

Does geographical proximity to IT suppliers affect IT adoption by firms? Evidence from the Sardinia case

Cristina Murrone

cristina.murrone@gmail.com

e Anna Maria Pinna

ampinna@unica.it

CRENOS - Centro di ricerche Nord-Sud
Università di Cagliari

www.crenos.it

CRENOS

CENTRO RICERCHE
ECONOMICHE NORD SUD

Università di Cagliari

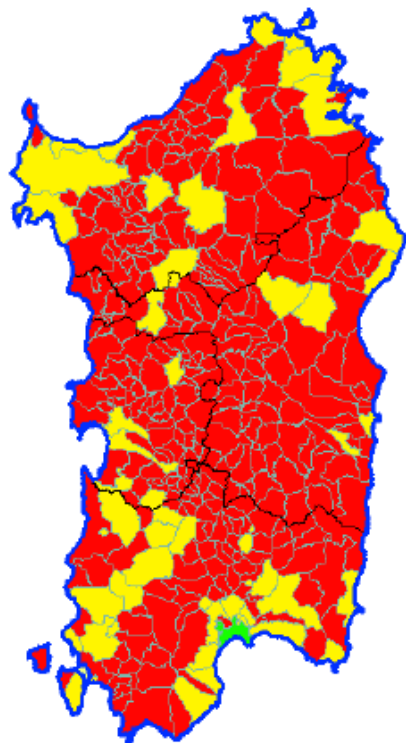
Università di Sassari

Cambridge, december 2005

The Story

- in 2000, the greatest success of Milan's New Market was a telecommunication company born out of nowhere: Tiscali
- Tiscali is located in Cagliari, main town of Sardinia – an island known for its centenarians and its beaches!
- How did this happen? *Ict and local development: a case study of the metropolitan area of Cagliari* (Murrioni, 2004)
- This paper: 1. How does an international company impact on its surroundings? 2. Is geographical proximity to an ISP a factor influencing decisions of investment and ICT adoption by local firms?

SARDINIA: background information



- <164 000 firms (109 simple)
- 3 avrge wrkrs per firm
- Current unemployment rate=15%

- **ITALY = 100**

- **Gen. economic infrastr. : 55.8**
- Road network: 45.8
- Rail network: 15.1
- Airports: 81.1
- Ports: 144
- Energy + environment: 32.9
- Telecommunications: 32.3
- Banks: 39

Measuring the impact of Tiscali: Cagliari and Sassari

- Historical rivalry between the two towns
- Both have access to port and airport
- Both have university and research centres
- BUT they are distant and badly connected
- For each:
 - Local ICT industry
 - Corporate ICT expenditure
 - Survey of local firms

Measuring the impact of Tiscali: Local ICT industry

- Sardinian ICT production: 2.4% of firms and 1.3% of workers of the national total.
- Incidence in the local economy: ICT sector represents 2.62% of Sardinian production units, and 3.47% of employed workers
(Mezzogiorno regions: 2.21%; Italy 3.21%)
- Cagliari is the main production base of the ICT sector in Sardinia hosting nearly 45% of the island's units in its metropolitan area
- ICT industry: Sassari smaller than Cagliari (2004):
819 ICT firms in Sassari (711 IT and 108 telecom)
1584 in Cagliari (1340 IT and 244 TLC)
- 1991-2001 average growth
CA: 4.9% - SS: 4.9%

Cagliari ICT industry

	1991	2001	91/01	1991	2001	91/01	2001
	units		A.Y.C.	workers		A.Y.C.	ave size
manufacturing							
office equipment, computers and hardware	5	25	16.1%	24	101	14.4%	4.04
cables and wires	1	0	-	2	0	-	-
broadcasting and telco transmitters, receivers, components	76	71	-0.7%	642	476	-3%	6.70
instruments for navigation, measurements and control	17	22	2.6%	72	101	3.4%	4.59
equipment for monitoring and controlling industrial processes	1	0	-	3	0	-	-
distribution							
appliances, radio and TV equipment	73	67	-0.9%	378	268	-3.4%	4.00
office equipment and hardware	46	63	3.1%	198	218	1.0%	3.46
other industrial machinery	50	67	2.9%	172	224	2.6%	3.34
services							
Telecommunication services	39	32	-2.0%	1568	1574	0.04%	49.19
Leasing of office equipment and hardware	0	3	-	0	10	-	3.33
IT and related services	368	758	7.2%	1387	2479	5.8%	3.27
TOTAL ICT	676	1 108	4.9%	4 446	5 451	2.0%	4.92

