

GEOGRAPHY AND THE STATISTICAL VALUE CHAIN

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Geography
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Corridor development in Gauteng

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The aim of the presentation is to illustrate how to visualise statistical data using spatial analysis techniques - *Corridors as spatial instruments to channel and focus economic development within the greater Gauteng region.*

This research focused on the following outcomes:

- 1) The resulting current or emerging multi-nodal structural composition (network of cities);
- 2) The degree to which economic activities are concentrated (agglomeration of economic activities);
- 3) How strong does economic activities flow between the various nodes (cities).



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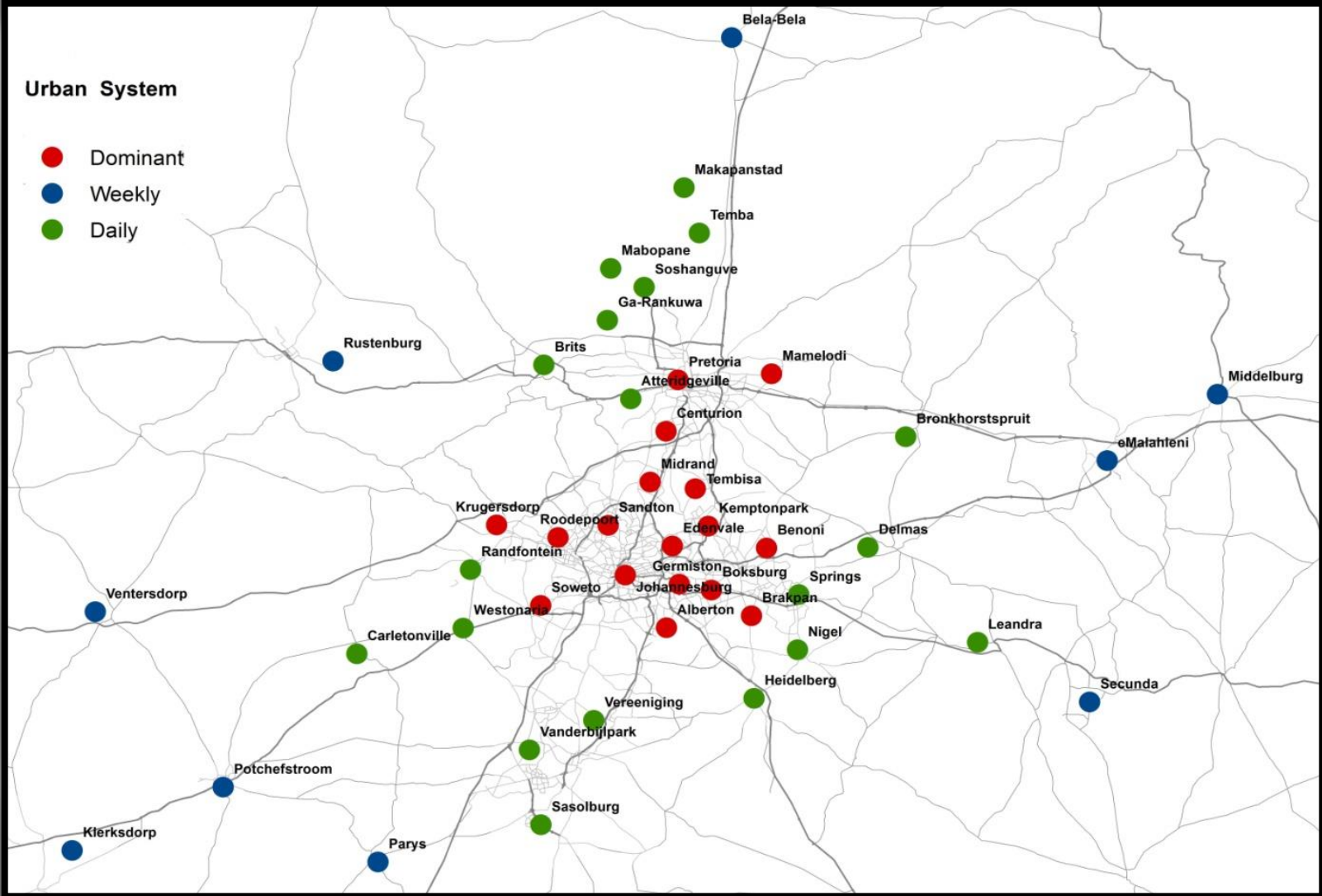
Network cities

The approach to establish a network of cities within the greater Gauteng region was based on:

- 1) The urban function index (UFI) and the city typology of the CSIR – ranks the importance of towns and cities;
- 2) The daily and weekly urban system concept - travelling distances of towns and cities from core city centres, the purpose to quantify the relationships and flow of economic activities between cities.



