Towards a Regional Corridor Model

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THE SOUTH AFRICA I KNOW, THE HOME I UNDERSTAND

Contextual issues

- South Africa is a **developing** country with **enormous economic inequalities**

- Spatial Planning and **'spatial targeting'** was practised **before 1994 –** thereafter a more ***laissez-faire*** approach

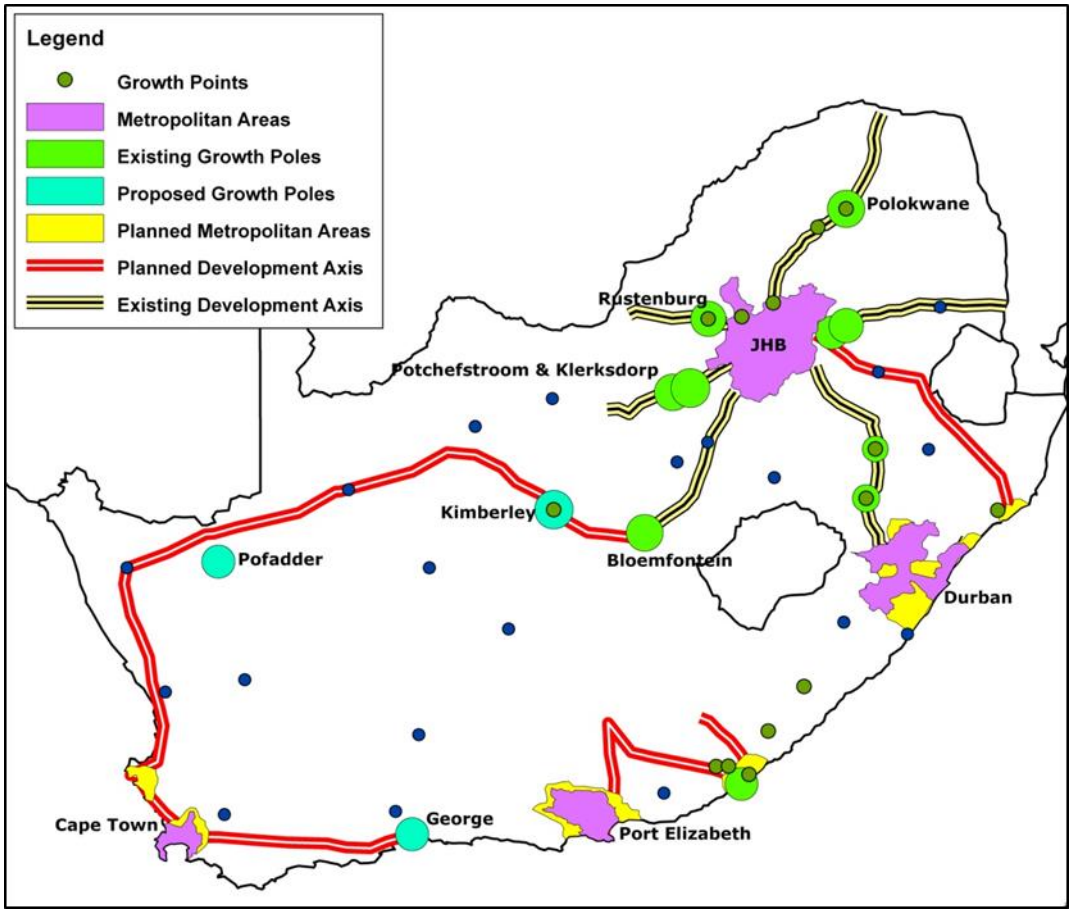
- Government now in the process of **revitalising socio-economic development** through **spatially focused plans**

- **RCM potentially contributes, scientifically, hereto**

NATIONAL PLANNING – SOUTH AFRICA

CONTEXT:

- **Decentralisation policy accepted in 1960's**
- **National Physical Development Plan (1975)**
  - Metropolitan Regions
  - Planning Regions
  - National corridors
  - Industrial development poles

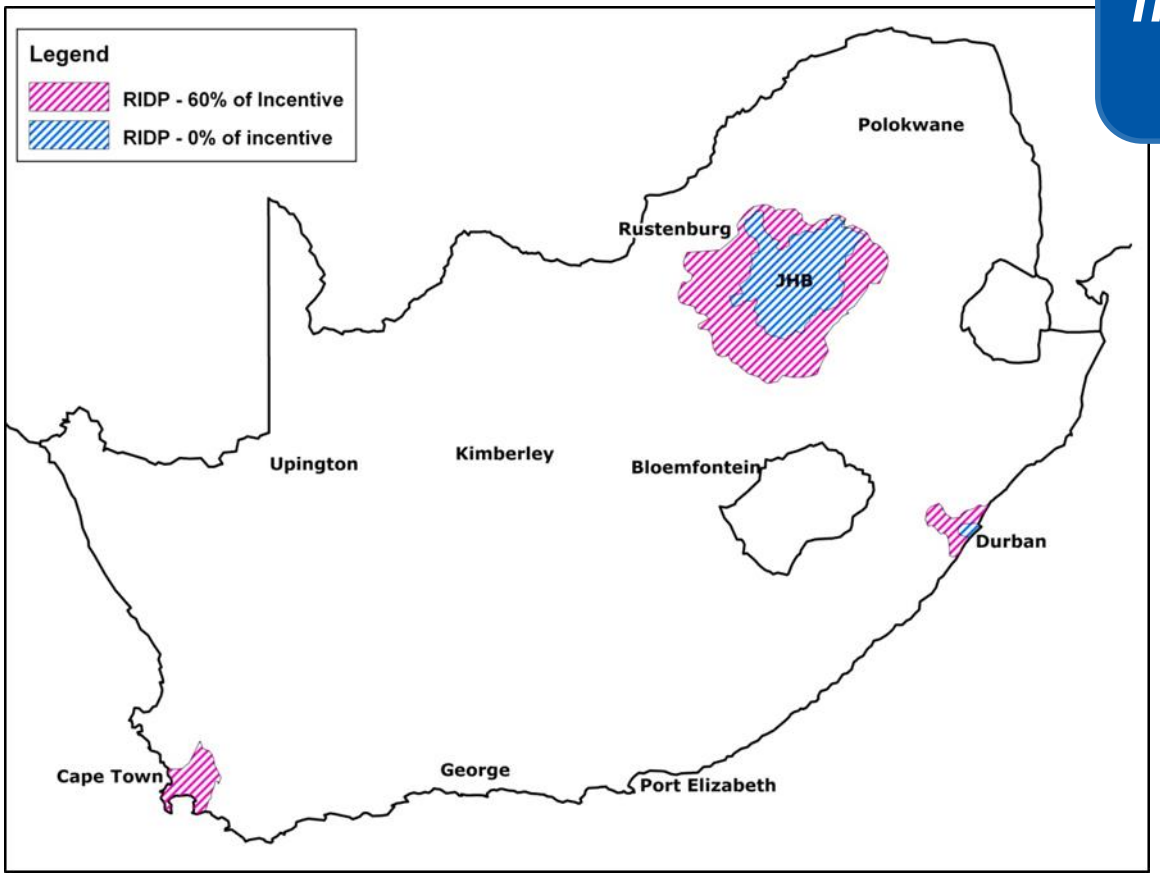


NATIONAL PLANNING – SOUTH AFRICA

Post-Apartheid Spatial Planning (1994+)

- National planning based on **industrial** development incentives
- No spatial targeting of **growth poles**
- **Metropolitan** zones excluded from development incentives
- **Apolitical** approach – definitive move away from “Apartheid-Planning” based on spatial targeting

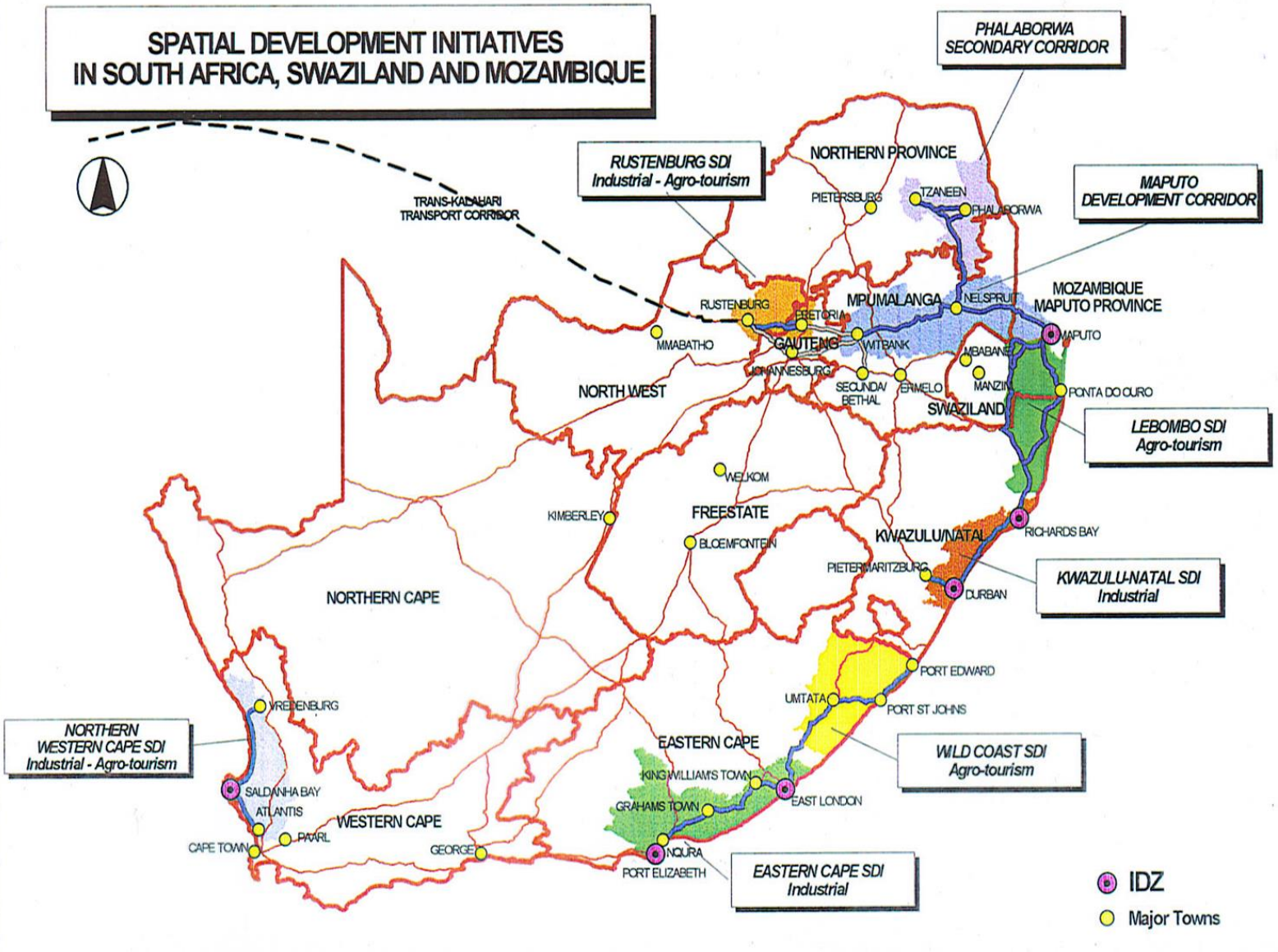
Regional Industrial Development Programme



