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IKINET

INTERNATIONAL KNOWLEDGE AND INNOVATION NETWORKS:

for European Integration, Cohesion and Enlargement

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REPORT ON THE CASE STUDIES OF THE AEREONAUTICAL CLUSTER IN CAMPANIA: MAIN FINDINGS OF THE EMPIRICAL ANALISYS

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Contents:

The IKINET project focuses on the process of innovation and knowledge creation within firms and geographical clusters specialized in intermediate technologies.

Most innovation studies focus on high-tech sectors. The medium tech sectors are less studied, although they represent a very large component of European industry. The selection of the mechanical industry is justified by the high number of people with a great diversity of knowledge capabilities working in it, making it more important to look for inclusion, lifelong learning and knowledge diffusion than in the often-analysed high-tech sectors.

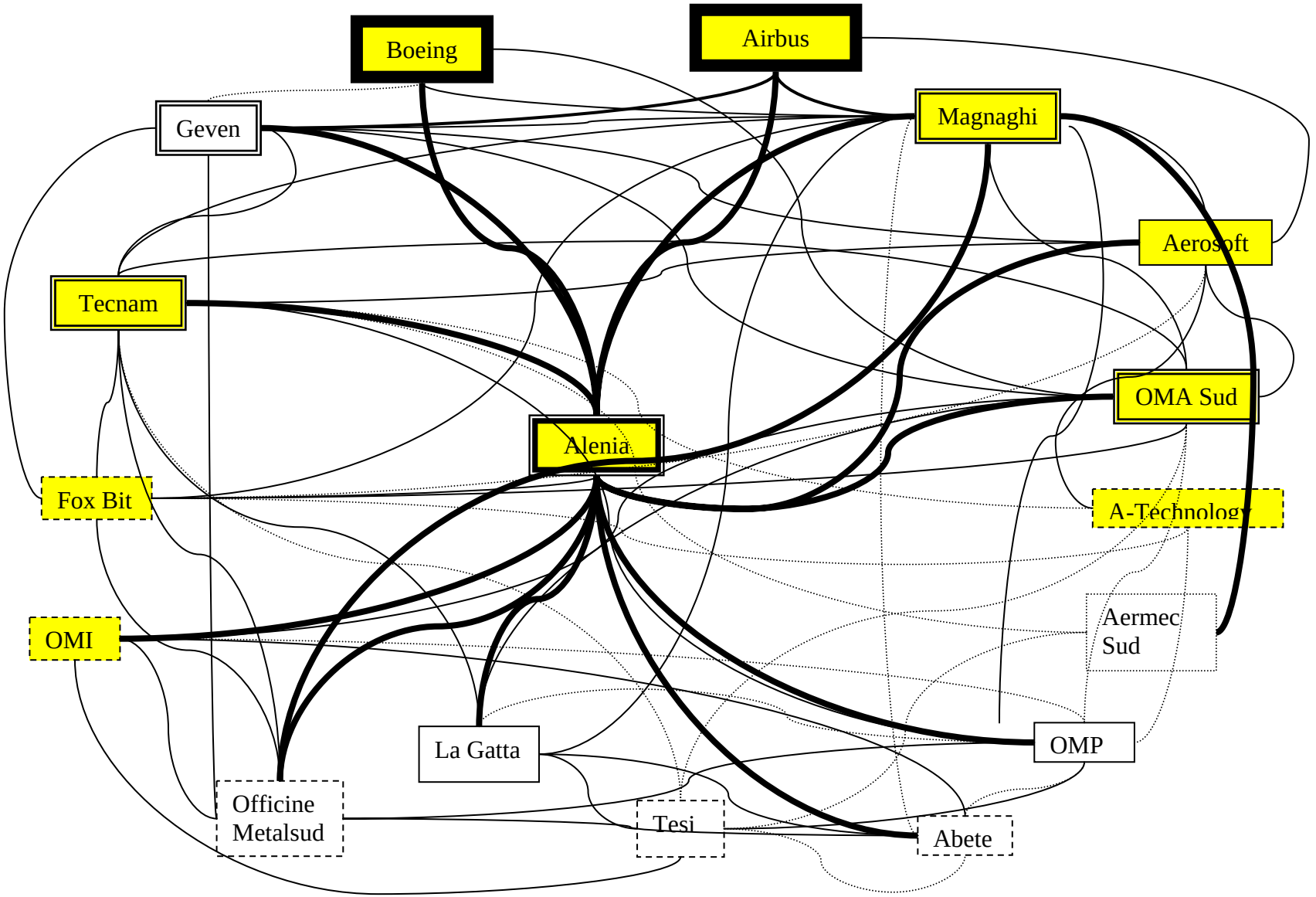
The Campania region in Italy has been selected for its characteristic as a large economically less developed region, which has however a strong industrial base and an important cultural and scientific tradition. The aeronautic cluster in Naples has been chosen for its characteristics as a technology leading sector in the regional economy, where many small and medium size firms operating in intermediate technology productions are tightly linked through subcontracting relations to major international firms.

As the major aim of the analysis in the IKINET project is the description of the key nodes in innovation and knowledge networks, the decisions on choosing the firms and organisations to be considered has been based on the prior identification of key stakeholders or gatekeepers in these networks within the regional innovation systems to be considered.

In most cases, knowledge and innovation networks have a rather hierarchical structure and are built of different layers. Thus, a limited number of firms/organisations actually influence the evolution of an overall regional network. Similarly to the other European regions considered in the IKINET project also in Campania region a limited number of firms/organisations/institutions (35) have been investigated. In fact, the aim of the empirical analysis was not to measure the average level of innovation potential in an overall sector or region, but rather to identify the structure of knowledge and innovation networks within one single sector and region. Thus, the choice of the actors to be considered has aimed to identify the “core” of the local cluster or those firms or actors which are most closely related than the other firms or actors.

A graphical representation of the Campania aeronautic cluster is indicated by figure 1 and 2 which represent the relationships between the industrial firms and the relationships between these latter and the non industrial organizations and institutions. The cluster has a rather hierarchical structure since it is organized around a major firm: Alenia, which is system integrator with respect to the two major global OEM firms: Boeing in USA and Airbus in Europe.

Aeronautic Cluster in Campania Region: Map of Industrial Firms



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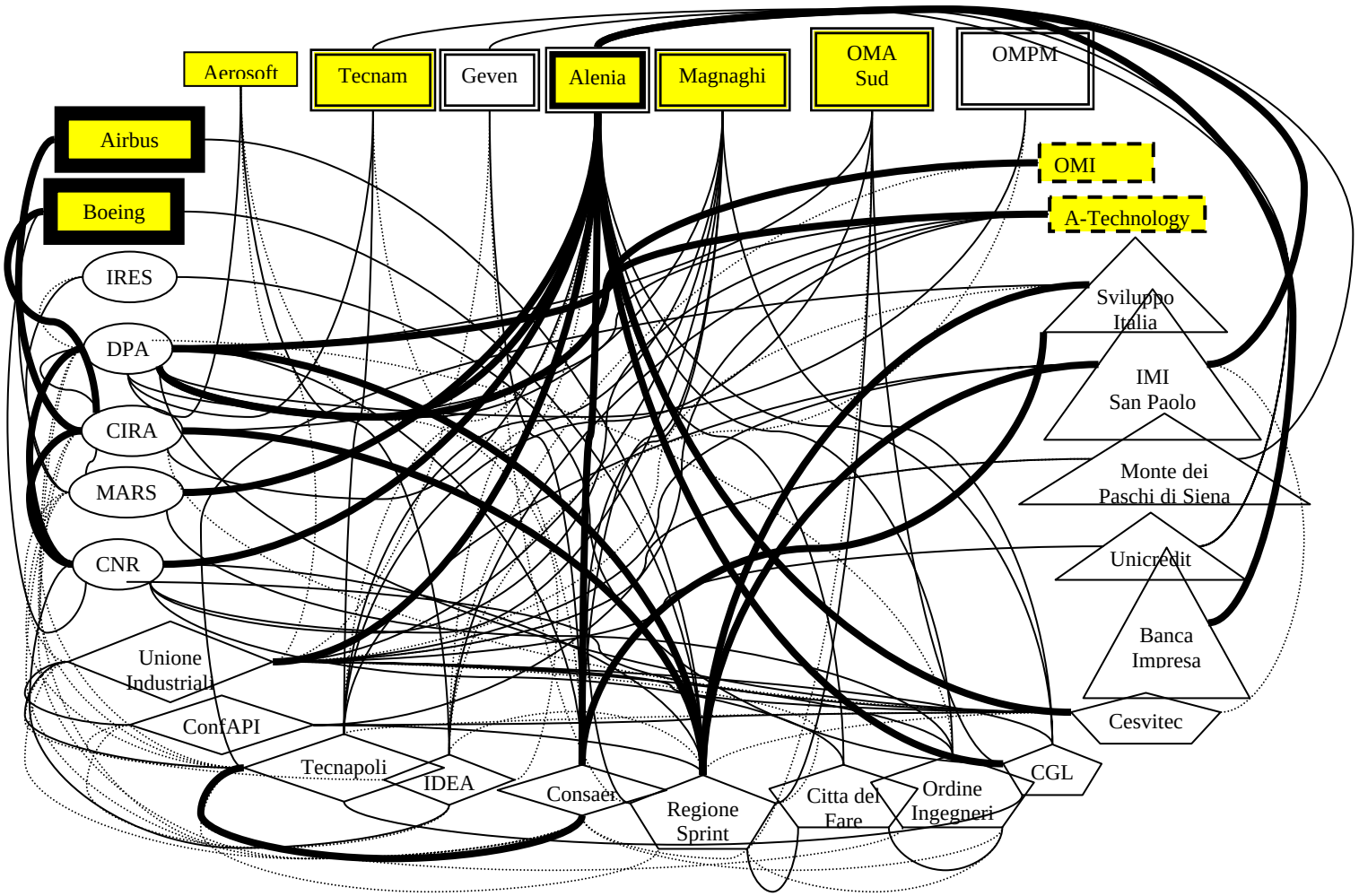
Aeronautic Cluster in Campania Region: Map of Service Firms/ Organizations

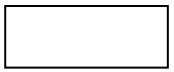


Industrial Firms

O E M

System Supplier

First Level Subcontractor

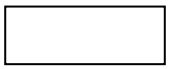


Second Level Subcontractor
(more than 100 employees)

Second Level Subcontractor
(20 - 100 employees)