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Economic Index Factor

Economic output refers to the total value of all goods and services produced in an economy and is calculated as follows:

$EIF_i = (PE_i / PT_i) / (PE_g / PT_g) GVA_i / GVA_g$
EIF_i = Economic Impact Factor of city, i, (i=1...n)
PE = Economic active population
PT = Total population
GVA = Gross value added product
g = All cities in the region

The outcome established the economic output levels of cities relative to one another - *concentration of economic activities*.



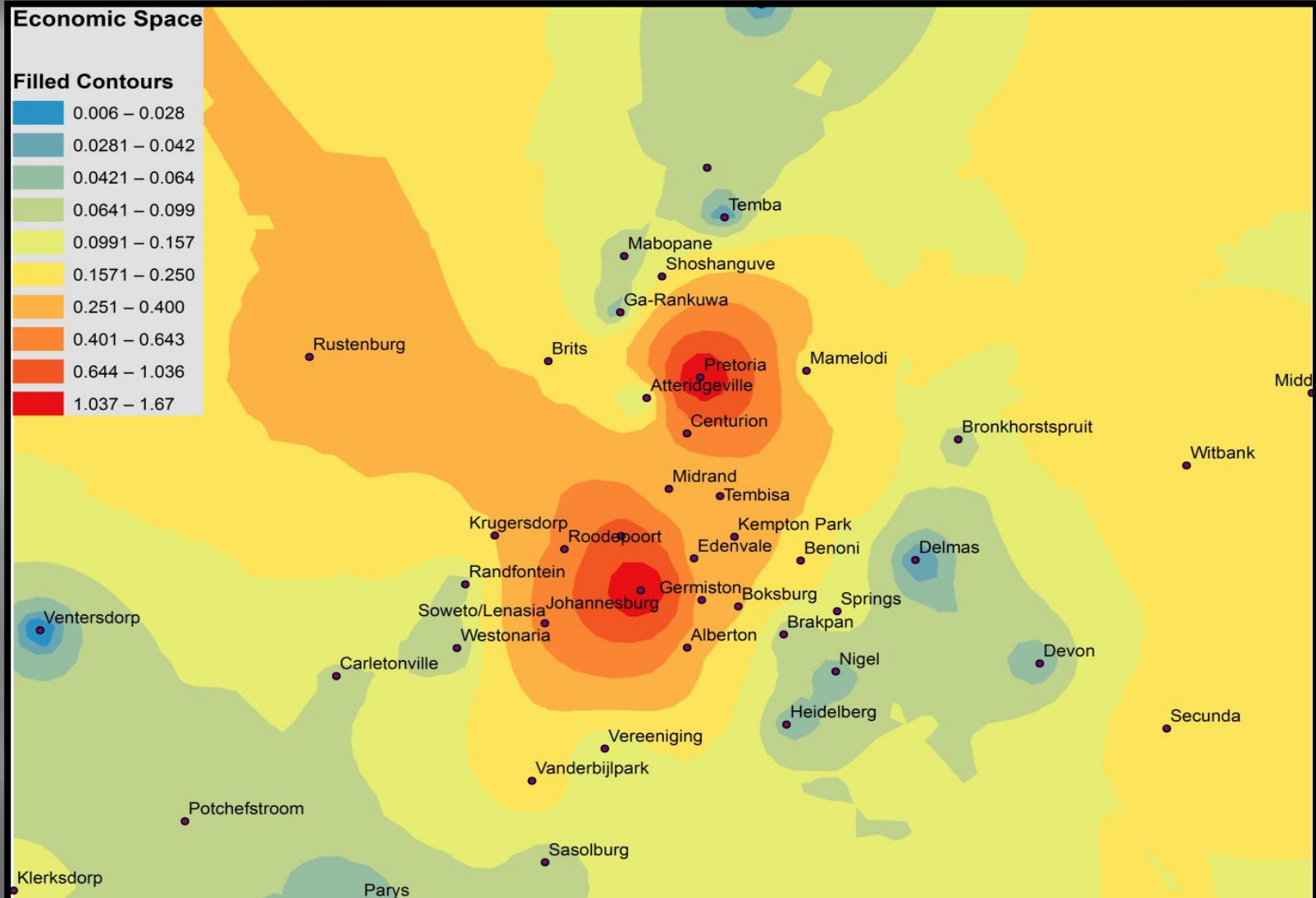
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Dominant urban system	GVA	Economic active	Total Population	Economic output
Alberton	23 971	254 451	800 937	0.31
Boksburg	16 684	113 676	287 832	0.27
Germiston	17 295	118 734	274 260	0.30
Kempton Park	17 521	87 129	171 573	0.36
Johannesburg	97 638	402 279	957 438	1.67
Midrand	8 607	50 895	87 390	0.20
Roodepoort	24 128	181 242	390 105	0.46
Sandton/Randburg	41 139	374 241	753 435	0.83
Centurion	24 624	234 675	472 125	0.50
Pretoria	92 281	464 205	1 062 021	1.64
Mamelodi	11 468	117 441	334 578	0.16
Krugersdorp	16 343	107 046	284 553	0.25
Soweto/Lenasia	38 775	464 412	1 573 920	0.47
Tembisa	12 465	279 021	793 857	0.18
Edenvale	12 607	26 445	49 293	0.28
Benoni	14 850	153 756	468 753	0.20
Brakpan	5 130	102 465	352 224	0.06
Total	475 526	3 532 113	9 114 294	

