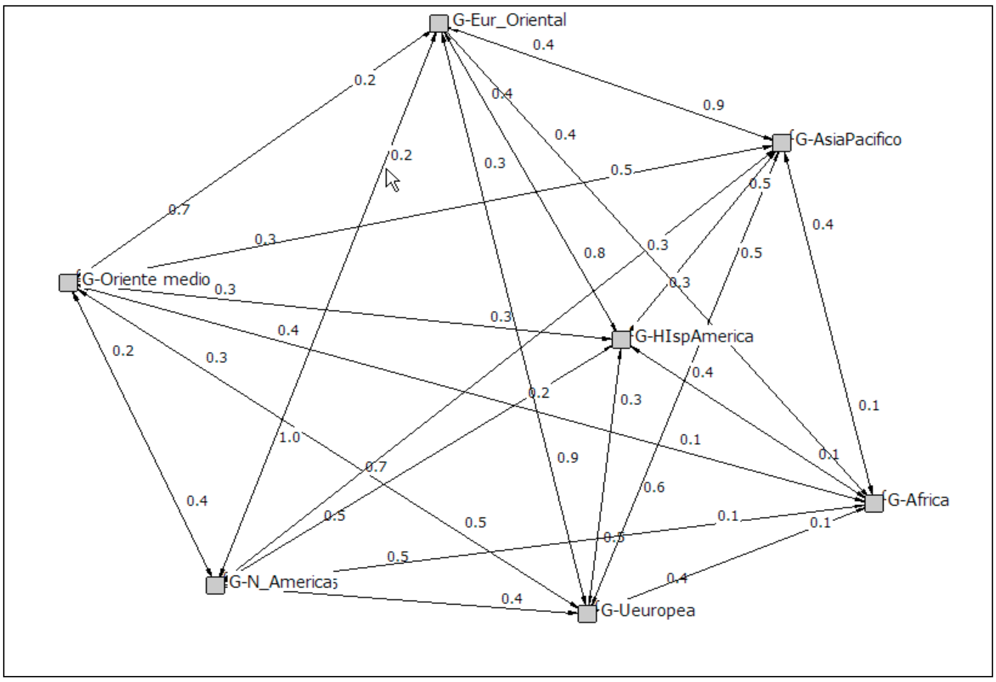

Figure 15. Number of influences of maximum intensity between geographical areas

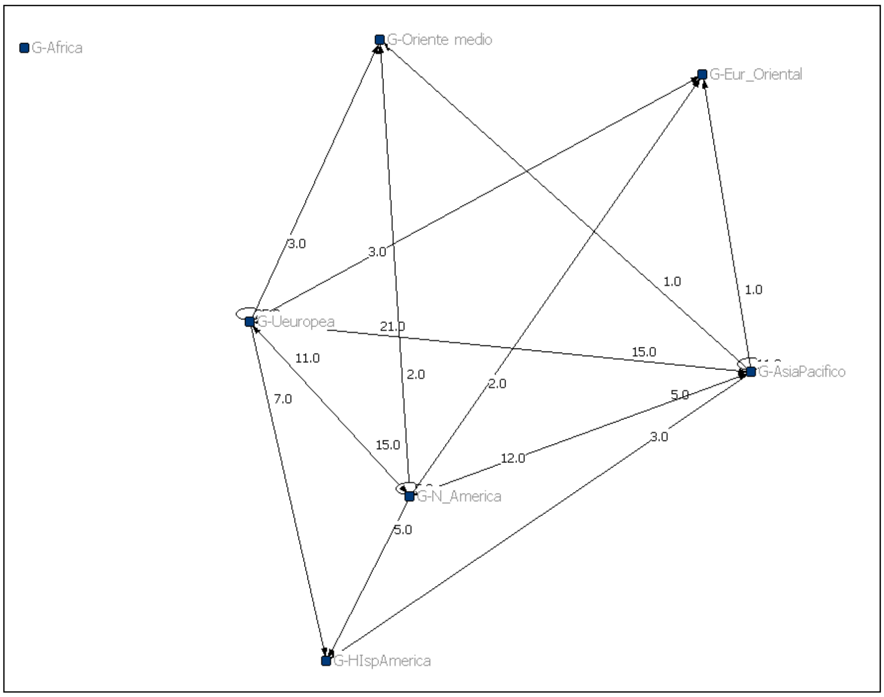