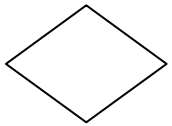
Second Level Subcontractor
(less then 20 employees)

Firms with Formal R&D:
codified knowledge

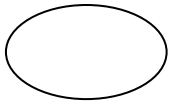


Firms with Informal R&D:
tacit knowledge

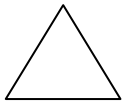
Service Firms and Organizations



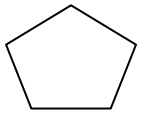
Services



Research



Finance



Public and intermediate institution

Flows intensity levels

casual

weak continuous

strong continuous

The elaboration of the case studies consists in an in-depth analysis of the firm, organizations and institutions considered. The 35 actors, on which a case study has been elaborated, have been chosen in order to represent the following sectors:

- Industrial firms: n. 15

1. Aermec Sud s.a.s. – Napoli - Via Brin Benedetto, 5/A
2. Officina Meridionale di Precisione Meccanica Srl - Angri (SA) - Via Delle Fontane, 5
3. Abete Arcangelo Srl - Nola (Na) - zona industriale
4. Officine Meccaniche Irpine Srl - Lacedonia (AV) - Via Calaggio Area Industriale
5. Alenia Aeronautica SpA – Stabilimento di Pomigliano D'arco (NA) - Viale Aeronautica
6. Aerosoft SpA – Napoli - Centro Direzionale di Napoli Isola E7
7. OMA Sud SpA - Capua (CE) - Via Silvani
8. Tesi Srl - Cicerale (SA) - Contrada Terzerie
9. Magnaghi Aeronautica Spa - Napoli (NA) - Via Ferraris Galileo, 76
10. Metal Sud Srl - Arienzo (CE) - Via Nazionale Appia Loc. CRISCI
11. Costruzioni Aeronautiche Tecnam - Capua (CE) - Via Maiorisi
12. Vincenzo La Gatta Srl - Pomigliano D'arco (NA) - Viale Aeronautica
13. GE.VEN. Srl - San Sebastiano Al Vesuvio (NA) - Viale Delle Industrie
14. A – Technology - Nusco (AV) - Contrada Fiorentine
15. Foxbit Srl - Napoli (NA) - Via Gianturco Emanuele, 31

- Research institutions: n. 5

16. IRES Campania- Istituto Ricerche Economiche e Sociali- Napoli (NA)- piazza Garibaldi, 39
17. DPA - Dipartimento di Progettazione Aeronautica, Facoltà di Ingegneria, Università degli Studi di Napoli "Federico II"- Napoli (NA)- Via Claudio, 21
18. CIRA- Centro Italiano Ricerche Aerospaziali- Capua (CE)- Via Maiorise
19. MARS® Srl- Microgravity Advanced Research and Support-Napoli (NA)- via Emanuele Gianturco, 31
20. CNR- IMCB -Institute for composite and biomedical materials- Portici (NA)- P.le E. Fermi 1

- Service firms: n. 4

21. CONSAER- Consorzio per lo Sviluppo delle Aziende Aeronautiche-Napoli (NA)-Centro Direzionale Isola E/7
22. Consorzio IDEA- Innovation and Development Enterprise Association-Napoli (NA)- Via P.Castellino 111
23. TECHNAPOLI- Science and Technology Park of Naples-Pozzuoli (NA)-Via Adriano Olivetti 1
24. CONFAPI Campania- Italian Confederation of small and medium-sized industry –Regional Federation-Napoli (NA)- Centro Direzionale isola C/2

- Financial institutions: n. 3

25. Sanpaolo IMI Banco di Napoli S.p.A., Napoli (NA)- via Imbriani n.42
26 Unicredit Banca/ Unicredit Banca Impresa- Napoli (NA)- Via Verdi, 18/d
27. Monte dei Paschi-Napoli (NA)- Via R. De Cesare,23

- Public institutions or collective organisation: n. 8

28. Regione Campania- Napoli (NA)- Via Santa Lucia, 81

29. Sprint Campania- Sportello Regionale per l'Internazionalizzazione delle Imprese-Napoli (NA)- Centro direzionale Isola F 4
30. Città del fare SCpA -Agenzia Locale di Sviluppo dei Comuni a Nord-Est di Napoli- Pomigliano d'Arco (NA)-Comprensorio Fiat Auto-Centro Direzionale- Via Ex Aeroporto
31. CESVITEC- Centro per la promozione e lo sviluppo tecnologico delle piccole e medie imprese del Mezzogiorno, Camera di Commercio di Napoli- Napoli (NA)- Corso Meridionale, 58
32. SI- Sviluppo Italia Campania- Napoli (NA)- Piazza Municipio, 1-4
33. CGIL -Italian General Confederation of Labour- Regional Secretary-Napoli (NA)- Via Torino, 16
34. UI- Unione Industriali della Provincia di Napoli- Napoli (NA)- Palazzo Partanna ,Piazza dei Martiri, 58
35. OI-Ordine degli Ingegneri della Provincia di Napoli-Napoli (NA)- Via del Chiostro, 9

The case studies have elaborated on the base of a sequence of interviews with the various firms and organizations which have occurred in the period December 2004 - February 2006.

The interviews to the various economic actors have followed a rather detailed and well defined list of issues in order to insure the homogeneity in the approach and priorities to be investigated in the various regions and sectors. This list of issues has been regularly extended during the elaboration of the case studies, in order to include new emerging issues and to secure a comparability of the study to be carried by the various national research partners.

These issues can be grouped into the following five major themes:
1. Key issues in the firm recent performance and factor of competitiveness
2. Innovation history and knowledge creation processes within the firm
3. Organizational characteristics of the firms, competencies and management of human resources
4. The relationships with local firms and service organizations and public institutions
5. The relationships with firms and service organizations and public institutions in a interregional and international framework,

The methodology of the case studies is finalized to collect key original information and to identify new emerging issues to be elaborated and investigated in the second year of research (in particular: WP2), when the theoretical analysis will be carried out on the four main scientific topics to be considered in the IKINET project:
- geographical agglomeration within clusters and the development of the local networks model,
- interactive learning and the process of knowledge creation,
- the role of institutions and social capital in knowledge creation,
- openness as a factor of innovation and development.

Chapter 1

The Campania Region and its aeronautic industrial sector:

preliminary analysis of regional and sectoral indicators and structure

by Massimiliano Bianca and Immacolata Caruso

The Campania region is characterized by the unstable equilibrium between the risk to become weaker, due to the transfer of resources towards more competitive areas, and the opportunity of a faster development, due to the strength of the growth in some of its areas.

The population of the region is about the 10% of the total population of Italy, and the growth of the GDP from 1996 and 2001 has been on average of 2,6% annual, which is greater than the 2,1% growth rate of Italy. Such good result is due to the growth of the building sector and of the exports of automotive and aeronautical products, while within the manufacturing sector dynamic sectors are those of the agro-food and the apparel sector.

The Campania region represents 25% of the economy of the South Italy, while it represents only the 6% of the national economy. These two percentages summarize the following regional problem: the region is the leader in the South of Italy, but it plays a minor role in a national framework.

The industrial structure of the region is the result of the past national industrial policies for the Italian South. In fact, South of Italy is characterized by a quite high number of large public companies, which operate in the traditional sectors of the public intervention: the iron and steel industry, the shipbuilding industry, the aerospace industry, railway industry. On the other, the regional economy is characterized by a quite large number of SMEs, which mainly operate in the traditional sectors, such as the apparel industry and the agro-food industry. These SMEs are mainly either assisted by public transfers or highly dependent by the demand of large companies. They are often working in the submerged (non official) economy, and most of them are really impermeable to the diffusion of new technologies.

On the contrary, the aeronautical industrial sector in the Campania region has a long tradition , since the beginning of 1900 and it can be considered as one of the few high-tech industrial clusters existing in the Objective 1 regions of the European Union.

The aeronautic sector in Campania is made by approximately sixty specialized firms and research centres. It has more than 10.000 employees and a turnover of more 500 million a year. It represents 7,3% of the national total and it is lower only to few other regions, such as Lazio (22,5%), Lombardia (21,5%) and Piemonte (8,8%).

The relevance of the sector for the regional economy is indicated also by various initiatives realized by the local public administrations. It is possible to recall the planning agreements with Boeing aimed to localize high-tech productions related to the new Boeing 7E7, and also the agreements with the CIRA (Public Research Center in the aerospace issues), located in Capua (Campania), the regional coordination for the creation of an Aerospace Pole in Campania (with the participation of universities, public research centers, large companies, SMEs, industrial associations, etc.) and the programming committee for the aerospace network (made by universities and public research

centers and large companies). However, even if all companies in the aerospace sector belong to a some network and are more or less involved in different programs of collaboration with the large companies, the extent of cooperation is quite low.

In particular, the most elementary forms of collaboration among SMEs as purchase groups etc are lacking. Attempts of aggregation have failed in the past due the definite aversion of the national large customers, which see the aggregations of SMEs as a threat to their privileged relationship with their larger international customers.

The analysis of the innovative potential of the Campania region has been based on the data of the "Observatory on the Knowledge Economy in the Italian regions", elaborated by a research group at the University of Rome "Tor Vergata", coordinated by Riccardo Cappellin. The indicators have been organized in a limited number of key subgroups corresponding to the various levers, which are indicated by the approach of "TKM-Territorial Knowledge Management"[1] and which play a key role in the process of interactive learning and innovation. The indicators have been collected from official sources and to a great extent differ from those considered in the European Innovation Scoreboard, as they are organized according a different methodological framework and refer to a wider perspective than a mere technological one to the analysis of the innovation process.

1. Indicators of regional profile and performance

The Campania region has a **per capita GDP**, which is 65,81 percentage points, in comparison to the national average, and is among the lowest in Italy. A worse result can be found only for the Calabria region (62,24), while the per capita GDP is almost double in other north Italian regions, such as Trentino Alto Adige (129,48) or Lombardia (128,11). Related to the low per capita GDP, is the fact that Campania has one of the lowest share of workers employed in the industry (66,70).

The Campania region has, historically, a predominantly agricultural vocation and, although in the last years biological cultivations and typical productions, as well as the agro-tourist activities have-contributed to raise notably the value of the regional production, the agricultural sector still is characterized by a low level of productivity.

The Campania region has recorded a very high **growth of the GDP**, as indicated by an index of 106,10 in comparison to the national average. Such result is in line with the results of other southern Italian regions, that have had a growth higher than the national average but, in relative terms, are still very distant from the richest areas in Italy and Europe.