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Modified law of gravitation

The modified law of gravitation takes into account the economic output of two places (cities) in relation to the actual distance between them and is calculated as follows:

$$SCIF_{ij} = EIF_i EIF_j / D_{ij}$$

SCIF_{ij} = Secondary Corridor Impact Factor of corridor between cities i and j, (i, j=1...m,n)

D_{ij} = Distance between cities, i and j (for consistency, Google Maps were used to determine real distances between cities).

The outcome established the strength of economic activities flow between the various cities.



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PLACES	Johannesburg	Pretoria	Sandton/Randburg	Alberton	Kempton Park	Roodepoort	Centurion	Soweto/Lenasia	Witbank	Rustenburg	Secunda	Boksburg	Germiston
Johannesburg	0	0.490	0.920	0.470	0.250	0.370	0.190	0.300	0.040	0.040	0.030	0.160	0.360
Pretoria	56	0	0.300	0.080	0.130	0.110	0.550	0.090	0.050	0.060	0.020	0.070	0.080
Sandton/Randburg	15	46	0	0.090	0.140	0.120	0.130	0.100	0.020	0.020	0.010	0.070	0.090
Alberton	11	63	30	0	0.040	0.040	0.030	0.050	0.010	0.010	0.010	0.040	0.120
Kempton Park	24	46	21	27	0	0.030	0.040	0.030	0.010	0.010	0.010	0.060	0.050
Roodepoort	21	69	33	34	54	0	0.040	0.200	0.010	0.020	0.010	0.020	0.040
Centurion	44	15	33	51	43	55	0	0.030	0.010	0.010	0.010	0.020	0.030
Soweto/Lenasia	26	83	40	30	55	11	70	0	0.010	0.010	0.010	0.020	0.040
Witbank	137	112	146	140	127	162	123	168	0	0.010	0.010	0.010	0.010
Rustenburg	169	114	133	142	171	103	144	116	230	0	0.010	0.010	0.010
Secunda	133	164	149	126	128	158	169	154	83	288	0	0.010	0.010
Boksburg	29	60	33	22	15	54	56	50	117	184	116	0	0.070
Germiston	14	60	27	8	21	32	47	39	129	173	122	11	0

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Final remarks

The article was published in October 2015 in the GeoJournal and can be googled at:
<http://link.springer.com/journal/>



Thank you