".. move away from the fixation of what a PLAN is supposed to be"

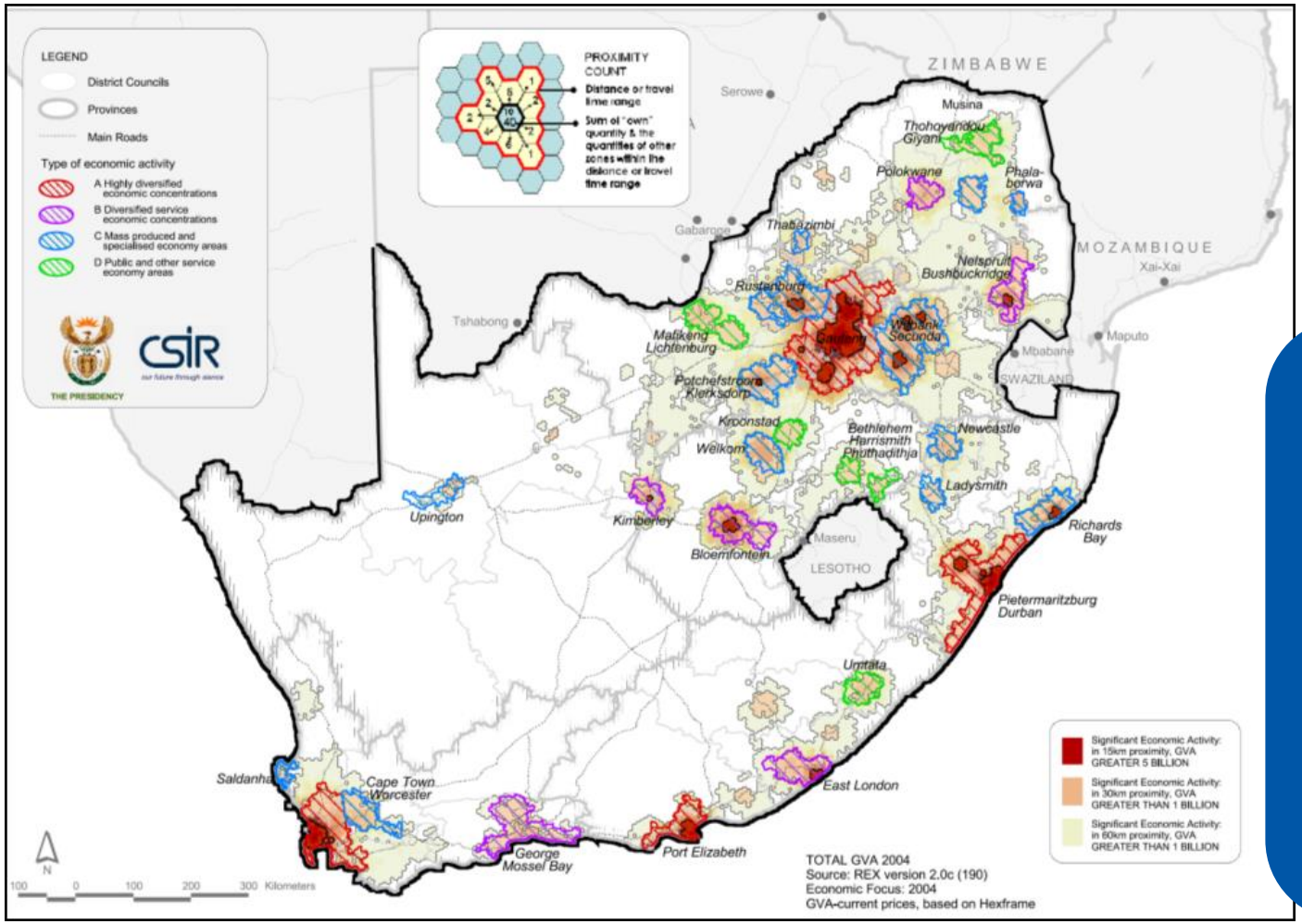
Principles:

- *Locational freedom*
- *Political correctness*



Spatial Development Initiatives: corridors and sectoral targeting return

National Spatial Development Perspective, 2002 & 2006



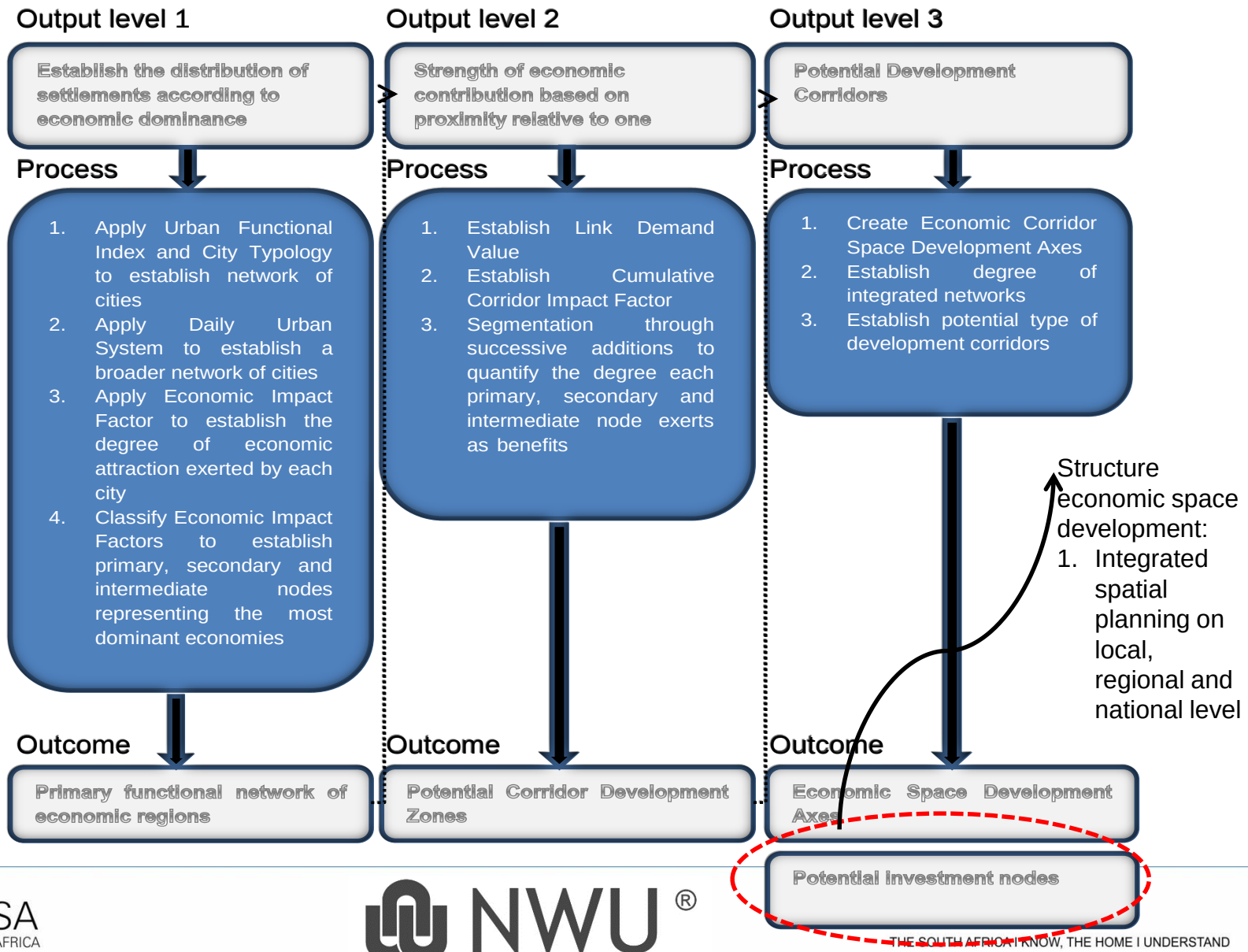
- ***"not a Plan"***
- Identify '***need***' and '***potential***' of nodes.

Regional Corridor Model

Focus of RCM

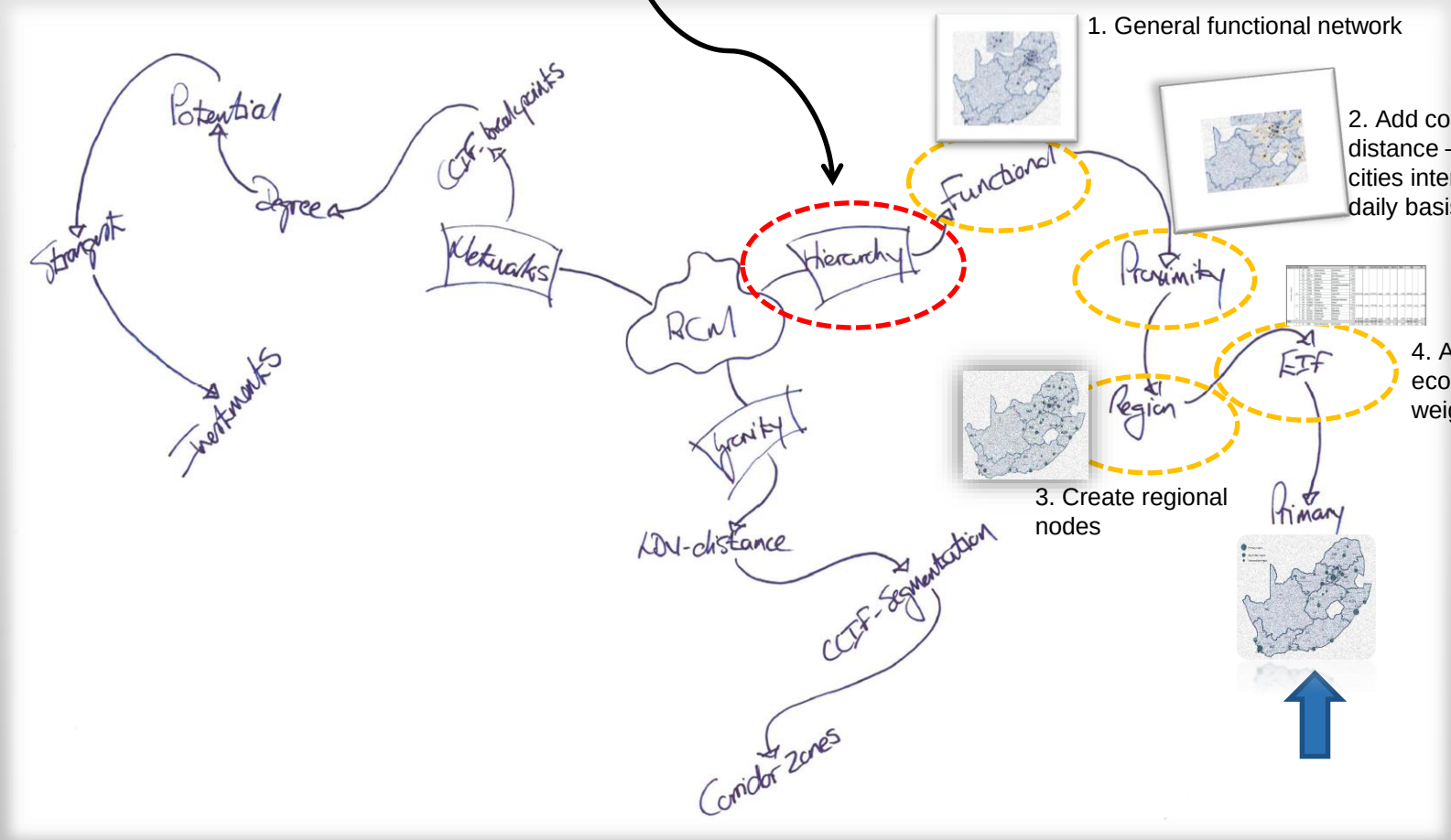
- Based on **key spatial planning theories** and concepts
- **Scientific integration of planning principles and statistical methodology**
- Provides a **model and methodology** for spatial targeting without political interference
- **National legislation** (SPLUMA, 2013): requires a national strategic development plan.
- Spatial targeting of **nodes, corridors, regions**, etc. a requirement