A figure which confirms the low contribution of Campania to the national economy, is the high unemployment rate that is equal to 20,2%, more than double of the national data of 8,7%. The data on the unemployment are even more worrying, whether we consider the distribution by age group, as the unemployment of young persons aged 15 to 24 years reaches 60%, that compares with 27,1% of the national average. Such percentage is still 46% in the group aged 25 to 29 years, against the percentage of 19,6% recorded on national base for the same group. This youth unemployment rate underlines the increasing difficulties youth face today trying to enter the labour force in Campania. That negative characteristics is only slowly improving as the index of employment growth in the region (100,32) is only slightly greater than the national average. Also the growth of employment in manufacturing industries has been slightly higher than the national average (100,72).

[1] Cappellin, R. (2003), Territorial knowledge management: towards a metrics of the cognitive dimension of agglomeration economies, International Journal of Technology Management, Vol. 26, Nos. 2/3/4, pp.303-325.

Particularly, **the firms that operate in the aerospace sector** give a remarkable contribution to all the considered indicators. The evaluation of the total sales produced from the companies localized in Campania can be esteemed in 1,33 billion of Euros while the SMEs realize a total sales of around 172 million of Euros; then the sales due to the whole sector in Campania is around 1,5 billion of Euros. Considering that the regional GDP in 2002 was 84.597,1 Ms Euros, in such year the aerospace sector total sales contributes with a share of 1,8% to the composition of the regional GDP.

Moreover, all the large national enterprises operating in aeronautic industry have own plants in the region and they represent about 7.000 workers, to which are added the about 2500 workers employed in the sixty local SMEs, which are the most important in the sector, with an occupational level in the whole aeronautic sector which is very close to 10.000 units. As in Campania employed workers in 2002 were few more than 1,8 million, the sector represents 0,55% of the regional labour force. That, indicates a minor role of the sector in the regional economy, although the share of the sector on the regional value added is greater.

TAB.1: Indicators of regional profile and performance[2]

	Per capita GDP	Share of manufacturing industry employment	GDP growth	Growth of manufacturing industries employment	Employment growth
Piemonte	115,10	129,59	98,60	97,08	98,15
Valle d'Aosta	126,59	52,82	88,90	108,87	101,30
Lombardia	128,11	135,46	95,80	96,57	100,01
Trentino-Alto Adige	129,48	76,91	94,50	104,29	100,32
Veneto	113,78	142,19	95,30	99,92	100,59
Friuli-Venezia Giulia	110,13	105,45	94,90	96,52	100,13
Liguria	109,92	62,94	105,10	102,32	99,04
Emilia Romagna	124,55	126,84	96,10	103,33	100,51
Toscana	110,96	115,25	101,70	99,05	99,83
Umbria	97,05	105,50	101,40	109,81	103,70
Marche	99,38	142,01	96,90	103,50	99,67
Lazio	114,49	48,24	105,50	99,16	100,42
Abruzzo	84,79	103,25	98,50	103,07	98,02
Molise	78,50	83,14	101,10	108,50	97,41
Campania	65,81	66,70	106,10	100,72	100,32
Puglia	66,05	69,77	100,70	101,93	100,28
Basilicata	68,59	81,58	99,00	122,50	98,89
Calabria	62,24	38,11	105,60	109,05	97,73
Sicilia	67,50	45,21	104,90	107,20	100,04
Sardegna	76,68	48,97	105,10	106,90	101,64
ITALIA	100,00	100,00	100,00	100,00	100,00

[2] All the data in the tables aren't in absolute terms but they are in comparison to the national average equal 100

2. Factors of the process of knowledge creation

The share of **R&D expenditure on GDP** within region represents the sixth place of the classification of the Italian regions with a value of 83,40. However, it is lower than the Italian average and rather distant from the levels of some regions such as Lazio or Piemonte, that reach values of 184,38 and 155,42, respectively. That is explained by the presence in Campania of great research centres, that enjoy of the collaboration and the geographical contiguity of seven Universities and of ten Regional Centres of Competence, localized on the territory[3] .

Despite the developments of the last years, **the technological balance of the payments** is widely negative and the Campania Region is the fourth to last between the Italian regions (10,55): a very poor result if compared with the values achieved by Lombardia and Lazio, equal to 254,63 and 203,74, respectively. Such situation reflects the often merely production oriented character of the firms in the region. The industrial environment, in fact, is primarily characterized by SMEs, that rarely produce new technologies, and by a small group of large enterprises, the only ones that are, indeed, able to produce and to export technologies.

In the specific case of the aeronautical sector, it presents a remarkable rate of investment in R&D and exports represent about a fifth of the total sales. Although there aren't precise data related to R&D investments in the large firms, as investments in R&D are reported by the national headquarters located in other regions and not in the single local establishment, it is possible to estimate that average level of the investments in R&D of the large regional enterprises is not lower than that of international competitors. The SMEs, on the other hand, invest a percentage equal to about 13% of their total sales. While, such percentage doesn't refer only to the investments in R&D but includes all investments made by the enterprises, it is opportune to underline that it is well above national average for the SMEs.

In particular, an intense partnership with the research and the innovation stakeholders has been promoted by the Region, in agreement with the National Research Ministry, in the framework of a "Regional Strategy for the Innovation": a planning document of the interventions in South Italy aiming to promote research and innovation in the most strategic sectors, among which the aeronautical sector. In agreement with the Regional Operational Program 2000-2006 (POR), the interventions concern both the promotion of the innovation demand from the various local production systems and the organization of networking of the research regional system structures. In particular, to promote innovation demand, SMEs have access to measures of financial support ("de minimis") finalised to the acquisition of services in the definition of a R&D project, the research of technological partners or the realization of a industrial research project. Furthermore, another intervention is aiming to aid pre-competitive development projects through the supports regime of the art. 11 of the law 598/94. In the case of aeronautic sector, these strategies have favoured activities of animation, scouting and incubation and continuous processes of networking between the relevant stakeholders, public and privates, of the sector.

[3] The Regional Centres of Competence, realized in Campania beginning from 2002, are the first organisms of this kind in Italy and they have the function to coordinate the research effected by the Universities, in collaboration with the enterprises and the Public Administration, not more on the base of the affiliations to the single departments or universities but on the base of the contiguity and complementarities of the own competences. In such way all those people who intend to develop complexes research projects (also industrial) characterized by the necessity to integrate different types of knowledges and competences can have a single interlocutor that deals in to individualize the most proper resources for the single necessities in a group of researchers composed by around three hundred elements.

In this perspective, the Campania Region has promoted the CARN - Campania Aerospace Research Network in 2002 with the participation of the University (Department of Aeronautical Planning, Faculty of Engineering, University of the Studies in Naples "Federico II") and various Research Centres (CIRA - Italian Aerospace Researches Centre and the IMCB-Institute for the composite and biomedical materials of the National Researches Council) as well as some majors enterprises, such as Alenia, Avio, Piaggio. The main objectives of the CARN are:

- Information exchanges and dissemination;
- Training systems through programs of specific educational offer financed by the regional funds, that answer to the needs of the network members;
- Development of pre-competitive research.

The members of the network share a common identity and interpretation of the needs of the cluster and aim to promote specific common projects for strategic industrial innovations. Moreover, the network allows to form a critical mass of human and financial resources and infrastructures needed in important technological innovations, and enhance the scientific competitiveness thanks to the sharing of costs, activities and management capabilities.

TAB.2: Factors of the process of knowledge creation

	Total R&D expenditure on GDP	Technological Balance of Payments. Payments per employment
Piemonte	155,42	114,9
Valle d'Aosta	65,24	14,71
Lombardia	108,54	254,63
Trentino-Alto Adige	48,57	26,43
Veneto	55,38	46,41
Friuli-Venezia Giulia	110,45	52,54
Liguria	79,52	81,97
Emilia Romagna	102,69	60,02
Toscana	95,13	32,37
Umbria	71,96	37,09
Marche	50,33	165,85
Lazio	184,38	203,74
Abruzzo	80,61	47,33
Molise	34,13	11,59
Campania	83,4	10,55
Puglia	49,87	11,4
Basilicata	73,49	4,17
Calabria	26,75	3,92
Sicilia	75,54	3,8
Sardegna	61,61	21,03
ITALIA	100	100

3. Factors of the process of innovation adoption

In the case of **the innovative enterprises percentage** and of **the enterprises introducing innovations** the data indicate higher values in the North and the Centre Italy than in South Italy. This result is also related to the strong shortage in the South of Italy of credit institutions and the higher capital cost between 3 to 5 points percentages than in the North Italy. In the classification related to **enterprises using hardware equipments**, the Campania Region results third to the last with 33,00 points percentages against 158,00 of Lombardia and 150 of Trentino Alto Adige. The same happens in the classification verifying **the use of means of production software** where Campania is even next to last, recording 43 points against the over 150 points recorded in Lombardia and Trentino Alto Adige. Such indicators still return the image of a industrial system largely based on traditional productive structures. The situation seems to improve in comparison to the percentage of **enterprises using a wide-band internet connection**, whereas the result in Campania, while being under the national average, differs from it only for few points. This result is certainly related to the lack of an adequate infrastructural endowment as, for instance, optical fibre are limited to the coastal area, excluding two provinces, Benevento and Avellino. A further factor is the presence of an high percentage of micro-enterprises working in traditional sectors[4].

In the aerospace sector the processes innovations are almost continuous. However, intrinsic characteristics of the aeronautical productions are the very high costs of planning and development, the long times of conception, the use of technologies and small incremental improvements operated on existing products. Thus, the products of the aeronautic sectors cannot be characterized by high rates of innovation. In recent years, a new model of innovation adoption has been promoted under the push of four factors: the engagement of the public institutions, the intervention of innovative firms, the participation of the private investors and the presence of talents. Particularly, in Campania, the Region has promoted in 2003 the birth and the growth of a technological district on the Engineering of the Polymeric and Composite Materials-IMAST. It is a consortium among enterprises and research centres, with the participation of the University of Naples “Federico II”, the National Research Council, other technological and industrial partners and, for the first time, also financial institutions such as San Paolo-Imi, Banco di Napoli, Fondazione Banco Napoli and Meliorbanca. In the district there are about 2500 mqs for the research structures and 1300 mqs have been equipped for laboratories shared by the public and private partners with over hundred researchers employed in the research centres of different firms. In this district are studied, projected and realized innovative materials for the aerospace, naval, automotive, biomedical, polymeric electronics and building sectors. The consortium has the mission to realize a research, educational and technological innovation system and it has a national leading role. The activities of the technological district are developed on three macro-axes:

- To reach the international excellence in the research, becoming leader in the engineering of the materials and its industrial application, through the collaboration of academy-firm along the whole process;
- To attract and to form the talents, becoming a pole of attraction for the best international talents in the field;
- To promote new technological entrepreneurship, creating a mine of new enterprises, spreading the innovation in the regional industry and accelerating its development.