Sassari ICT industry

	Production units			workers			av.size
	1991	2001	Δ	1991	2001	Δ	
manufacturing	39	38	-0,26%	115	222	-0,26%	5,84
office equipment, computers and other IT systems	0	2	-	0	11	-	5,50
cables and wires	0	2	-	0	20	-	10,00
radio, TV transmitters and wired telephony	36	29	-2,16%	95	139	4%	4,79
instruments for navigation, measurement and control	2	4	6,93%	16	41	9%	10,25
equipment for industrial monitoring and control	1	1	0,00%	4	11	10%	11,00
Distribution	55	58	0,53%	275	184	-4,02%	3,17
Appliances, radio and TV equipment	17	17	0,00%	88	77	-1%	4,53
office equipment	20	23	1,40%	118	65	-6%	2,83
other industrial machinery	18	18	0,00%	69	42	-5%	2,33
services	132	274	7,30%	950	1.185	2,21%	4,32
Telecommunication services	11	7	-4,52%	385	261	-4%	37,29
IT and related services	121	267	7,91%	565	924	5%	3,46
TOTAL ICT	226	370	4,93%	1.340	1.591	1,72%	4,30

Measuring the impact of Tiscali: ICT industry in CA and SS

- The local market is just over 1% of national
- Low levels of IT expenditure per employee €362
- Telecommunications and software houses are largest sectors

	concentration	specialisation
GENOA Lws	1,80%	0,98
CATANIA Lws	1,13%	1,04
CAGLIARI Lws	0,70%	0,69
SASSARI Lws	0,20%	0,51
SARDINIA	1,27%	0,65

Source: our calculations from ISTAT 2004

Measuring the impact of Tiscali: financial analysis in CA and SS

- From Aida of Bureau Van Dyke
- >1000 firms in CA; >300 in SS
Result should not reflect any size effect: a. size of the LLS;
b. average size of the firms in the LLS;
- Relevant variables for measuring investment in ICT:
IP&IPRS; Concessions, Licences, Trademarks;
- INTANGIBLES IN 2001-2004: the sum of (a) amortization of intangible assets in the year and (b) year-on-year differences in investment levels for each individual intangible

Measuring the impact of Tiscali: IP&IPR

	2001	2002	2003	2004
% companies spending CA	11%	12%	10%	10%
% companies spending SS	13%	12%	8%	7%
total expenditure (€'000) – CA	9 270	7 720	35 900	24 390
total expenditure (€'000) – SS	1 340	1 190	907	354
average expenditure (€'000) – CA	82	64	335	230
average expenditure NO Tiscali	41	34	73	28
average expenditure (€'000) – SS	34	36	37	17

Measuring the impact of Tiscali: CLT

	2001	2002	2003	2004
% companies spending CA	12%	12%	10%	10%
% companies spending - SS	13%	12%	12%	11%
total expenditure (€'000) – CA	44 400	41 200	29 000	40 200
total expenditure (€'000) – SS	2 200	2 590	1 131	459
average expenditure (€'000) – CA	389	349	261	373
average expenditure (€'000) – SS	61	81	30	14

Measuring the impact of Tiscali: financial analysis in CA and SS

FLUX OF INTANGIBLES € '000	2002	2003	2004
CAGLIARI	90 785	55 303	92 435
SASSARI	8 204	6 445	5 916

Measuring the impact of Tiscali: financial analysis in CA and SS

- Expenditure in SS is 3% of CA if Tiscali is included; otherwise 9%
- CA has almost all large companies of island
Could these differences be explained by the type of companies in the two areas? Could it be simply that since Cagliari hosts the largest and richest firms of the island, its investment levels would far exceed those of Sassari anyway, even if Tiscali was not there?
- Tiscali contributes to difference, but cannot explain it

Measuring the impact of Tiscali: Probit analysis

Explanatory Variables	IP&IPR 01		IP&IPR 04		CLT 01		CLT 04	
	Marg.	Prob.	Marg.	Prob.	Marg.	Prob.	Marg.	Prob.
Constant	- 1,205	0,000	- 1,568	0,000	- 1,238	0,000	- 1,502	0,000
Sector								
Benchmark: Manufacture								
Agriculture	0,249	0,005	0,011	0,084	-0,044	0,563	0,005	0,945
Extractive	0,101	0,398	dropped		-0,002	0,985	-0,027	0,747
Editorial	0,170	0,122	0,019	0,850	0,009	0,925	0,197	0,138
ICT	0,033	0,546	0,009	0,827	0,046	0,418	0,100	0,082
Energy	0,345	0,217	0,062	0,618	0,207	0,337	dropped	
Construction	-0,065	0,024	-0,054	0,016	-0,035	0,258	0,005	0,863
Retail	-0,047	0,091	-0,030	0,209	-0,044	0,133	0,030	0,340
Wholesale	-0,056	0,057	-0,046	0,050	-0,065	0,035	-0,070	0,020
Hotel and Risto	-0,063	0,262	-0,070	0,103	0,007	0,909	0,097	0,123
Transport	-0,043	0,263	-0,070	0,463	-0,034	0,408	0,043	0,287
Services	-0,064	0,096	0,021	0,497	-0,004	0,930	0,065	0,109
Other services	0,063	0,263	0,044	0,277	0,014	0,805	-0,018	0,698
G. Revenues (000 E)	7.54e-06	0,000	5.89e-06	0,002	6.26e-06	0,003	5.97e-06	0,004
Proximity								
SLL di Cagliari	0,017	0,497	0,054	0,010	0,011	0,693	0,009	0,700
Proximity*Revenue	-6.37e-06	0,003	-5.70e-06	0,003	-3.71e-06	0,088	-2.87e-06	0,180
Num of obs.		1066		1303		1064		1314
Log likelihood		-363		-384		-363		-398,3
LR chi2		68,30		51,21		44,78		82,07
Prob > chi2		0,000		0,000		0,000		0,000
Pseudo R2		0,086		0,063		0,058		0,093