Regional Corridor Model



Output level 1

Establish the primary functional network (primary, secondary and intermediate regional nodes)

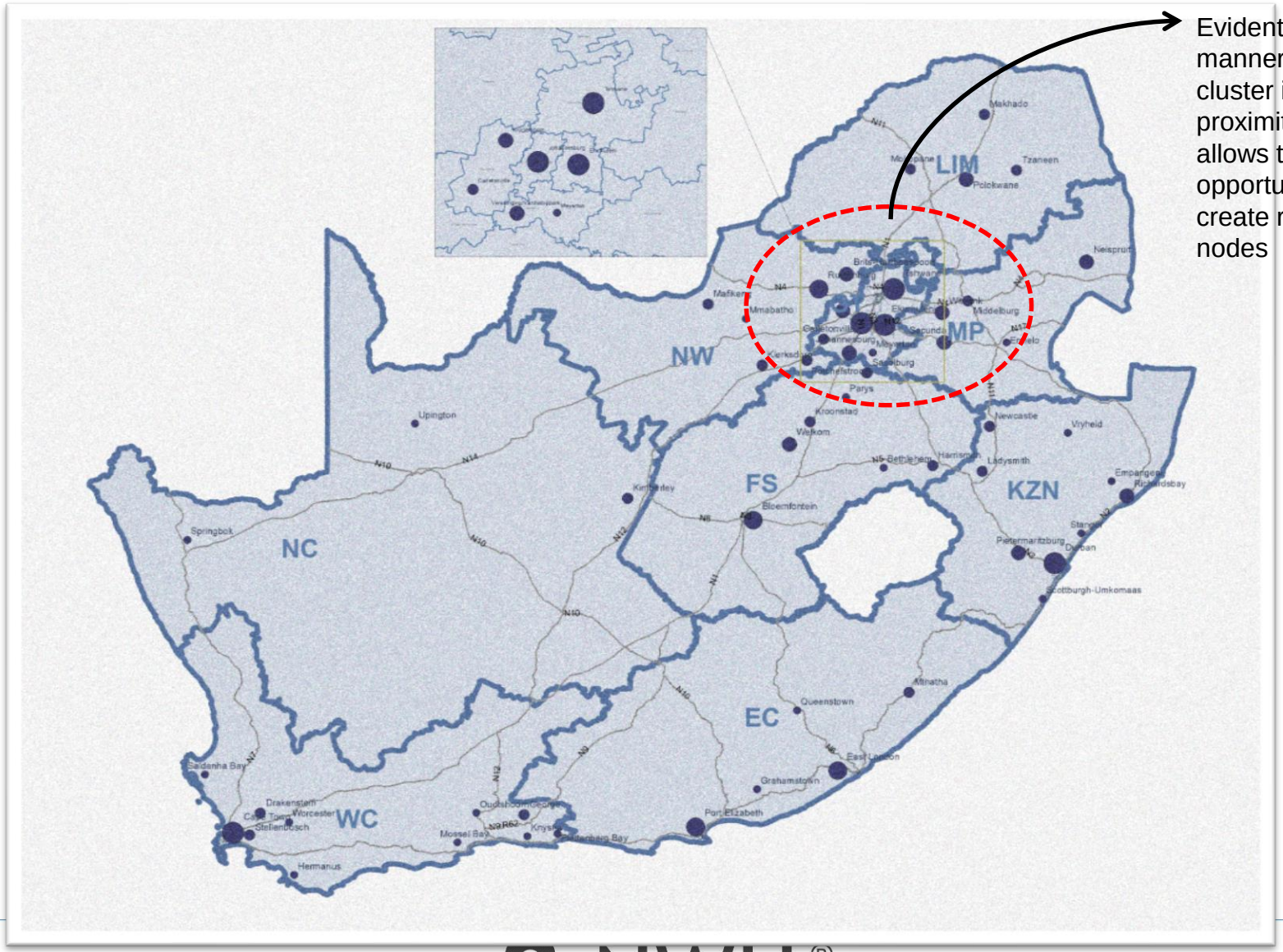


Establish a functional network of cities

UFI	Municipality				Population		Economic active		GVA	
100,00	WC	CPT	City of Cape Town	Cape Town	3 740 025	*7,22%*	1 700 229	*9,06%*	186 199	*10,93%*
94,51	GT	JHB	Johannesburg	Johannesburg	4 434 828	*8,57%*	2 261 487	*12,05%*	233 761	*13,72%*
76,05	KN	ETH	eThekwini	Durban	3 442 362	*6,65%*	1 422 879	*7,58%*	148 555	*8,72%*
51,70	GT	TSH	City of Tshwane	Tshwane	2 921 490	*5,64%*	1 424 601	*7,59%*	156 169	*9,17%*
38,49	GT	EKU	Ekurhuleni	Ekurhuleni	3 178 470	*6,14%*	1 582 452	*8,43%*	149 601	*8,78%*
34,93	EC	NMA	Nelson Mandela Bay	Port Elizabeth	1 152 117	*2,23%*	457 386	*2,44%*	42 415	*2,49%*
25,91	FS	MAN	Mangaung	Bloemfontein	747 429	*1,44%*	292 971	*1,56%*	30 394	*1,78%*
Total					**19 616 721**	***37,89%***	**9 142 005**	***48,69%***	**947 094**	***55,59%***
19,26	EC	BUF	Buffalo City	East London	755 202	*1,46%*	285 225	*1,52%*	28 005	*1,64%*
18,97	KN	KZN225	The Msunduzi	Pietermaritzburg	618 537	*1,19%*	229 674	*1,22%*	23 152	*1,36%*
16,65	GT	GT481	Mogale City	Krugersdorp	362 421	*0,70%*	178 479	*0,95%*	16 342	*0,96%*
12,21	MP	MP322	Mbombela	Nelspruit	588 792	*1,14%*	228 237	*1,22%*	17 226	*1,01%*
11,82	LIM	LIM354	Polokwane	Polokwane	628 998	*1,21%*	230 475	*1,23%*	17 177	*1,01%*
11,23	WC	WC044	George	George	193 671	*0,37%*	79 545	*0,42%*	5 866	*0,34%*
9,12	NC	NC091	Sol Plaatjie	Kimberley	248 040	*0,48%*	92 562	*0,49%*	8 834	*0,52%*
9,02	NW	NW403	City of Matlosana	Klerksdorp	398 676	*0,77%*	158 895	*0,85%*	11 799	*0,69%*
8,32	NW	NW373	Rustenburg	Rustenburg	549 576	*1,06%*	266 472	*1,42%*	26 313	*1,54%*
8,24	WC	WC024	Stellenbosch	Stellenbosch	155 733	*0,30%*	67 134	*0,36%*	9 501	*0,56%*
7,83	GT	GT421	Emfuleni	Vereeniging/Vanderbijlpark	721 665	*1,39%*	310 095	*1,65%*	21 797	*1,28%*
2,02	NW	NW384	Ditsobotla	Mmabatho	168 900	*0,33%*	52 434	*0,28%*	4 397	*0,26%*
Total					**6 334 041**	***12,23%***	**2 081 445**	***11,09%***	**162 177**	***9,52%***
TOTAL					**33 110 394**	***63,96%***	**14 166 585**	***75,46%***	**1 375 665**	***80,74%***

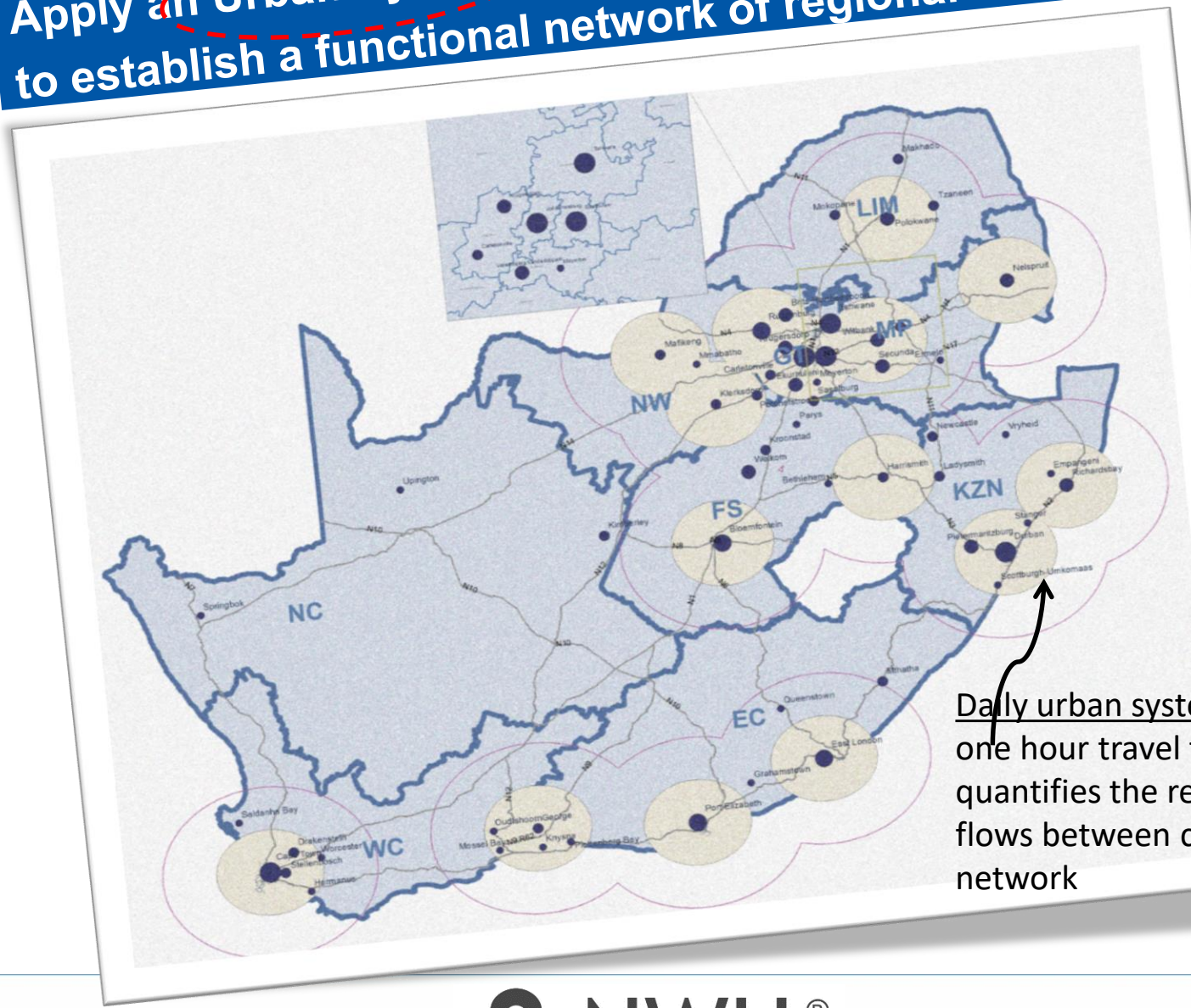
Urban Function Index (UFI) is to determine the relative economic dominance of cities in relation to one another – 57 cities with an economic contribution of 80%