[4] It is opportune to underline, nevertheless, that in the years '80, it was been in the Italian regions the multiplication of organisms (public or private) offering support to the enterprises. Often they implicated co operations at local level among private sector and the public institutions. In Campania this has allowed the production of services according to a model of “knowledge and internet organization”, based on criterions of organization for processes of knowledge management, of comakership (involving “suppliers” and users/customs) and of learning organization.

Clearly all enterprises in the aeronautical sector extensively use IC technologies. For example, all the communications exchanges in the value added chain are managed through telematic networks. The production of services to support the aeronautical cluster is variegated. In particular services for research activities, technological transfer and training are provided by TECHNAPOLI, Scientific and Technological Park (PST) of the metropolitan area of Naples and Caserta, or by CESVITEC, Centre for the promotion and the technological development of the SMEs in the South of Italy, which is a Special Agency of the Chamber of Commerce in Naples, active since 1972 in the field of the research-enterprise cooperation, diffusion of the innovations, support to the technological transfer, exploitation of the research products and services. To this aim they have developed the product "Symbiosis", that has the objective to develop the information interchange among large and small enterprises on the respective needs, ability and competences, facilitating the diffusion of the knowledge.

TAB.3: Factors of the process of innovation adoption

	Innovating enterprises on total enterprises	Enterprises introducing innovations on total enterprises	Enterprises using hardware equipments	Enterprises using software equipments	Enterprises using a wide-band internet connection
Piemonte	104,90	103,40	79,00	102,00	106,41
Valle d'Aosta	104,90	103,40	90,00	86,00	106,41
Lombardia	104,90	103,40	158,00	149,00	106,41
Trentino-Alto Adige	104,50	100,90	150,00	143,00	98,94
Veneto	104,50	100,90	133,00	128,00	98,94
Friuli-Venezia Giulia	104,50	100,90	142,00	127,00	98,94
Liguria	104,90	103,40	85,00	89,00	106,41
Emilia Romagna	104,50	100,90	113,00	114,00	98,94
Toscana	100,00	100,00	94,00	89,00	95,93
Umbria	100,00	100,00	77,00	83,00	95,93
Marche	100,00	100,00	86,00	92,00	95,93
Lazio	100,00	100,00	119,00	101,00	95,93
Abruzzo	88,50	96,30	56,00	67,00	93,34
Molise	88,50	96,30	40,00	56,00	93,34
Campania	88,50	96,30	33,00	43,00	93,34
Puglia	88,50	96,30	32,00	54,00	93,34
Basilicata	88,50	96,30	48,00	65,00	93,34
Calabria	88,50	96,30	22,00	36,00	93,34
Sicilia	88,50	96,30	64,00	56,00	93,34
Sardegna	88,50	96,30	99,00	97,00	93,34
ITALIA	100,00	100,00	100,00	100,00	100,00

4. Factors promoting the external accessibility and openness

In Campania the propensity to conclude **agreements with foreign partners is quite high**, as the value of the relative index is equal to 117. This extremely positive result refers, however, to merely commercial agreements rather than to agreements of industrial and productive nature, as underlined both by the indicator related to **direct net investments of the region abroad** , and by the other index related to **the foreign direct investments** in region. Both, in fact, reach rather low values putting Campania to the last places of the classification of the Italian regions. The whole data returns the picture of a region with a productive system characterized by a scarce opening to the international economy. This situation is determined also by the advantages to be a region objective 1 for EU, as that doesn't probably stimulate the local firm to look for investment abroad. As regard the foreign investments, instead, an important negative factor is determined by the fact that the whole Region is identified with its capital city: Naples, that have received negative evaluations on the national and international media, due to the diffused presence of organized crime. In fact, the emphasis on its dangerousness has led to neglect its vocations and potentiality.

This situation is reflected in particular in the data related to **the presence of foreign citizens in the hotels** and to **the passengers embarked and disembarked by airlines** in Naples, that show percentages, which while being greater than those recorded in other regions of South Italy, are very low with respect to those present in the regions of the North and the Centre Italy. However, the data related to arrivals and departures in the airports located in South of Italy are strongly influenced by the little dimensions of these airports, that only support the continental flights and those from the Mediterranean area. The low values of the presences in the hotels is partially compensated by the greater diffusion of the cruise tourism and of services alternatives to the traditional receptive structures[5]. The region shows a scarce expansion of the structures finalized to the mass tourism.

The large enterprises of the aeronautic sector in Campania have a complex network of relationships and industrial agreements with many international partners. Nevertheless, these agreements are not locally managed, since the central offices of the same firms are situated out of the region. In this perspective, only the SMEs of the sector could contribute to increase the number of the international agreements. The degree of international openness of the SMEs is rather low, since a limited number of SMEs are present on foreign markets through commercial agreements or partnerships in productive structures. Foreign investments by local firms in this specific industrial sector are practically non existent in the region.

[5] According to the Bank Italia Report on the regional economy in 2003, the tourists presences are lowered because of the diminution of the foreign component due to both the reduction of the propensity to effect international trips after the September 2001 and the smaller prices competitiveness of the tourist supply in the euro area.

TAB. 4: Factors promoting the external accessibility and openness

	Enterprises having agreements with foreign partners	Direct net investments of the region abroad	Direct net investments in the region from abroad	Presence of foreign citizens in all hotel services	Passengers embarked and disembarked by airlines
Piemonte	102,00	81,93	86,15	33,52	41,50
Valle d'Aosta	86,00	24,70	28,72	445,32	-
Lombardia	103,00	114,46	187,73	44,36	188,03
Trentino-Alto Adige	109,00	- 18,07	15,73	669,04	2,74
Veneto	122,00	39,76	67,82	209,46	101,40
Friuli-Venezia Giulia	110,00	41,57	22,22	132,83	33,86
Liguria	94,00	11,45	20,06	156,09	32,46
Emilia Romagna	102,00	40,96	42,86	153,59	59,90
Toscana	109,00	10,24	61,76	177,27	52,64
Umbria	99,00	8,43	24,96	115,56	4,26
Marche	84,00	22,89	33,48	148,16	19,48
Lazio	97,00	185,54	76,48	90,23	313,75
Abruzzo	78,00	- 24,10	6,78	85,93	7,45
Molise	67,00	0,60	- 3,32	35,42	-
Campania	117,00	19,28	8,08	59,95	45,13
Puglia	73,00	2,41	5,34	37,67	27,63
Basilicata	73,00	1,20	- 0,43	46,34	-
Calabria	76,00	0,60	1,30	48,54	40,29
Sicilia	82,00	1,20	1,73	44,84	96,69
Sardegna	81,00	45,18	45,17	102,49	153,47
ITALIA	100,00	100,00	100,00	100,00	100,00

5. Factors promoting internal receptivity and human capital

As regards the human capital, the Campania Region shows positive indicators from which it is possible to deduce a good presence of the factors promoting internal receptivity to innovation. In particular, the index related to **student with secondary school certificate on 19aged persons** is near to the national average while the **persons registered to tertiary education per 1000 inhabitants** in the region overcomes it of around 17 points percentages, classifying Campania well above regions as Lombardia, Veneto or the Piemonte. However, the index of **the population between 25 and 64 years in lifelong learning** in Campania has a very low value of 76,28, which compares with the values of 90,71, 122,73, 91,30 respectively in Lombardia, Veneto and Piemonte. That indicates the need to invest more of improving the endowment, the availability and the quality of the human resources, not only allocating greater financial resources but also increasing the awareness of the firms on the problem of human capital.

In conclusion, the exploitation of the potential of human resources in Campania requires not only to consider the demand of new occupations and the growth of productivity and professional capabilities, but it also requires to focus on the change of cultural values and the accumulation of knowledge, in the perspective of a transformation of the whole regional community.

The indicator related to **the employment in business services on total service employment** appears connected to the previous variables. Also in this case, Campania indicates a certain delay in the diffusion of modern services, that characterize the mature areas and new realities both in Italians and European regions.

The index related to **the gross annual average wage** for the region is about 6 points percentages lower than the national average, as an higher diffusion of highly skilled employees and of service-sector jobs are major factors that influences average wage.

A common characteristics of the human resources in the SMEs is the high share of persons with secondary school certificate. In fact, **in the aeronautical sector** of Campania, over sixty percent of the employees has a secondary school certificate, while few more than thirty percent has elementary school education. Such percentages correspond to those of the human resources qualification in the SMEs at the national level.

The paradox is: the same enterprises sometimes seek qualified personal, without being able to employ them locally. This problem could be due to the effect at the local level of the existing occupational unbalance recorded at national level. Therefore, it is necessary to redesign the relationships between the educational and training system and the new production models, as a great basin of competences would require, positive actions aiming to reconvert, to direct, to employ. The relationships between enterprises and non industrial organizations can be improved by measures such as the one promoted by Industrial Union of Naples (U.I.), that has promoted since 1990 the relationship between the firms and the University, through the signature of various agreements.

In particular, a first step has been to stimulate the associated enterprises to organise training and student stages at their plants. A further step has been represented by the organization of degrees in the framework of the Project "North South Campus", producing the first graduates in three innovative curricula related to Aerospace Engineering, Electronic Engineering and Science of the Material/Packaging, as they were required by the vocations business in Turin, Alessandria and Naples.

A third field of possible collaboration has been activated in experimental way through the program "Campus One" that has promoted training courses with business testimonies. A further project of integration between the Industrial Union and the Universities is represented by the Masters and by the Secondary technical formation (I.F.T.S) that are organized in the framework of the regional call for tenders in the POR-FSE Campania and have been promoted through agreements between associated firms, schools, professional institutes and university.

A further example of important action in the training field is constituted by the CONSAER – a Consortium for the development of the Aeronautical Firms. This organization, born in the 2000 under the auspices of Sviluppo Italia s.p.a., a national agency of the Department of the Treasury for the economic and entrepreneurial development of the South Italy, is sustained by partners as ATITECH s.p.a (Alitalia), Avio, Officine Aereonavali Venezia (Finmeccanica group coordinated by Alenia), etc.. Its activity is related to educational and vocational training in the technical-managerial field, serving as interface among the demand of skilled personnel by the enterprises and supply of the training organizations.