Figure16. Degree distribution and descriptive

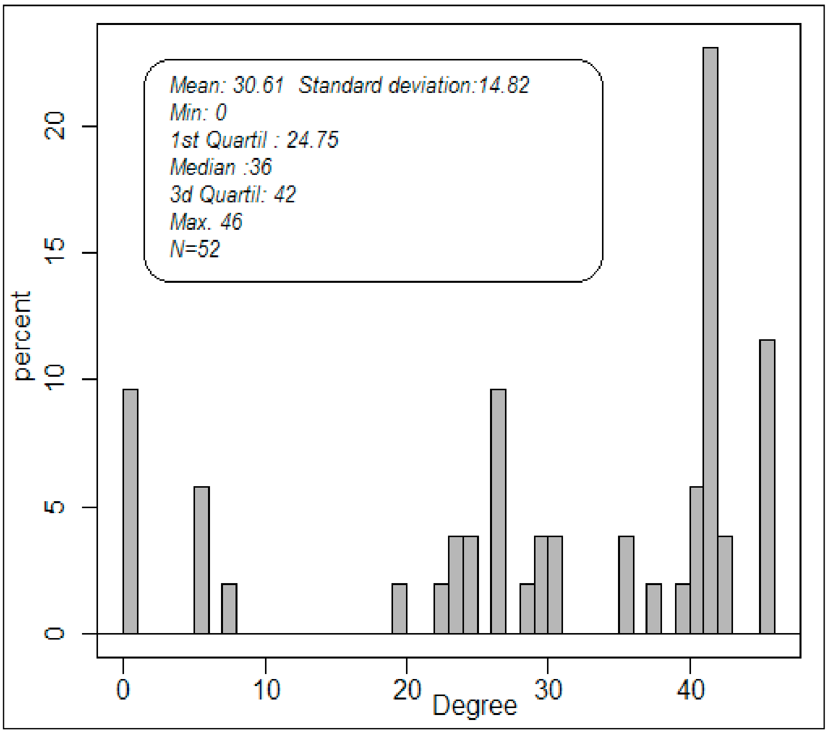

Figure 17: Poisson distribution

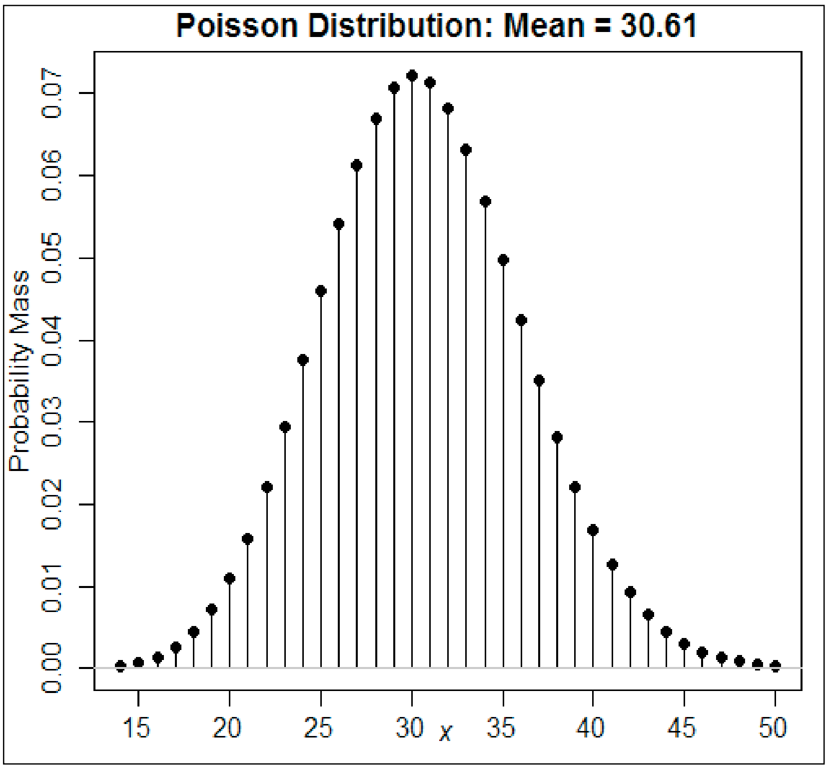

Figure 18. Pareto distribution