Functional network of cities



Evident is the manner how cities cluster in close proximity which allows the opportunity to create regional nodes

Apply an Urban System in relation to proximity to establish a functional network of regional nodes



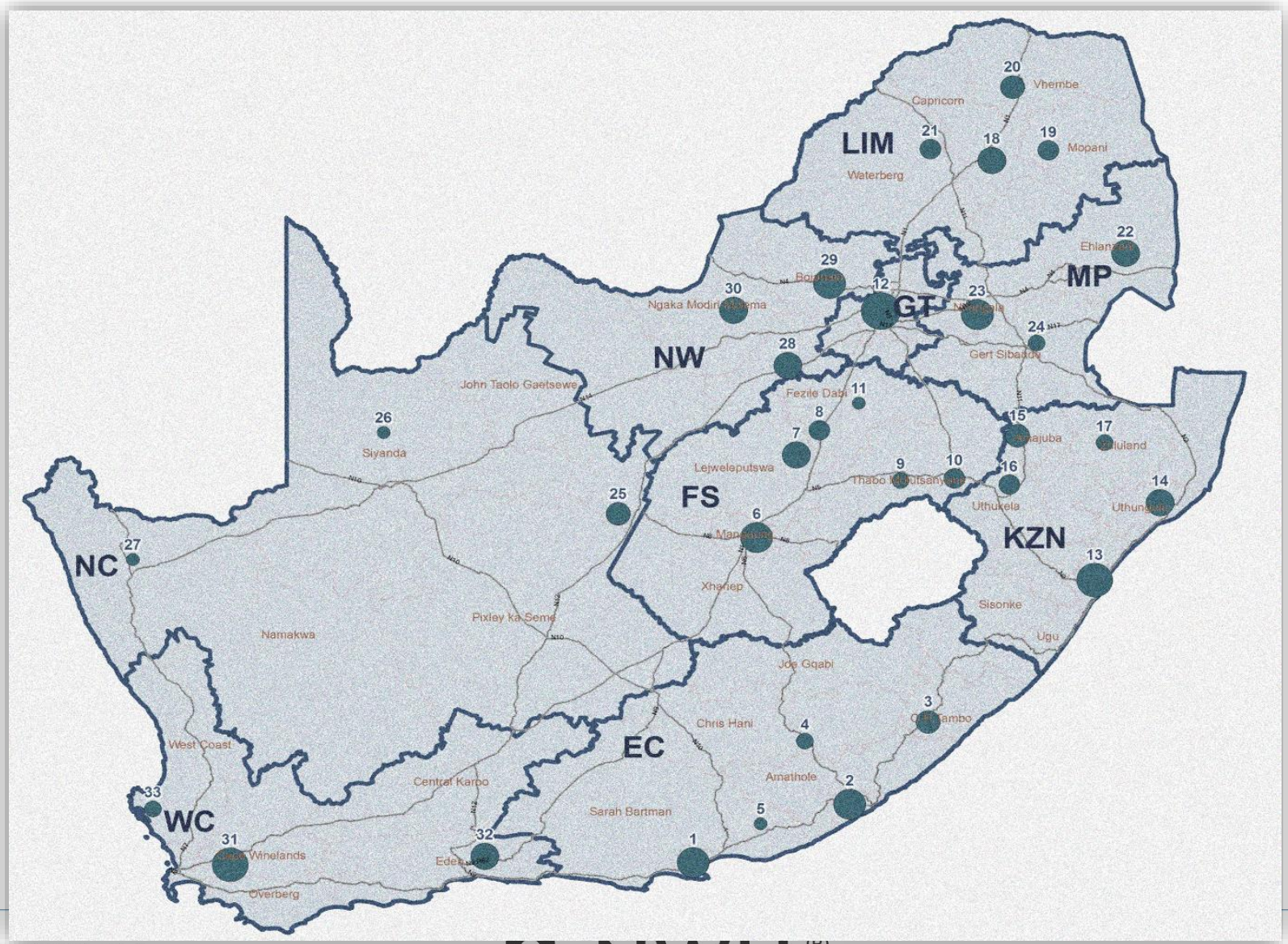
Daily urban system refers to a one hour travel time that quantifies the relationship and flows between cities in a network

Functional network of regional nodes

Regional nodes	Municipality				UFI	Population		Economic active		GVA	
1	EC	NMA	Nelson Mandela Bay	Port Elizabeth	34,93	1 152 117	2,23%	457 386	2,44%	42 415	2,49%
2	EC	BUF	Buffalo City	East London	19,26	755 202	1,46%	285 225	1,52%	28 005	1,64%
3	EC	EC157	King Sabata Dalindyebo	Mthatha	3,74	451 713	0,87%	95 577	0,51%	7 997	0,47%
4	EC	EC134	Lukanji	Queenstown	2,79	190 725	0,37%	53 262	0,28%	3 948	0,23%
5	EC	EC104	Makana	Grahamstown	2,32	80 391	0,16%	28 491	0,15%	2 143	0,13%
6	FS	MAN	Mangaung	Bloemfontein	25,91	747 429	1,44%	292 971	1,56%	30 394	1,78%
7	FS	FS184	Matjhabeng	Welkom	7,43	406 461	0,79%	158 175	0,84%	13 027	0,76%
8	FS	FS201	Moqhaka	Kroonstad	3,94	160 536	0,31%	55 593	0,30%	5 529	0,32%
9	FS	FS192	Dihlabeng	Bethlehem	3,92	128 703	0,25%	47 496	0,25%	3 288	0,19%
10	FS	FS194	Maluti a Phofung	Harrismith	2,10	335 784	0,65%	90 870	0,48%	6 891	0,40%
11	FS	FS203	Ngwathe	Parys	2,03	120 519	0,23%	39 555	0,21%	2 240	0,13%
	GT	JHB	Johannesburg	Johannesburg	94,51						
	GT	TSH	City of Tshwane	Tshwane	51,70						
	NW	NW372	Madibeng	Brits-Hartbeespoort	4,60						
	GT	EKU	Ekurhuleni	Ekurhuleni	38,49						
	GT	GT481	Mogale City	Krugersdorp	16,65						
	GT	GT421	Emfuleni	Vereeniging/Vanderbijlpark	7,83						
	FS	FS204	Metsimaholo	Sasolburg	3,03						
	GT	GT422	Midvaal	Meyerton	3,46						
12	GT	GT484	Merafong	Carletonville	2,74	12 538 182	24,22%	6 175 011	32,89%	609 004	35,74%
	KN	ETH	eThekwini	Durban	76,05						
	KN	KZN212	Umdoni	Scottburgh-Umkomaas	3,04						
	KN	KZN292	KwaDukuza	Stanger	3,08						
13	KN	KZN225	The Msunduzi	Pietermaritzburg	18,97	4 370 964	8,44%	1 768 764	9,42%	179 081	10,51%

Outcome – 33 regional nodes representing 57 cities with an economic contribution of 80%