TAB.5 : Factors promoting internal receptivity and human capital

	Student with secondary school certificate on 19aged persons	Persons registered to tertiary education per 1000 inhabitants	Population between 25 and 64 years in lifelong learning	Employment in business services on total service employment	Gross annual average wage
Piemonte	95,75	66,67	91,3	114,5	102,94
Valle d'Aosta	93,12	3,15	101,78	62,5	103,16
Lombardia	94,29	76,13	90,71	131	110,27
Trentino-Alto Adige	86,82	48,65	164,62	63	112,65
Veneto	96,49	74,77	122,73	94,5	97,47
Friuli-Venezia Giulia	107,61	109,91	138,54	99,5	102,95
Liguria	104,54	84,23	71,94	89,5	99,54
Emilia Romagna	106	127,03	118,18	97,5	98,47
Toscana	104,83	123,87	124,51	91,5	94,53
Umbria	116,69	139,64	121,15	87,5	92,84
Marche	112,74	131,08	77,47	86	90,9
Lazio	115,81	155,86	103,56	111,5	109,99
Abruzzo	110,54	116,22	96,44	70,5	88,49
Molise	105,71	90,09	98,62	88,5	91,5
Campania	96,19	117,12	76,28	85	94,19
Puglia	92,39	87,84	92,09	88,5	85,68
Basilicata	114,2	32,43	104,74	90	93,36
Calabria	106,88	71,62	100,59	82	88,03
Sicilia	95,46	100	82,61	88,5	95,12
Sardegna	92,53	109,46	118,38	78	93,6
ITALIA	100	100	100	100	100

6. Factors promoting local identity, trust and social capital

The Campania Region is assuming more and more the characters of a society that presents marked divergences in behaviours, expectations, tensions and attitudes. The social composition is inhomogeneous and characterized by the presence of both expressive models congruent with an advanced society and of traditional behaviours, which produce a resistance to the innovation. These contradictory characteristics of the society are probably related to the lacking quality of the community life and of the social capital, which are leading to a less dynamic change of traditional models of values. This is true for more instrumental social dynamics as the consumption and the investment, but also for some collective behaviours, for instance towards the culture of the legality.

The **organised criminality index for inhabitants** in Campania is equal to 83,45 and it represents the ninth place in the classification related to the twenty Italian regions. This conceal wide disparities between the Campania provinces, as it is inferior in provinces such as Avellino or

Benevento, where the episodes related to the presence of organized crime are very few in comparison to those recorded in Naples and in its province. The overall data justify the wish by the region to revive in the last decade the sense of legality and the social trust. These priorities have been pursued through cultural, economic, social initiatives but also through a more effective police actions. In this field, sensitive areas are represented by the illegitimate use of the territory and the environment, or by the diffusion of the informal or irregular economic activities, where serious abuses on the safety and the rights of the workers are frequent. Despite these actions and the so far reached results, the indicators remain negative with respect to the other Italian regions. That, is especially the case of the territory of so-called ``greater Naples ": the conurbation around the capital city which has around three million of inhabitants and it has been characterized in the recent period by of a bloody feud between the different groups of organized criminality aiming to the control of the territory. In such context, the diffusion of the illegal economy represents a constraint to the development of the regular activities, it has distorted the functioning of the productive system and the allocation of the resources, frustrating partly the impact of the politics until now pursued.

The indicator of the hours of work lost for labour conflicts in Campania has been largely inferior to that recorded in other Italian regions (19,23). The motives for this result are probably connected to the characteristics of the regional productive system, with the presence, as previously mentioned, of a myriad of SMEs where there isn't a strong presence of the labour union, while the management models are often paternalistic or cooperative. Accordingly, the labour conflicts are rather an exception and the hours lost for the strikes refer to conflicts of national rather than local character.

A further indicator among the factors promoting local identity, trust and social capital is represented by **the percentage of people that participate to voluntary social activity** that in Campania isn't very far from the national average. This indicator puts, nevertheless, the region at the last place among the Italian regions, confirming the necessity to integrate the traditional forms of support such as the parental and friendly nets with the improvement of the ability by the people in working together for a common objective in an organised and voluntary manner, sharing rules and values and in subordinating individual interests to collective aims.

In the case of the aeronautical sector, the social capital and especially the level of trust has a role of great importance not only for the growth of the individual enterprises and it represents a prerequisite of a commune productive and industrial culture and of the local cluster development, whereas the existing relationships and the effectiveness of the initiatives are referable rather to informal and personal social nets that to a real network with a certain degree of institutional thickness.

TAB.6: Factors promoting local identity, trust and social capital

	Organised criminality index for inhabitants	Hours of work lost for labor conflicts	People participating to voluntary social activities
Piemonte	86,58	115,38	99,97
Valle di Aosta	39,79	246,15	103,52
Lombardia	69,57	153,85	102,17
Trentino-Alto Adige	34,19	215,38	114,73
Veneto	54,65	76,92	106,71
Friuli-Venezia Giulia	60,28	76,92	102,15
Liguria	75,44	307,69	99,8
Emilia Romagna	95,5	288,46	103,08
Toscana	86,84	53,85	103,7
Umbria	81,43	100	98,07
Marche	63,29	73,08	98,54
Lazio	86,56	30,77	97,2
Abruzzo	57,72	19,23	95,9
Molise	58,86	61,54	97,66
Campania	83,69	19,23	94,46
Puglia	153,83	7,69	96,97
Basilicata	85,45	115,38	98,19
Calabria	235	50	96,94
Sicilia	189,8	3,85	96,5
Sardegna	176,63	42,31	98,93
ITALIA	100	100	100

7. Factors promoting territorial embedded ness of industry and relational capital

A characteristic of the Italy industrial system is that the small size of the SMEs is often compensated by the fact that a large part of them participate to industrial groups which have a much larger size, as the same entrepreneurial group controls several related and formally autonomous firms. The situation of Campania appears worrisome as the indicator that represents **the companies belonging to industrial groups** records for the region the lowest value among the totality of the Italian regions[6]; the indicator related to **the employees in companies belonging to industrial groups** is in Campania is equal to 67,80, putting the region at the fourth to last in the classification of the Italian regions. The index related to **the employment in SMEs Local Development Systems** results, equal to 74,03, is lower than the national average, while greater values are to be found in the northern regions.

[6] According to the elaborations on Starnet- Unioncamere data made by the Ministry of the Productive Activities, in 2003 the regional entrepreneurial plot is constituted by 441.035 active enterprises whose the most greater percentage is in the sector Commerce (37,2%) while the industry represents only 11% of the total. If we add the data related to the percentage of the enterprises for dimensional class, we can notice that in 2001 80,9% of the total firms present in Campania are included in the group that counts 1-2 employees to forehead of 0,3% and 0,1%, percentages related to the enterprises with 50-199 and over 200 employees respectively.

The regional productive structure, in fact, is marked by the role of entrepreneurial initiatives of small dimension, that have had a dynamic role in the transformations of the system but are strongly limited by the lacks of fundamental factors such as organization and management. In this context, the presence of several local industrial systems must be underlined (i.e. 28 areas within the 84 areas of the Italian South). The territorial distribution of these productive clusters reveals, moreover, the existence of cases of spontaneous development of industrial concentrations, next to the traditional strongest centres in the regional territory. In fact, with the exception of some cases (such as Solofra) broadly and historically rooted in the industrial development of Campania, other interesting productive clusters have emerged along some specific axes such as the territories next to Caserta and Rome and the centres in the area of Salerno and Avellino.

	Employees in companies belonging to industrial groups	Companies belonging to industrial groups	Employment in SMEs Local Development Systems	Enterprises having agreements with other local actors	Enterprises cooperating in distribution or procurement
Piemonte	111,3	103,2	86,9	99,8	99,7
Valle d'Aosta	99,2	104,1	72,84	99,9	99,7
Lombardia	111,4	103,5	121,58	100,2	99,7
Trentino-Alto Adige	91,9	105,8	84,77	99,9	101,7
Veneto	92,9	100,8	136,2	101,4	101,7
Friuli-Venezia Giulia	104,4	101,5	108,08	101,1	101,7
Liguria	103,9	102,7	73,49	99,5	99,7
Emilia Romagna	85,2	102,7	121,69	101,4	101,7
Toscana	79,9	98,1	110,72	100,3	100,6
Umbria	89,9	99,2	93,17	99,9	100,6
Marche	83,6	96,7	148,25	100,4	100,6
Lazio	122,3	97,8	74,42	99,8	100,6
Abruzzo	91	97,5	95,84	98,9	97,2
Molise	69,4	97,4	72,84	99,4	97,2
Campania	67,8	91,3	74,03	98,4	97,2
Puglia	68,3	91,7	79,52	99,3	97,2
Basilicata	59,8	94,9	72,84	99	97,2
Calabria	56,6	90,5	73,77	98,4	97,2
Sicilia	74,1	93,3	72,84	98,6	97,2
Sardegna	67,7	99,2	72,84	100,7	97,2
ITALIA	100	100	100	100	100

Indicators regarding the relational capital in Campania, such as the data **on the enterprises having agreements with other local actors** and **the enterpriseses cooperating in distribution or procurement**, equal to 98,40 and 97,20 classify the Region in the average of the regions of the South Italy. The data indicate a less great difference from the areas of the north and the centre of the country.

In the specific case of the aeronautical sector, all great national enterprises (Alenia Aeronautica, AMS, Avio, Augusta, Officine Aereonavali, Atitech) have own establishments in the region and,

except for Avio, all these firms belong to the same industrial group, as they have Finmeccanica as the major shareholder. That concentration is clearly very different with respect to the SMEs, among which less than 20% belong to an industrial group, and, often, the firms have a family structure. In these cases, since the 80ties the founders have been accompanied and in some cases substituted by the younger generation. That entrepreneurial change has implied a deep change in the management style of the firms. In fact, the founder generation was strongly tied to a technical logic of the production centrality. The new generation has also had the advantage to be grown within firm but, thanks to their higher and, often, university education, is more open to the relationships with the external environment, capable of more autonomous relationship of collaboration with the large enterprise and also with the other SMEs. These latter, in fact, are trying to reproduce the competitive model implemented by their major clients in the sector, thus developing a system of alliances with the other operators.