Measuring the impact of Tiscali: OLS on positive investments

Explanatory	IP&IPR 04		CLT 04	
	Coeff	Prob.	Coeff	Prob.
Constant	7,217	0,617	26,383	0,215
Sector				
benchmark: Manufacturing				
Agriculture	-12,447	0,554	-29,663	0,581
Extractive			-14,715	0,845
Editorial	277,879	0,000	-23,533	0,755
ICT	82,065	0,000	35,933	0,245
Energy	-11,109	0,814		
Construction	-4,571	0,777	-25,656	0,261
Detail	0,358	0,979	-22,363	0,286
Wholesale	7,119	0,651	-29,175	0,332
Hotel and Risto	-8,110	0,864	-16,709	0,621
Transport	1,308	0,942	-1,713	0,947
Services	16,001	0,289	-0,752	0,976
Other services	8,560	0,619	-23,706	0,598
Revenues (OOO E)	0,00017	0,446	8.38e-05	0,807
Proximity				
SLL di Cagliari	7,885	0,552	4,613	0,785
Proximity*Revenues	-0,00017	0,460	0,00048	0,173
Number of observations		122		130
Adjusted R-squared		0,240		0,375

Measuring the impact of Tiscali: financial analysis in CA and SS

- The probability to have positive investment on IT depends on some sectoral dummies (Agriculture and ICT sector) and on revenues (size). Tiscali effect is small and mostly non significant;
- The amount of investment depends on the sectoral affiliation of the firm; size effect is significant but rather small;
- Tiscali contributes to the difference in size, but cannot explain more than it;

Measuring the impact of Tiscali: ICT survey in CA and SS

- Sample of firms drawn from local Archive of companies ASTRI 2002
- 132 companies surveyed (99 in Cagliari and 33 in Sassari);
- The questionnaire asks:
 - firms' sector of activity /number of employees
 - existence of a dedicated web-site
 - number of PCs available in the firm
 - type of connection and web services/applications used
 - existence or hiring of ICT staff
 - investments on ICT technologies.

ICT survey by local firms

- “Founder only” firms
- All indicators suggest that firms in SS are better equipped with PCs and broadband connection
- Higher investment in ICT is not due to a catching up process

	CA	SS
Total firms interviewed	99	33
‘founder only’ firms with no PC	25 (25%)	5 (15%)
micro firms with no PC (excludes above)	19 (19%)	2 (6%)
At least one PC in the firm	55 (56%)	26 (79%)
Internet connection of any type	49 (49%)	21 (64%)
ADSL connection	37 (37%)	18 (54%)
Web Site (also under construction)	27 (27%)	7 (21%)
Investment in the ICT field during last year	16 (16%)	7 (21%)

Internet connection and web site

	CA		SS	
	Broadband (Dial-up)	No Conn.	Broadband (Dial-up)	No Conn.
Manufacturing and Constructions	30%	28%	33%	33%
Traditional services	8%	20%	0%	25%
Tradable Services	11%	10%	17%	25%
Retail	51%	42%	50%	17%
	Web site			
Manufacturing and Constructions	26%		29%	
Traditional services	11%		0%	
Tradable Services	15%		14%	
Commerce	48%		57%	

Web applications

	Web application used	
	CA	SS
Email	86%	67%
E-Banking	33%	29%
ERP	41%	19%
Videoconference	2%	5%
Administration	12%	5%
Production System	2%	5%
Sales	67%	43%
None (over all firms)	51%	36%

What policy lessons? (1)

- **CRS4: investing in knowledge paid off in 4 yrs**
 - Digital paradigm in evolution
 - Profitable markets just opened
- **Timing is crucial**
 - Technologies move faster than public decision making
- **Supporting institutions went missing 1998-2001**

THANK YOU!

ampinna@unica.it