Functional network of regional nodes

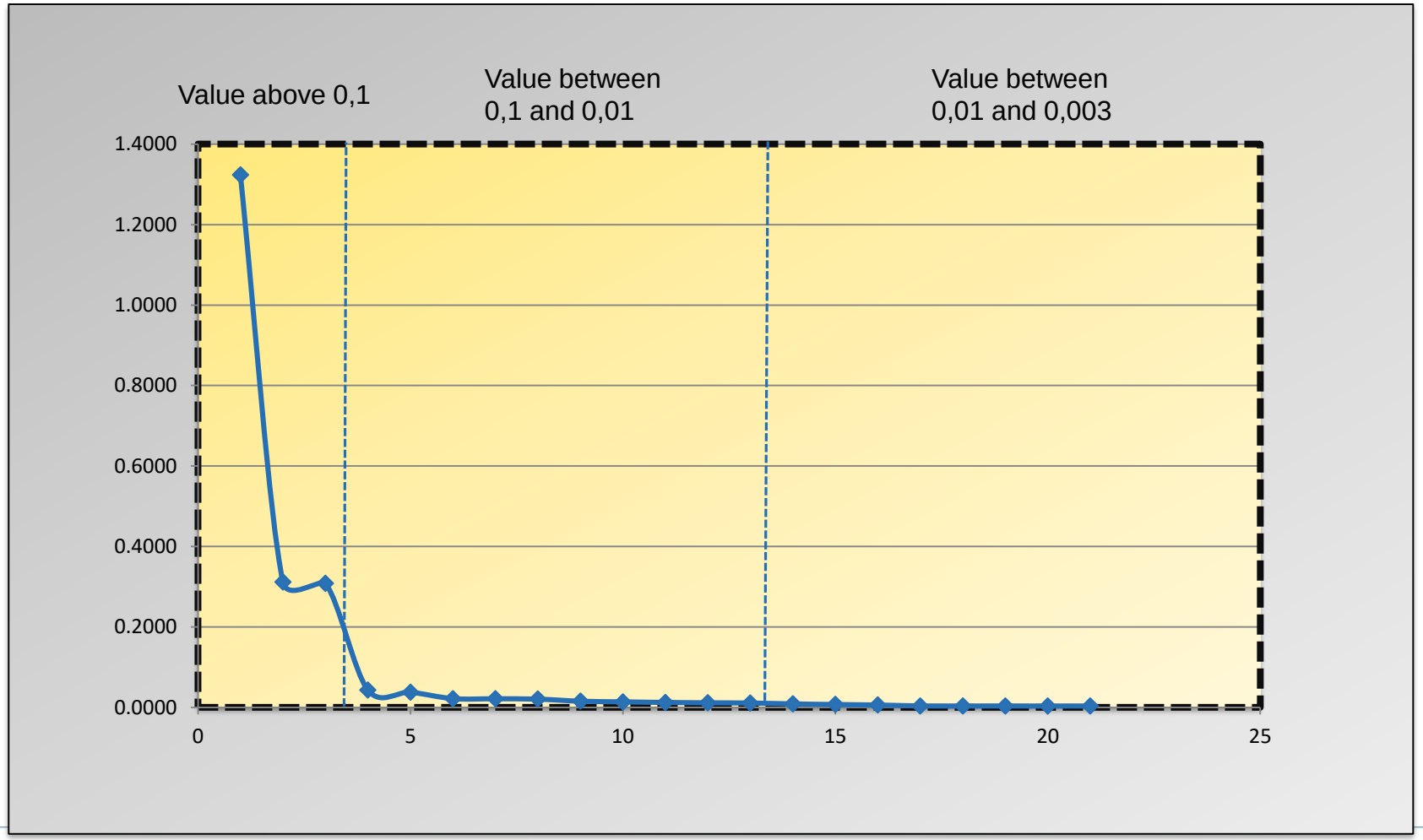


Assign an Economic Impact Factor (EIF) - establish degree of economic attraction exerted by each regional node

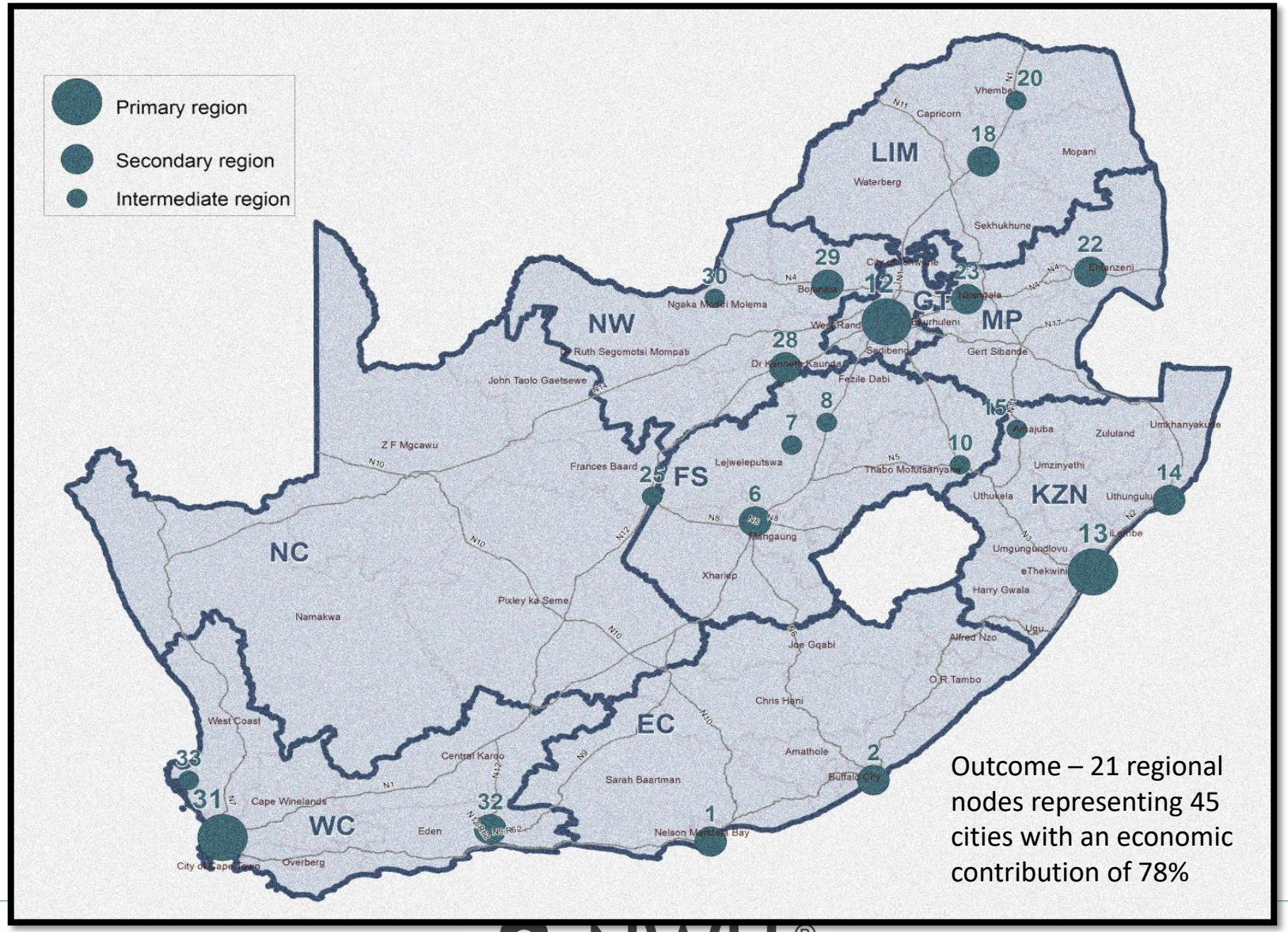
Regional nodes		Municipality				UFI	Population		Economic active		Seaport	Airport	MmIF	GVA		EIF
Primary nodes		GT	JHB	Johannesburg	Johannesburg	94,51										
		GT	TSH	City of Tshwane	Tshwane	51,70										
		NW	NW372	Madibeng	Brits-Hartbeespoort	4,60										
		GT	EKU	Ekurhuleni	Ekurhuleni	38,49										
		GT	GT481	Mogale City	Krugersdorp	16,65										
		GT	GT421	Emfuleni	Vereeniging/Vanderbijlpark	7,83										
		FS	FS204	Metsimaholo	Sasolburg	3,03										
		GT	GT422	Midvaal	Meyerton	3,46										
	12	GT	GT484	Merafong	Carletonville	2,74	12 538 182	*24,22%*	6 175 011	*32,89%*	0,000	1,838	1,838	609 004	*35,74%*	1,3233
		KN	ETH	eThekwini	Durban	76,05										
		KN	KZN212	Umdoni	Scottburgh-Umkomaas	3,04										
		KN	KZN292	KwaDukuza	Stanger	3,08										
	13	KN	KZN225	The Msunduzi	Pietermaritzburg	18,97	4 370 964	*8,44%*	1 768 764	*9,42%*	1,179	0,244	1,423	179 081	*10,51%*	0,3084
		WC	CPT	City of Cape Town	Cape Town	100,00										
		WC	WC023	Drakenstein	Drakenstein	7,15										
		WC	WC024	Stellenbosch	Stellenbosch	8,24										
		WC	WC025	Breede Valley	Worcester	4,12										
	31	WC	WC032	Overstrand	Hermanus	3,74	4 394 277	*8,49%*	1 977 552	*10,53%*	0,459	0,515	0,974	211 542	*12,42%*	0,3115
Total							**21 303 423**	***41,15%***	**9 921 327**	***52,85%***				**999 627**	***58,67%***	
	1	EC	NMA	Nelson Mandela Bay	Port Elizabeth	34,93	1 152 117	*2,23%*	457 386	*2,44%*	0,317	0,153	0,470	42 415	*2,49%*	0,0431

Note: 1) **Total population count** is defined as all usual residents, generally referred to as the *de jure* population, and the total of all persons present, referred to as the *de facto* population; 2) **Economically active population** is defined as the fraction of a population that is either employed, or actively seeking employment; 3) **Gross value added (GVA) at basic prices** is defined as output valued at basic prices less intermediate consumption valued at purchaser's prices. Therefore, the GVA is known by the price at which the output is valued. GVA is a useful way of comparing regions of different sizes of economies.

Classify each regional node considering natural breakpoints - establish the primary functional network of economic regions



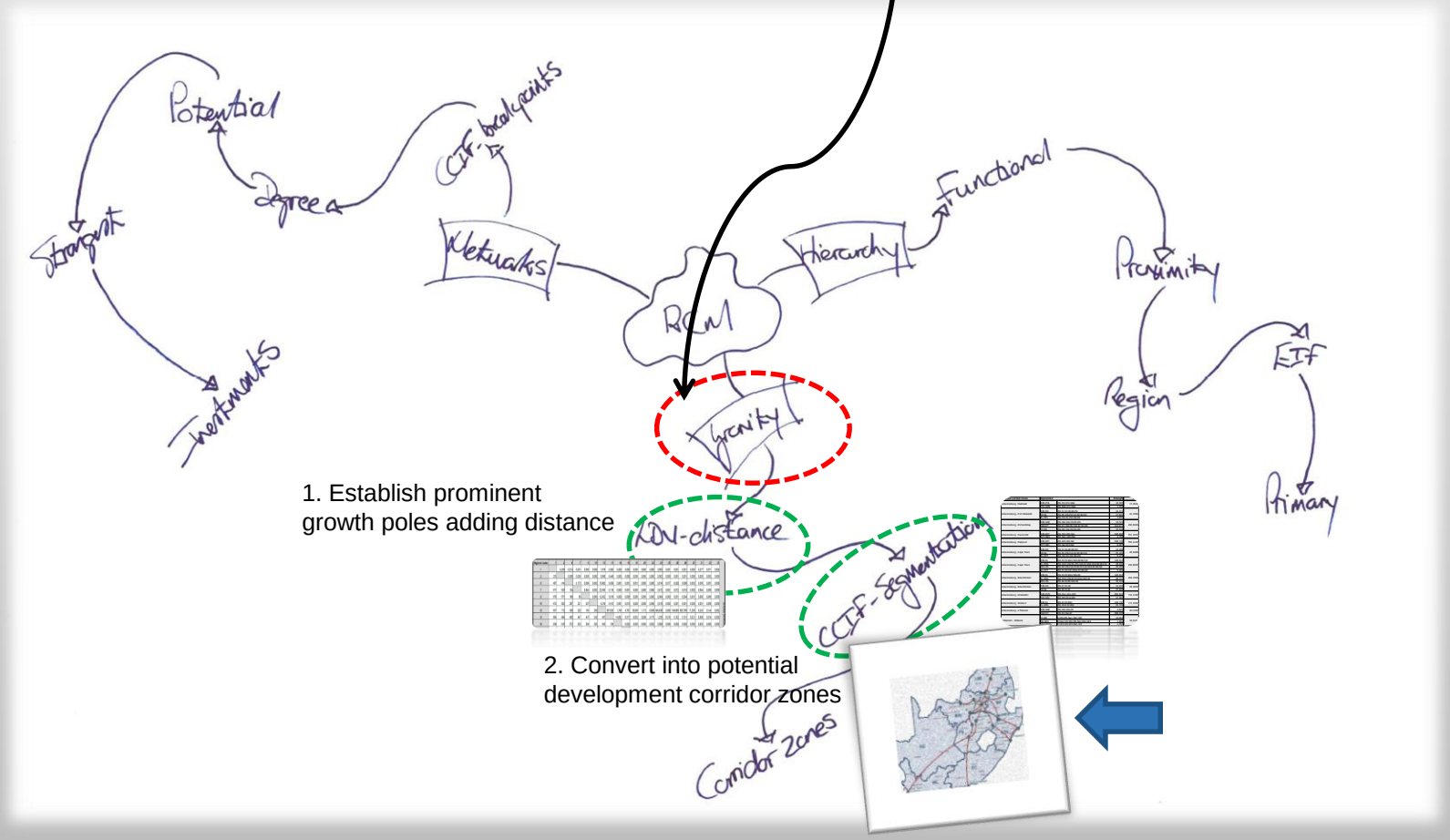
Primary functional network of economic regions