The relationships between the large national aeronautic enterprises located in the region and their subcontracting SMEs of the local cluster are characterized by great stability and continuity. Therefore, many SMEs founded over thirty years ago have maintained for all of their existence the same clients.

Accordingly, the relationship allows an intense information interchange, both of technical and organizational and managerial character.

8. Factors promoting a sustainable local development

The index of infrastructural endowment in the years 1997-2000 in Campania is equal to 96,60 and, while being lower than the national average, it is the best in the Centre South area of the country. However, the endowment in the southern regions is worse in the economic infrastructures than in the social infrastructures. Particularly, in Campania, **the index of economic infrastructure** indicates a much lower level than that recorded in most other southern regions, being equal to 51,20, due to the sector of energy and water. **The indicator of quality of life** confirms these results and it appears lower by almost 10 points than the national average, thus leading Campania in the middle-low band of the Italian regions.

TAB. 8: Factors promoting a sustainable local development

	Index of infrastructural endowment	Index of economic infrastructure	Score of quality of life
Piemonte	89,2	118,3	100,13
Valle d' Aosta	46,2	132,6	110,64
Lombardia	120,3	118,5	105,11
Trentino- AltoAdige	62,7	123,1	111,28
Veneto	115,9	115,4	103,96
Friuli- Venezia Giulia	118,6	125,2	107,72
Liguria	183,8	127,1	101,66
Emilia Romagna	107,2	144,2	106,15
Toscana	117,1	112,6	108,02
Umbria	81,8	109	98,51
Marche	92,5	109,9	104,26
Lazio	142	111,2	96,34
Abruzzo	78,5	92,2	101,66
Molise	54,3	62	97,66
Campania	96,6	51,2	90,85
Puglia	81,6	63,3	87,28
Basilicata	43,3	69,7	96,91
Calabria	78	50,2	90,3
Sicilia	86,2	66,1	87,26
Sardegna	57	66,5	96,28
ITALY	100	100	100

9. Factors promoting entrepreneurship and organizational capital

The analysis of the data on **the enterprises birth-rate** in the Italian regions indicates that the performance of the South results superior to that of the other areas of the country, positioning Campania to the third place among the Italian regions with an indicator of 157,28, just after Calabria (187,86) and Sardegna (158,25).

The phenomenon of the high birth of new enterprises to the South deserves, nevertheless, a more careful analysis, due to the great share of individual owners and the self-employed workers, which have historically had an important role in South Italy. The individual enterprises require a modest initial investment and have always been very present in the South as micro commercial firms ("pizzeria", itinerant shopkeepers, etc.). These traditional forms in the commercial sector have been facilitated by the low competition of the great distributive chains, which have led in the North to the increase of the wage earners in comparison to the individual ownership.

The indicator of the average **Investment / GDP** ratio in the years 1997-2001 in Campania reaches the level of 99,73 that is close to the national average, while it is strongly lower to those recorded in most of the Italian regions and, except for Puglia, of the totality of the regions in South Italy. That situation is related to an unsuccessful policy of attraction of national and foreign investments as also to the difficult relationship between banks and enterprises and the negative characteristics of the

local environment from the point of view of personal safety and the public administrative efficiency.

TAB. 9: Factors promoting entrepreunership and organizational capital

	Birth rate of new firms	Average of Investement/ GDP 1997-2001	Gross fixed investments on added value 1995-2001
Piemonte	56,8	100,67	100,7
Valle d'Aosta	69,9	103,96	105,1
Lombardia	68,93	98,9	98,5
Trentino-Alto Adige	62,62	108,05	108,9
Veneto	95,15	101,17	101,2
Friuli-Venezia Giulia	54,37	100,37	99,6
Liguria	35,92	96,16	96
Emilia Romagna	55,34	100,36	100,5
Toscana	85,92	98,57	98,6
Umbria	57,28	100,81	101,2
Marche	88,35	100,26	99,8
Lazio	133,98	98,11	98
Abruzzo	91,26	101,87	102
Molise	104,37	103,96	103,5
Campania	157,28	99,73	100
Puglia	151,94	99,54	99,1
Basilicata	84,47	103,8	104,8
Calabria	187,86	103,19	103,3
Sicilia	141,26	100,53	100,7
Sardegna	158,25	104,66	105,3
ITALIA	100	100	100

10. Factors promoting the market orientation of knowledge and value creation

The percentage of **enterprises introducing product innovations only** is the same for Campania and for the South of Italy equal to 78,2. **The index of the ratio of exports on the gross internal product** is to 87,74, putting the region to the 16° place in the classification of the Italian regions. This occurs despite the relative high value of the indicator of all **exports growth** in the years 1996-2001, which, with a value of 120, is among the highest recorded in the regions. In fact, according to the elaborations on ISTAT data the world exports from Campania for the period 1994-2001 have constantly increased in absolute value, passing from 4121 million euro to 8450 million euro.

In effects, such positive result reflects the trend observed in the whole area of the South Italy that, in 2001, according to the SVIMEZ Report 2002, has slightly reduced the North-South divide with a GDP increase equal to 2,2% against 1,7% of the Centre –North.

The growth of exports confirms the economic restructuring process occurring in the South during the last years and the impact of the public expenditure containment, beginning from the years' 90, together with an acceleration of the internationalization level of the Italian economy. In fact, the share of the firms in South Italy on the national exports increased from 9,3% in 1995 to 10,9% in 2001, even if the indicator of **the value of the exports for employment** is only 37,14 points, confirming that the productive system of Campania appears too little open to the exchanges with the international economy.

The indicator of **the enterprises with quality certification** is rather important as the market requires quantitative parameters to the firms to measure the capability by the firms to respect the norms ISOs. Quality is key requirement especially for the great enterprises, and these latter are led to enforce the same methodologies also to their subcontracting firms in order to guarantee the competitiveness, the permanence on the market and the attainment of the economic objectives. Since 2003, besides, the enterprises are introducing the new norms Vision 2000. The data for Campania are greater than the national average and confirm the record of the region among the southern regions. These data are confirmed by the data published by the Sincert (the corporate body that accredits the societies of certification), according to which among the Italian regions, those with a greater number of firms that adopt the certification are Lombardia, with 12798, Veneto, 5480, and Emilia Romagna with 5223, followed by Lazio, Piemonte, Campania and Toscana with, respectively, 4864, 4861, 3709 and 3148 certified firms. Although the certification of quality is a voluntary action, not obligatory for law, it has become an almost essential condition, as indicated by the data Sincert on the growth of the certified firms in Italy. They were in 1991 only 212; in 1993 they were 1169, in 1997 they arrived to over 11000 certified firms and in 2001 they reached the level of 55000.

The indicator of the ratio **R&D expenditure on GDP** in Campania is equal to 97,39. This low level correspond to the national average, as according to the ISTAT surveys on R&D in Italy the percentage incidence of the expense for R&D on GDP is only slightly increasing, passing from 1,11% of 2001 to 1,16% of 2002. Italy remains, however, still distant from the average level of R&D expense of the twenty-five countries of the EU that in 2001 has been equal to 1,93%.

In the aeronautical sector, production strongly belongs to a globalized market. The Italian production, except for helicopters (i.e. Augusta) is not represented by final products but by systems and components which are used by few non Italian enterprises dominating the aeronautic sector. Therefore, it may be considered that the totality of the production of the sector is oriented to the export. All enterprises of the sector in Campania are certified not only in term of quality as in the great majority of the cases, they also have specific certifications released by the regulatory agencies of the aeronautic sector at the European level. As earlier indicated, the R&D expenses done by enterprises in Campania are not directly recorded in the regions as they attributed to the controlling group, which has the headquarters in other regions. SMEs do not have a distinct R&D department, while they make industrial research through the network of relationships with public and university research departments.

TAB.10: Factors promoting the market orientation of knowledge and value creation

	Enterprises introducing product innovations only	Exports per GDP	Exports growth: 1996-2001	Exports per employment	Enterprises with quality certification	Enterprise R&D expenditure on GDP	Share of enterprise on total R&D expenditure
Piemonte	100	106,81	81,2	139,36	105,08	108,57	199,65
Valle d'Aosta	100	90,16	96,1	58,56	91,53	100,23	110,69
Lombardia	100	109,28	96,5	157,79	125,42	103,27	120,67
Trentino-Alto Adige	109,41	95,34	93,2	87,56	86,44	96,61	54,53
Veneto	109,41	112,62	103,1	161,07	118,64	97,63	57,56
Friuli-Venezia Giulia	109,41	110,88	105	152,22	101,69	100,03	99,13
Liguria	100	89,27	91,5	53,82	93,22	98,24	78,4
Emilia Romagna	109,41	107,56	103	140,61	116,95	100,86	99,18
Toscana	115,29	104,44	97,8	120,69	88,14	98,12	79,88
Umbria	115,29	92,14	97,3	58,59	113,56	96,05	37,29
Marche	115,29	104,75	106,4	114,85	88,14	96,5	51,79
Lazio	115,29	85,74	106,4	34,7	88,14	99,77	106,79
Abruzzo	78,82	102,06	128,5	98,59	111,86	98,62	73,49
Molise	78,82	88,25	88,6	40,7	111,86	94,8	19,27
Campania	78,82	87,74	120,9	37,14	100	97,39	61,42
Puglia	78,82	88,91	104	39,76	69,49	95,72	43,65
Basilicata	78,82	91,86	245,7	55,06	98,31	98,59	80,6
Calabria	78,82	79,79	95,4	4,32	69,49	94,66	18,72
Sicilia	78,82	85,83	159,3	30,92	64,41	96,39	62,1
Sardegna	78,82	85,65	140,3	29,05	67,8	95,06	28,62
ITALIA	100	100	100	100	100	100	100

Chapter 2

Innovation and knowledge creation in the Naples aeronautic clusters

by Massimiliano Bianca and Riccardo Cappellin

1. The process of industrial restructuring of the aeronautic firms

1.1 The impact of the globalization processes

Since the end of the second world war Italian aircraft industry has collaborated with other national aircraft industry. In the peace treaty that Italy subscribed after the war, in fact, there is the impossibility to produce entirely an aircraft. Today the industrial sector for civil aircraft at the world level is characterized by two large producers, with which the other enterprises must collaborate. Thus, since 60ties major Italian aircraft firms took part into large programs of international collaboration.

In the Campania industrial cluster emerge two different tendencies and strategies, according to the enterprise dimension.