Outcome – 21 regional nodes representing 45 cities with an economic contribution of 78%

Output level 2

Establish potential development corridor zones



Establish the most prominent growth poles - calculate the attraction levels between regional nodes

Regional nodes	1	2	6	7	8	10	12	13	14	15	18	20	22	23	25	28	29	30	31	32	33
1		0,259	0,014	0,001	0,000	0,000	1,679	0,306	0,000	0,000	0,000	0,000	0,000	0,003	0,001	0,001	0,001	0,000	0,277	0,071	0,000
2	233		0,008	0,000	0,000	0,000	0,995	0,448	0,000	0,000	0,000	0,000	0,000	0,002	0,000	0,001	0,001	0,000	0,029	0,002	0,000
6	487	414		0,173	0,006	0,003	15,902	0,459	0,001	0,001	0,001	0,000	0,000	0,014	0,017	0,028	0,008	0,003	0,030	0,001	0,000
7	617	520	134		0,045	0,002	22,630	0,118	0,000	0,001	0,000	0,000	0,000	0,012	0,001	0,072	0,010	0,002	0,004	0,000	0,000
8	678	571	196	80		0,000	12,452	0,018	0,000	0,000	0,000	0,000	0,000	0,004	0,000	0,031	0,004	0,001	0,000	0,000	0,000
10	672	502	287	221	207		4,216	0,415	0,001	0,010	0,000	0,000	0,000	0,010	0,000	0,001	0,001	0,000	0,001	0,000	0,000
12	837	712	359	225	163	255		397,620	1,745	4,761	16,008	1,172	8,559	546,638	0,600	149,665	692,799	17,239	9,243	0,144	0,002
13	684	464	465	447	447	243	487		14,892	0,517	0,052	0,008	0,170	1,255	0,010	0,102	0,151	0,021	0,608	0,014	0,000
14	838	618	572	523	504	302	493	154		0,002	0,000	0,000	0,002	0,008	0,000	0,000	0,000	0,000	0,002	0,000	0,000
32	262	484	584	715	778	835	940	902	1050	942	1229	1333	1214	1026	537	805	955	865	443		0,000
33	751	963	926	1031	1086	1210	1231	1336	1472	1316	1504	1595	1552	1342	784	1069	1214	1072	99	490	

Demand Value)

Distance in Kilometre (centroid to centroid)

Calculate attraction levels based on distance friction – if distance increases, attraction level decreases and vice versa - value one and above consider best fit – most prominent growth poles

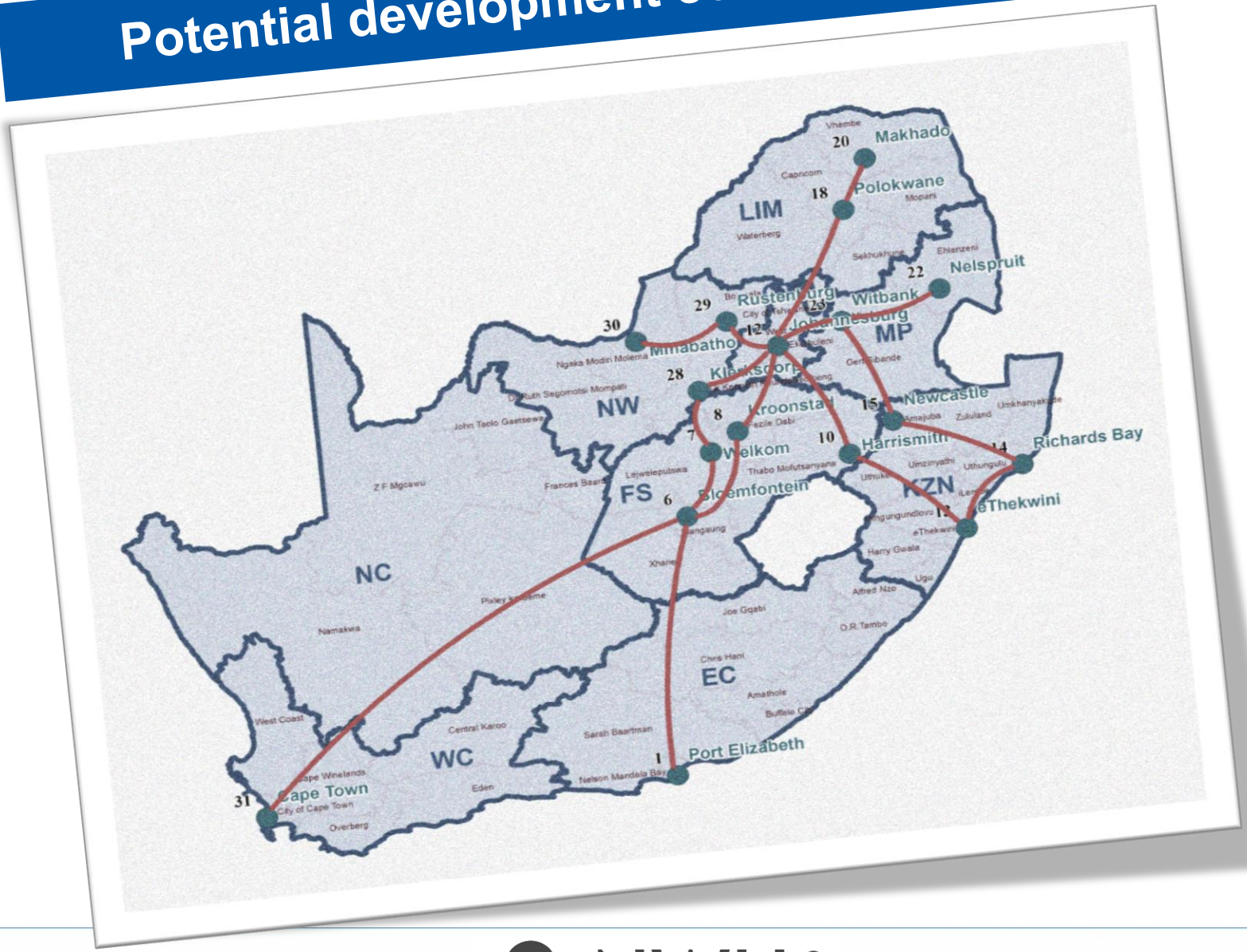
Potential corridor zones	Segmented		Strenght	CCIF
Johannesburg - Makhado	JHB-POL	Jhb-Pol+Pol-Mak	16,095	17,3540
	POL-MAK	Jhb-Mak+Pol-Mak	1,259	
Johannesburg - Port Elizabeth	JHB-KR	Jhb-Kr+Kr-Bl+Bl-Pel	12,472	31,7660
	KR-BL	Jhb-Bl+Jhb-Pel+Kr-Bl+Bl-Pel	17,601	
	BL-PEL	Jhb-Pel+Kr-Pel+Bl-Pel	1,693	
Johannesburg - Richardsbay	JHB-HAR	Jhb-Har+Har-Et+Et-Rb	19,523	450,8330
	HAR-ET	Jhb-Et+Jhb-Rb+Har-Et+Et-Rb	414,672	
	ET-RB	Jhb-Rb+Har-Rb+Et-Rb	16,638	
Johannesburg - Newcastle	JHB-WIT	Jhb-Wit+Wit-Nec	546,666	551,4550
	WIT-NEC	Jhb-Nec+Wit-Nec	4,789	
Johannesburg - Nelspruit	JHB-WIT	Jhb-Wit+Wit-Nel	546,746	555,4130
	WIT-NEL	Jhb-Nel+Wit-Nel	8,667	
Johannesburg - Cape Town	JHB-KR	Jhb-Kr+Kr-Bl+Bl-Cpt	12,488	46,9480
	KR-BL	Jhb-Bl+Jhb-Cpt+Kr-Bl+Bl-Cpt	25,181	
	BL-CPT	Jhb-Cpt+Kr-Cpt+Bl-Cpt	9,279	
Johannesburg - Cape Town	JHB-KL	Jhb-Kl+Kl-Wel+Wel-Bl+Bl-Cpt	149,910	232,6000
	KL-WEL	Jhb-Wel+Jhb-Bl+Jhb-Cpt+Kl-Wel+Wel-Bl+Bl-Cpt	38,777	
	WEL-BL	Jhb-Bl+Jhb-Cpt+Kl-Bl+Kl-Cpt+Wel-Bl+Bl-Cpt	25,383	
	BL-CPT	Jhb-Ct+Kl-Cpt+Wel-Ct+Bl-Cpt	9,284	
Johannesburg - Bloemfontein	JHB-KL	Jhb-Kl+Kl-Wel+Wel-Bl	149,910	204,7900
	KL-WEL	Jhb-Wel+Jhb-Bl+Kl-Wel+Wel-Bl	38,777	
	WEL-BL	Jhb-Bl+Kl-Bl+Wel-Bl	16,103	
Johannesburg - Bloemfontein	JHB-KR	Jhb-Kr+Kr-Bl	12,458	28,3660
	KR-BL	Jhb-Bl+Kr-Bl	15,908	
Johannesburg - Mmabatho	JHB-RUS	Jhb-Rus+Rus-Mm	692,844	710,1280
	RUS-Mm	Jhb-Mm+Rus-Mm	17,284	
Johannesburg - Welkom	JHB-KL	Jhb-Kl+Kl-Wel	149,737	172,4390
	KL-WEL	Jhb-Wel+Kl-Wel	22,702	
Johannesburg - eThekwini	JHB-HAR	Jhb-Har+Har-Et	4,631	402,666
	HAR-ET	Jhb-Et+Har-Et	398,035	
eTthekwini - Witbank	ET-RB	Et-Rb+Rb-Nec+Nec-Wit	14,922	18,0150
	RB-NEC	Et-Nec+Et-Wit+Rb-Nec+Nec-Wit	1,802	
	NEC-WIT	Et-Wit+Rb-Wit+Nec-Wit	1,291	

1. Segment prominent growth poles into sections
2. Calculate the Cumulative Corridor Impact Factor - cumulative adding each adjacent section allows quantifying the degree or the forces each section exerts as benefits – benefit value for each section

Convert prominent growth poles into potential development corridor zones

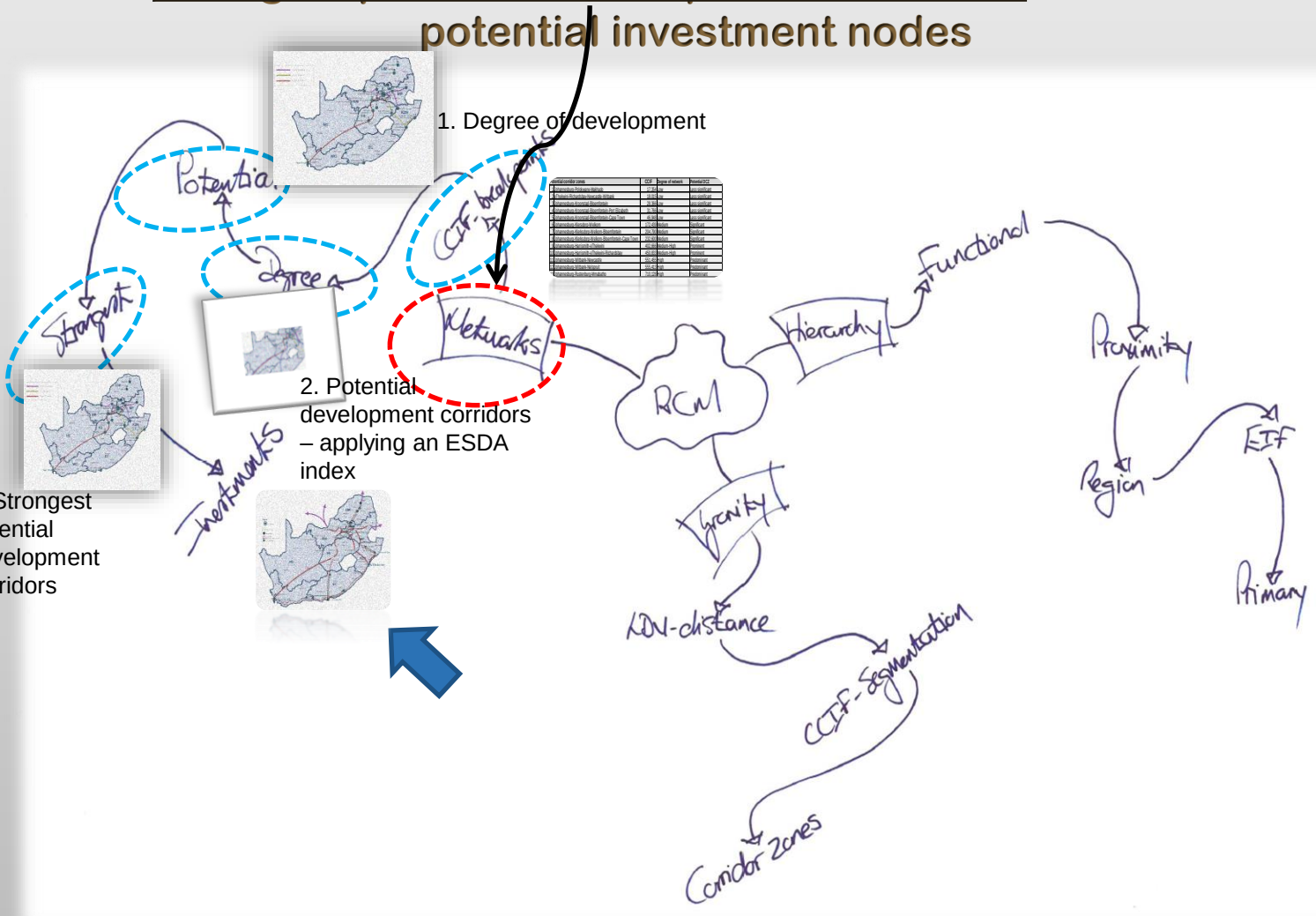
Primary nodes	EIF	Primary nodes	EIF	Secondary nodes	EIF	Intermediate nodes	EIF	IDV
Johannesburg	1,3233					Makhado	0,0033	1,172
Durban	0,3084			Witbank	0,0376			1,255
Johannesburg	1,3233			Port Elizabeth	0,0431			1,679
Johannesburg	1,3233			Richardsbay	0,0152			1,745
Johannesburg	1,3233					Harrismith	0,0032	4,216
Johannesburg	1,3233					Newcastle	0,0035	4,761
Cape Town	0,3115					Saldanha Bay	0,0034	4,806
Johannesburg	1,3233			Nelspruit	0,0113			8,559
Johannesburg	1,3233	Cape Town	0,3115					9,243
Johannesburg	1,3233					Kroonstad	0,0033	12,452
Durban	0,3084			Richardsbay	0,0152			14,892
Johannesburg	1,3233			Bloemfontein	0,0213			15,902
Johannesburg	1,3233			Polokwane	0,0107			16,008
Johannesburg	1,3233					Mmabatho	0,0070	17,239
Johannesburg	1,3233					Welkom	0,0086	22,630
Johannesburg	1,3233			Klerksdorp	0,0122			149,665
Johannesburg	1,3233	Durban	0,3084					397,620
Johannesburg	1,3233			Witbank	0,0376			546,638
Johannesburg	1,3233			Rustenburg	0,0217			692,799

Potential development corridor zones

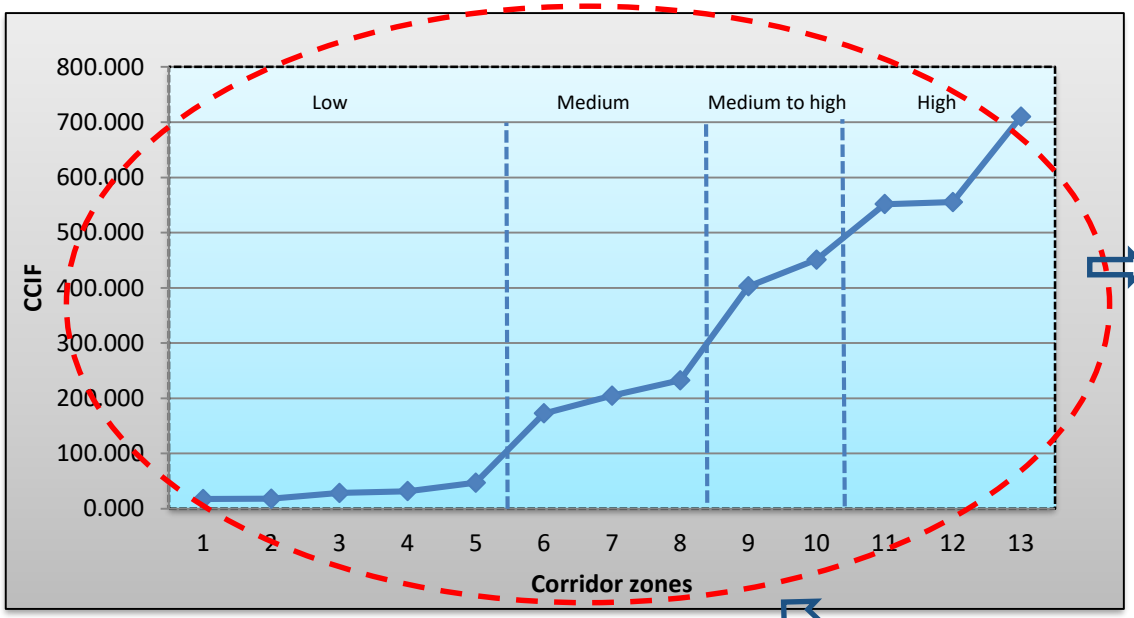


Output level 3

Establish strongest potential development corridors to be converted into potential investment nodes