1.1 Medium Enterprises

Most of the enterprises, that are in this category, started an important process of internationalization. This process is finalized to enlarge the potential market and to bypass the national large enterprises in order to establish a direct contact with international actors leading in the sector.

The internationalization process appears as the result of a gradual process of dimensional and competences growth in the national market, based on the relationships with the national leading firms.

Within the medium size firms it is important to distinguish between enterprises that produce a semi-final product from those which produce a specific subsystem or a final product, for which they have the final responsibility of flying certification.

In the first case some firms (such as: Aerosoft) chose the strategy to open a new subsidiary and/or to acquire a local enterprise geographical close to the main plants of the large international leading firms. Other firms ones (such as: Oma Sud , Magnaghi, La Gatta) succeeded to become a direct supplier of international leading firms and work in strong collaboration with the large national leading firms enterprises, thus becoming in the case of some specific programs a partner rather than a supplier.

In the second case (Geven, Tecnam and Magnaghi) enterprises have created an international sales network or in some occasions a joint venture with a local partner for a specific project or for serving a regional market or a subsidiary for selling and providing assistance. For example, Tecnam is present in 30 countries in all five continent.

1.2 Small Enterprises

None of the small enterprises analyzed in the Campania aircraft cluster are involved in a process of internationalization. All entrepreneurs know that international competition is becoming really hard, but it not really affecting their individual firm but rather representing a challenge for the cluster build around the Alenia Aeronautica SpA, that represents the largest (50% - 75% of turnover) customer for these smaller enterprises. They believe that it would be impossible for the individual firm to enter in the international market, due to their small dimension rather than to eventual limited technical competences. On the other side these firms feel sure about the fact that foreign firms could not in the national supplier market, as their relationship with Alenia Aeronautica SpA is based on long and strong collaboration and trust and the cooperative relationships are really hard to structure, so competition seems limited to the local firms.

1.2 Future innovation strategy

According to the literature on the supply chain, particularly in aeronautical sector, the interviews with Alenia Aeronautica SpA indicated that the customer aim to find a supplier which is really focalized in the sector and willing to build with the customer a long term partnership. For example, they require that aeronautical activity should be separate, also physically, from activities in other sectors' of production. Moreover, it is rather difficult, for the supplier enterprise to use the knowledge reached in aeronautical context for different productions in other sector. On the other hand, the demand in the market or the customer is a major driver of the innovation process.

Similarly to the process of globalization, also in the case of innovation strategy is possible to find some differences between small and medium enterprises.

1.2.1 Medium Enterprises

In the case of medium firms the main strategy in the innovation is the change in the internal and or external organization. It is quite difficult to find a common aim between the various firms in the introduction of possible innovation, as the individual needs derive from a perception of a risks and opportunities that are strictly specific to the individual firm. Most firms are really reluctant to change their internal organization in order to solve problems related with product / process quality and production cost and to take advantage from new market. These changes are often related to the creation of a new plant only for aeronautical production, to a change in the rules in their own supply chain organization and in the evaluation of suppliers performances, to the redefinition of firm's rules to participation to structured network of SMEs. In a specific case, an enterprise in order to produce a new aircraft for general aviation had to change its internal organization in order to coordinate the process and manage the relationship with the partner that build aircraft instrumentation. Only one entrepreneur proposed to manage, in future, product that are more complex than the actual ones through the creation of a SMEs network that would explicitly aim to serve the principal costumer.

1.2.2 Small Enterprises

While the medium enterprises have elaborated a well designed innovation strategy, including an analysis of the firm knowledge and financial needs required for making innovation, smaller enterprises are only capable to perceive the problem but, most of them, haven't a strategy to solve it.

Some firms declare that they will not do innovation in the next years and others think that it would be important to diversify the markets, but their ideas are still quite confused and not founded on a specific analysis of the needs for innovation.

To this general trend there are relevant exception in the case of two firms. In the first case, the firm is introduced in the market a masterpiece of art with use of acquisition of 3D imaging, although without the development of a specific techniques. In the second case the enterprise develop a new machinery for work on long dimension pieces: a project which required a large investment based on public financial support and the collaboration with some public research centre. This new machinery, now at the prototype phase, could allow the firm to enter in the market of machinery producers, also at global level.

1.3 Growth objective

The factors that can promote or hinder the strategy of growth seem not being related to the firms size or their types of production.

The most important factor that influences the long term growth aim of the firms is the situation of these latter after the ’90 crisis. Therefore, those firms which were most affected by the crisis have been led to a change in the ownership structure and that has allowed to bring in new human resource. This is the case for 3 medium and 1 small enterprises. This process is strictly related to the growth of productivity and the introduction of new productions.

Another group of firms seems to have survived quite easily to the ’90 crisis. In this second group is possible to identify a clear commitment to the enterprises growth. In this general tendency there are two exceptions. In a first case, the firm aims to maintain the actual size, because of the difficulty to reach an agreement within the ownership structure on the group strategy. In the second case the firm seems to aim to decrease its size, but this strategy is related to the aim to create three new firms, which will create a new industrial group. Therefore, the decrease of employment in the firm would represent growth for the overall group.

All firms indicate that the development of internal capabilities is the key factor for the firm’s growth and a particular emphasis is assigned to the recruitment of new technicians and managers.

Most firms believe that the local environment is just a support for the firm’s growth, while some firms think differently and mention examples in which the local public administration and local financial institutions represented an important obstacle to the firm growth.

1.4 External relations and past firm performance

The relationship between all the industrial actors in the cluster are generally good, both with the large customer, with the firms that are at the same level in the supply chain and with the suppliers. That applies both to medium and to small firms. Some differences can be identified in the case of relationship with not industrial organizations, since small firms have fewer relationships with these latter. In particularly the relationship with the major customer are generally really good and collaborative.

This perception of the reciprocal relations is seemingly related to the long time duration of the relationships, that in same cases stretches so long as the firm life.

Some firms believe that the competitive pressure from other local producers is quite low because of their individual technical diversity and structure. Moreover, the distinct structure of the supply chain, which is managed by principal customer, implies that collaborative more over than competitive behaviors prevail.

Most small firms do not have an own structured supply chain, as their suppliers are generally firms that make work with low value and without having great implications on the characteristics of their product. An exception is represented by the supplier of special process, which are characterized by larger dimension and turnover leading to an asymmetry in the relation. Although the relation may give satisfactory results, in this case the customer can't lead the relation. On the contrary, medium enterprises have, generally, a more structured supply chain and they can manage relationship according to their needs. It is the specific case of a medium firm which was recently acquired by an industrial group. Thus the new owners has just inherited the suppliers from the ancient one, and there is the need of a normal period of transition, in which customer and suppliers must arrive to new equilibrium solutions.

Labour relationships are in the interviewed firms always positive and strongly collaborative. Some times this opinion may be quite wrong as the entrepreneur adopt a really paternalistic style in dealing with his subordinates. Generally labour union are not strong in the SMEs of the cluster.

Relation with local public institution are, generally, quite good and enterprises participate to one or more enterprise association in order to be capable to better represent their needs to the public institutions. This characteristics is quite independent from firm's size and it seems related more to entrepreneurs' acquaintances.

Conflict or dissatisfaction with local or national banks are quite often in the case SMEs, especially in a region such as Campania, where there are not local financial institution. Several entrepreneurs refer to iniquity and personalism in the delivery of financial services.

Many enterprises work with row material and specific instrumentation (like stamp, tool for assembling etc.) which are owned and supplied by their major customer. it makes that indicators of turnover and of turnover for employees have a low value as main criteria in financial evaluation.

Differently from other regions where the SMEs are not so close to the research world, in the aeronautic cluster only few enterprises haven't relation with public research centre. Clearly medium enterprises have in most of the cases a strong and time long relationship with more than one single centre and small enterprises have a relation which is less strong and not continued, but it seems to have been every time with good results.

1.5 Key areas for future performance

The relevance of the different factors than can influence the growth of the enterprises varies according to the actual position of these enterprises. So only medium enterprises that operate in foreign markets think that those market will be relevant in the next future, as they think that they can not easily expand their market share in the national market. Similarly, small enterprises think to a positive role of the national market, as they can not expand their regional market.

Entrepreneurs seem to be confident on the capability of the regional labour market to provide all those competencies that the firms need, as the cluster is characterized by an ancient and deep - rooted culture in aeronautical production.

The major customer of the considered enterprises has adopted in 2003 a new strategy in supply chain management aiming to reorganize in a vertical system the row material and to define direct relationship only with few strategic suppliers. Those suppliers should be capable to manage an own supply chain to produce complex subsystem, so these suppliers can perform the role of strategic suppliers.

1.6 Spin-offs and origin of the firm

Differently from other Italian clusters of SMEs, the creation of groups made by several firms linked by financial ties has not still appeared in the Naples aeronautic cluster. The creation of new firm is an unknown practice, when excluding firms created abroad. None of the entrepreneurs has recently funded a new enterprises linked to the present one. However, sometime the interviewed enterprises represent the spin off from other enterprises which share the same entrepreneur or members of his family. A single case has been identified where the entrepreneur is planning to create 3 new specialized enterprises, as spin off from the ancient enterprise, and to create an industrial group. Similarly, no firm has an active policy to encourage the employees to create a new firm.

2. The process of innovation

Like in every product, innovation in aircraft industry responds to final market needs. Four technical areas can be distinguished in the aircraft industry: aerodynamic, propulsion, structures and materials and system. Single technical areas have own "technological guidepost"[7] in which there are "technological trajectories". New airplanes represent a complex innovation system, that relies on these four technological areas. The innovation process leading to a new product should not only be defined as "specialist innovation", but it also requires a new organization of old and new techniques required to be combined into the new aircraft. Thus this innovation can be defined as "system innovation".

"Specialist innovation" represents an incremental innovation as in the case of the innovation developed for a new version of an existent aircraft. In this case, we don't speak in the sector about a "new aircraft".

2.1 Types of innovation

Enterprises involved in the role of suppliers are generally those where specialist innovation are more common. However, two medium enterprises are producer of small airplanes and for them system innovation are crucial.

2.1.1 Product and process innovation

New process are very important for larger enterprises. However there are 3 SMEs where the change of the entrepreneur has led to a change in the process or in the lay out or in machinery control. Change in the production process is related to the launch of new products. Clearly in the aircraft

[7] On this concept see Dosi (1982), Momigliano e Dosi (1983), Freeman et al. (1985). So concept of "technological guidepost" came from "scientific guidepost" see Kuhn (1980, Bernal (1969) and Koyré (1980), also.

sector, the larger enterprises are those which prevalently make new products. Product innovation may be those that are absolutely new, such as a new little aircraft or a new kind of seat, but also products that are new only for the firm considered.