Establish degree of development based on natural breakpoints

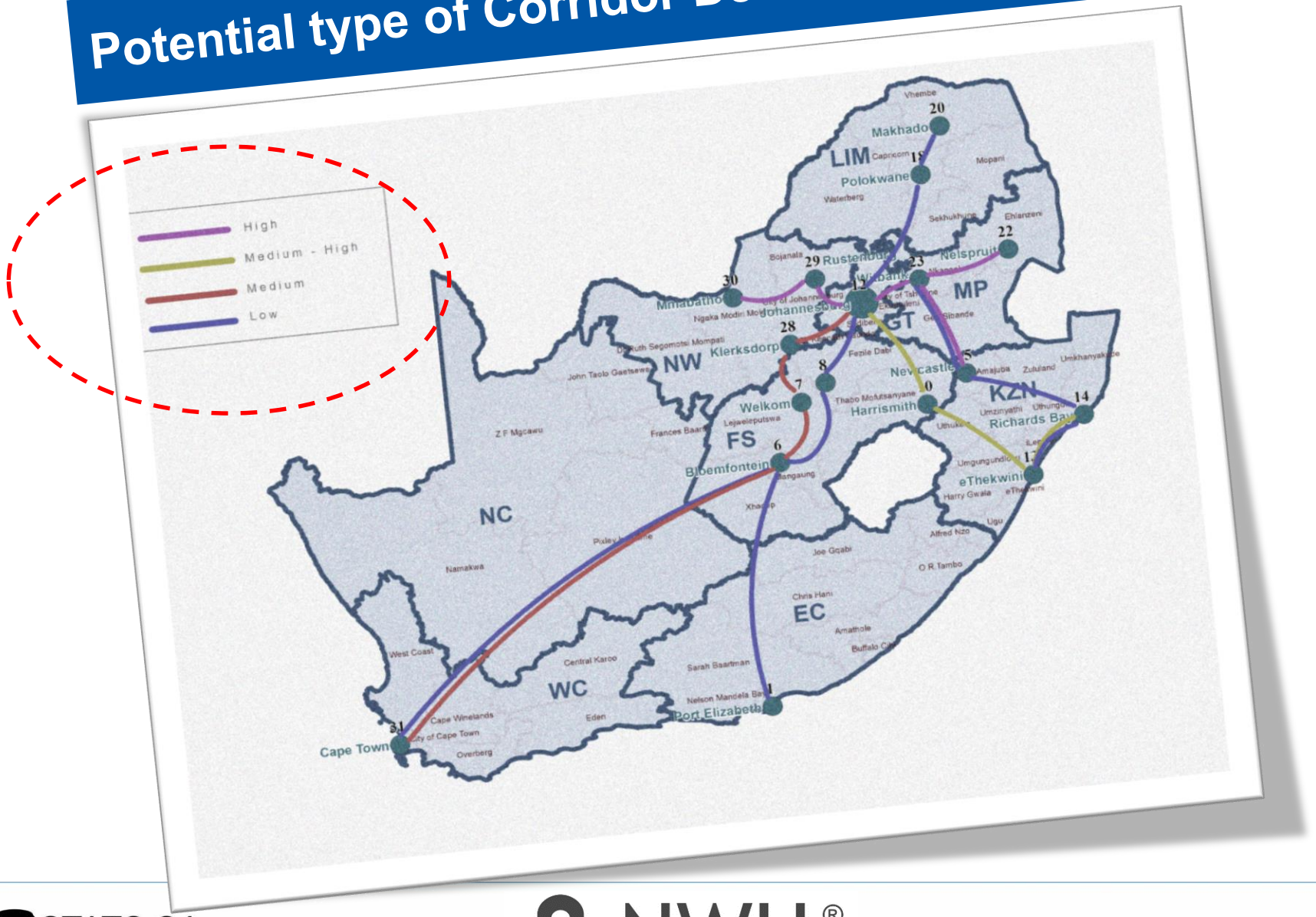


Establish potential corridor type applying an ESDA classification index

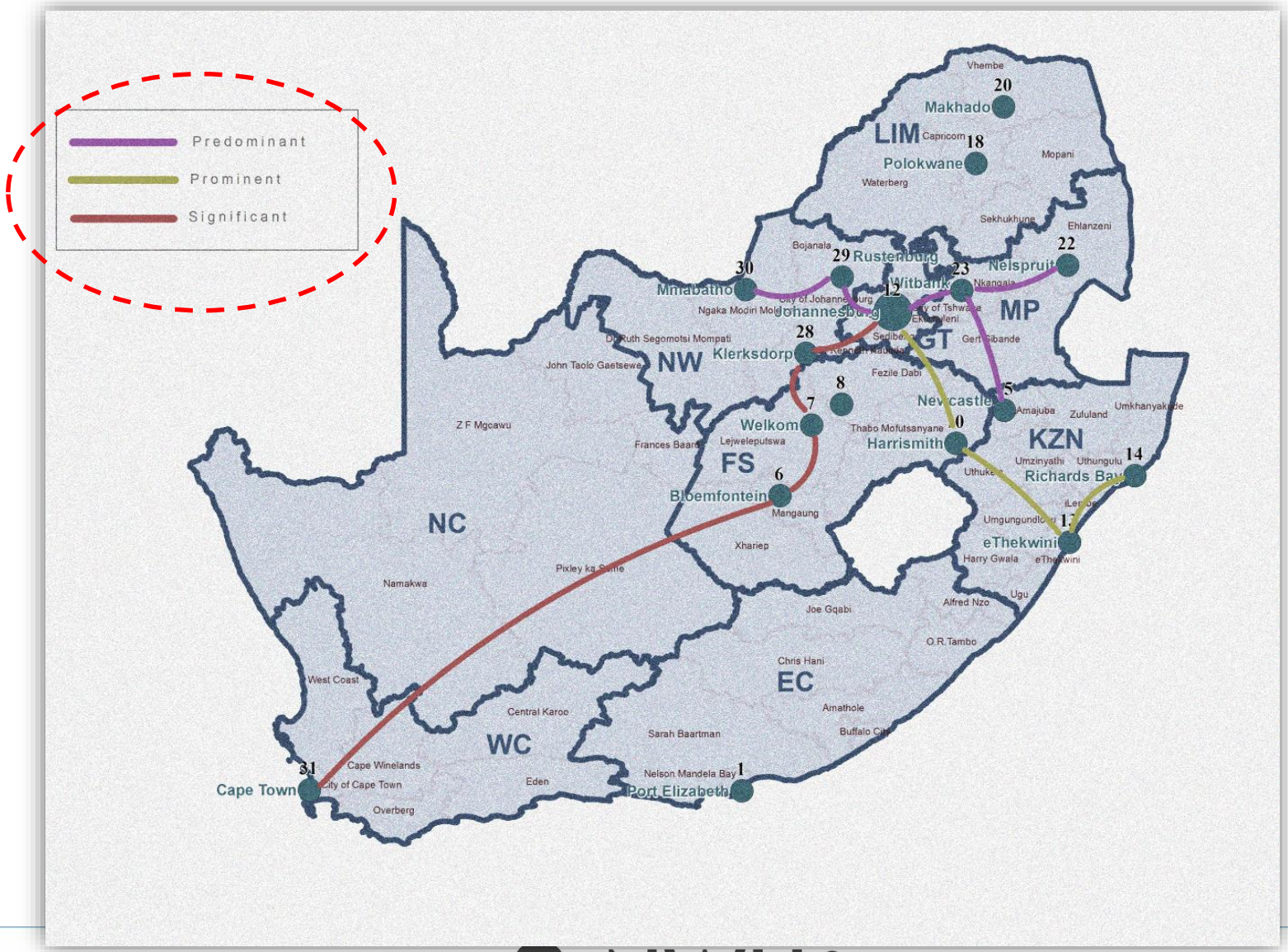
ESDA	Degree of integrated networks	Potential type of DCZ
>500	High	Predominant
500 - 300	Medium to high	Prominent
300 - 100	Medium	Significant
<100	Low	Less significant

	Potential corridor zones	CCIF	Degree of network	Potential DCZ
1	Johannesburg-Polokwane-Makhado	17,354	Low	Less significant
2	eThekwini-Richardsbay-Newcastle-Witbank	18,015	Low	Less significant
3	Johannesburg-Kroonstad-Bloemfontein	28,366	Low	Less significant
4	Johannesburg-Kroonstad-Bloemfontein-Port Elizabeth	31,766	Low	Less significant
5	Johannesburg-Kroonstad-Bloemfontein-Cape Town	46,948	Low	Less significant
6	Johannesburg-Klersdorp-Welkom	172,439	Medium	Significant
7	Johannesburg-Klerksdorp-Welkom-Bloemfontein	204,790	Medium	Significant
8	Johannesburg-Klerksdorp-Welkom-Bloemfontein-Cape Town	232,600	Medium	Significant
9	Johannesburg-Harrismith-eThekwini	402,666	Medium-High	Prominent
10	Johannesburg-Harrismith-eThekwini-Richardsbay	450,833	Medium-High	Prominent
11	Johannesburg-Witbank-Newcastle	551,455	High	Predominant
12	Johannesburg-Witbank-Nelspruit	555,413	High	Predominant
13	Johannesburg-Rustenburg-Mmabatho	710,128	High	Predominant

Potential type of Corridor Development Zones



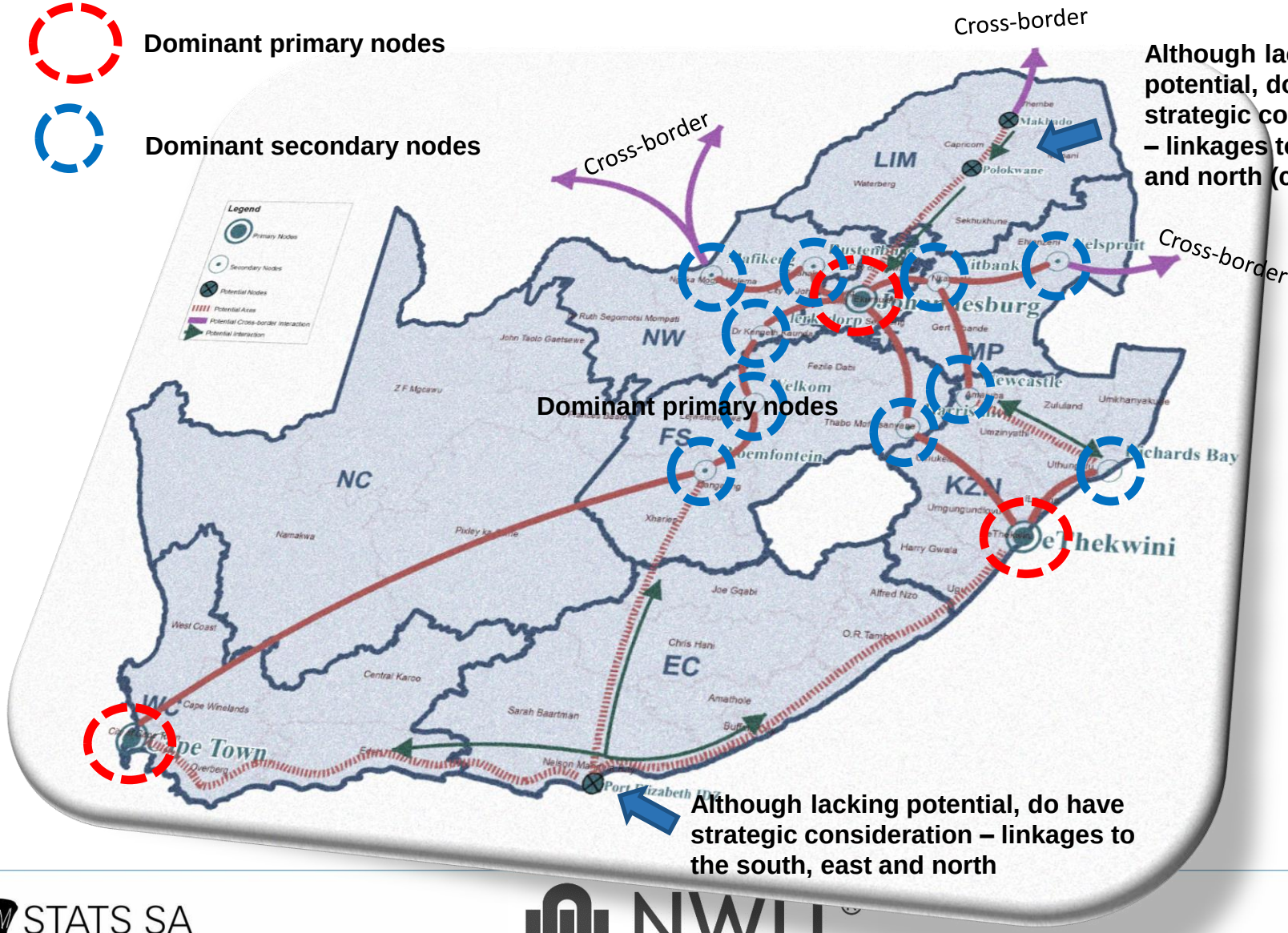
Strongest potential Corridor Development Zones



Potential investment nodes

Dominant primary nodes

Dominant secondary nodes



What does the RCM offer?

1. It provides a **framework** for the establishment of **potential regional economic zones**
2. It promotes **explicit, focused areas** guiding economic space development
3. It highlights **nodes lacking potential development** opportunities
4. It **creates economic conditions stimulating intra-regional** and cross-border trade **opportunities** (SADC)

Way forward…

1. RCM approach sets a platform for policies and strategic actions plans to promote sustainable economic development.
2. It sets a platform to organize infrastructure and resources for implementation based on a scientific approach – given the highly politicized environment that spatial planning relates to.

Thank You

GOD is the light and the life of creation