On the contrary, new process have a greater importance as innovation in the case of smaller firm, since within these firms generally new product are almost absent. Still a firm has been capable to design a new product which was introduced in a industrial sector different from aircraft industry.

2.1.2 Organizational innovation

Like for product and process innovation, also in the case of organizational innovation larger firm have an advantage with respect to smaller firms.

Often relevant change in the organization's rules are the natural consequence of a new ownership structure. However that does not represent the only reasons for the introduction of this kind of innovation. Some organizational innovation derive from the need to adapt to changes in the customer needs or in the supply chain organization, some other are related to requirement implied by new products and finally some organizational change are related to changes in the structure of overall industrial group.

Smaller firms are introducing incremental changes in their organization, such as adjustment in the quality management or in the administrative process, but this kind of changes seems not be very important in their general innovation process.

2.1.3 Market innovation

All enterprises believe that changes in the destination markets of the products are very relevant forms of innovation and that applies both to large and to small firms.

However, for larger enterprises a new market means a new geographical market or new industrial customer. While smaller enterprise mainly refer to new sectors, where they could use technology developed in the aircraft industrial sector, as in these more traditional sectors technologies developed in an high tech sectors may give a competitive advantage.

3. The process of knowledge creation

Knowledge is high specific in the case of the aeronautical products / process.

According to the approach of territorial knowledge management the process of interactive learning and of innovation is the result of the tight interaction of six different levers.

3.1 Focus on customers satisfaction.

The adoption of an innovation is the result of the focus on a localized framework and of the clear definition of a specific problem, which calls for a solution and motivates to a search of different complementary competencies. Cognitive processes and innovation within firms are the result of repeated attempts and a gradual search activity, stimulated by the motivation to reduce the tension created by specific problems and the challenge that these latter may represent to the survival of the

firm, rather by the explicit desire to seek a profit maximization solution, which is the result of a deductive reasoning.

Customer are the principal source of knowledge. That is related to the need for homogeneity in technical areas related to the customer's core technology.

The design of a collaborative scheme with networks of SMEs implies the identification and continuous assessment of the specific role of each partner within the overall network. The needs of clients and the opportunities for suppliers may vary as the result of the trend toward an increase of the outsourcing practices due to the interest by larger firms to focus on higher value added functions, such as research, final assembly and commercialization, while they may decentralize the production phases to their suppliers.

3.2 Manage accessibility and technological capital.

Since cognitive processes and innovation in the firms often develop in the framework of a specific "local" problem and they require the in depth knowledge of clients needs and of suppliers complementary capabilities, geographical proximity and appropriate technologies, such as ICT, may favor the development of the relations with various other actors and firms. The access to external complementary competencies and the access to a variety of building blocks of codified and of tacit knowledge. requires the creation of those hard and soft infrastructure both in a local context and at the interregional level, which allow to organize the knowledge and innovation networks.

The problem of accessibility is clearly different in the communication and collaboration with the large international firms, such as Boeing or Airbus, or in the case of local suppliers.

Larger firms have the need to systematically search the global markets for the identification of best practices, while smaller firms may concentrate on the exploitation of existing technologies and they require a less wide reach of their external contacts. Larger firms are also responsible for the diffusion of key technologies to their suppliers.

The problem of accessibility to suppliers in subcontracting networks of SMEs may differ in the various sectors. Some large companies have considerably reduced the number of suppliers, such as in the automobile sector, while in other sectors large companies have a large number of suppliers, since the productions considered can be much less standardized and the volume of inputs is much smaller. Intranet technologies clearly may be more easier applied in the first case, while personal contacts are still important in the second case.

3.3 Manage receptivity and human capital.

The openness of the various actors and nodes within the knowledge and innovation networks should be enhanced, in order to avoid lock in effects and that they become capable to acknowledge the need of complementary external knowledge and to assimilate it. The capability to interact of the various actors to be involved in an innovation process may be considered as a form of tacit knowledge and it is hindered by the cognitive distance determined by differences in the education level, cultural background, but also the different sectoral or technological specialization, the lack of broad diversified experiences and a too low capability of learning.

3.4 Building a common identity and improve institutional/organizational proximity.

Actors to be involved in innovation should share common aims, mental models, as also trust and loyalty. To promote knowledge sharing and the willingness to collaborate requires a change in the corporate culture. The identification of common challenges to survival and development create a sense of belonging to the same community or group and are a prerequisite for collaboration in innovation. Collaborative attitudes by the firms in a sectoral cluster can be considered as a form of tacit knowledge and are tightly related to the creation of various intermediate institutions, such as industry associations or specialized services or just common agreed routines, which are part of the "social capital" of the regional economy considered.

The know-how of the suppliers within SMEs subcontracting networks should be capable to integrate with that of the other client firm. The existence of a common culture is prerequisite also for receptivity.

The establishment of collaboration require a common motivation and the identification of some common aims. That may be related to the orders and stimulus coming from the market and the clients. Other stimulus may be the commonly perceived need to face the risk of foreign competition or the lack of time leading to the search of external partners in order be capable to meet very urgent needs.

However, a factor leading firms to collaborate may also be their spontaneous common interest for the technology and the internal passion for technological excellence. These types of relations based on reciprocal esteem and trust may be informal at the beginning, while prove to be very long lasting and capable to develop into concrete joint projects.

The design of the collaboration between the firms implies the assessment of the respective role in the collaborative scheme. Within, subcontracting scheme, suppliers may be qualified as "suppliers of capacity" or "supplier of speciality", whether there are just capable to respect technical production indications of the client or a capable to provide a separate and rare contribution with the supply of specific components or services.

The form of collaboration within subcontracting networks of SMEs implies not only contracts for the provision of goods, but also a form of tutorship by the larger firms with respect to the detailed indications of the production technologies to their suppliers. They are also characterized by the willingness by the supplier to participate to the solution of new problems and even in some case to the participation to the risk of the development of new productions by directly whether they have to directly assume the costs in the research and design of new solutions.

The design of a collaboration is also leading to decide the forms of participation to the joint results of that collaboration. Usually an equal scheme is required even between partners, who may have very different size, as the collaboration is based on a reciprocal advantage and exchange of information.

3.5 Lever creativity and manage internal organizational capital.

According to cognitive theories, creativity is related to pattern making or the capability to establish original contacts or synapsis between different potentially complementary information, technologies, know-how, thus leading to new discovery and inventions. Creativity is crucial in order to diversify the structure of the local economy into new productions. Creativity can not be planned in advance, being the capability to discover original solutions. However, it can be facilitated by

favoring the diversity of the various actors to be involved in the innovation process and the exploitation of their idiosyncratic characteristics.. In particular, to increase creativity firms should aim to leverage morale and to the empowerment and commitment of people, in order to secure to potential inventors the freedom, security and willingness to invest in risky exploratory analysis and in a lengthy process of systematic search.

Technology transfers occur also through the hiring of technical and manager experts, like consultants, that came from larger enterprise such as the principal firm customer.

Within a firm the creativity function may be concentrated in specific R&D organizations or left to the effort of individual persons, such as the entrepreneurs or the persons responsible for the technical production. In the case of aeronautic sector the complexity of the projects implies a rather hierarchical and detailed division of the responsibilities in the design of the various components. On the other hand, the firms have longer time for the design of new solutions than in other sectors, where the life cycle of the models is shorter.

3.6 Insure the governance and enhance entrepreneurship.

The implementation of innovative solutions requires the capability to cope with key problems of the organization and to manage the complex relationships between many different actors and to mobilize them. That requires entrepreneurship capabilities and to integrate knowledge with complementary material resources, in order to transform knowledge into action. The adoption of innovation requires the tight collaboration of various actors and the facilitating role of intermediary organizations and institutions, which may coordinate the joint effort. The governance of the innovation process requires an explicit effort in institution building and institutional learning, as the creation and maintenance of “social capital” or of “public goods” require appropriate investments by all partners belonging to a given innovation system. The existence of routines, institutions and governance activity has a positive effect on all the above indicated phases of the knowledge management process.

The management style within the SMEs is often very hierarchical or paternalistic, while it is tempered by the frequent direct contacts between the managers and their employees.

Subcontracting networks of SMEs have a strong hierarchical organization in the aeronautic sector, due to the existence of few large OEM firms (e.g. Airbus and Boeing) and the need by the suppliers to fully respect the indications derived from the design of the models received from these large firms. Moreover, the governance in this sector is still rather similar to traditional planning, since the role of international agreements between national governments and the role of public subsidies is crucial in defining the R&D projects of the OEM and their main suppliers.

Public subsidies and national industrial plans are typical of the aeronautic sector due to the long time and high costs required by the development of new airplane models and due to the military implications of the research in specific fields.

The various phases indicated above interact dynamically or follow a traditional linear approach. In fact, innovation may be the result of the respect of the indications of a key client, who has already developed the new technologies. Otherwise it may be the result of the tight interaction between various SMEs which lead to the discovery of new solutions and then to the search of potential clients. The development of new communication infrastructures and of training program for the labour force may occur both as the result of the adoption of an innovation or represent the prerequisite for its discovery.

Chapter 3

Strategies of non industrial organizations : actors, roles and tools

by Immacolata Caruso

Global competition does not affect any longer only individual producers (firms), but also regions and cities that host producers. In fact, more and more frequently dynamic regions and cities try to attract new investments and new residents to develop and reinforce their role. However, urban competition is coupled with intense exchanges of people, goods, technologies and information: nowadays, urban hierarchies have evolved towards a rich system of urban functional networks.

Also in Italy, while the Government has the tasks of coordination and harmonization of the intervention strategies (i.e the definition of pluriannual objectives of national expenditure for research and high formation in meaningful percentage of GDP or the creation of tools to support the research, production and innovation activities- DLgs 297/99), the decentralization has induced an expansion of the regions role in the field of technologies diffusion and innovation support. Therefore, since the years '80, we have assisted in the regions to a renewed development of public institutions, research centres and traditional organizations of services as the Chambers of Commerce, the Industrial Associations and the Financial Institutions.

It has been the multiplication of organisms-public or private-supporting to the enterprises that, often, implicated co-operations, at local level, among private sector and public powers. The quantity and the quality of such organisms were been and are very varying because they reflect both the national and local context. Nevertheless among the consequences that they have behaved, there has been the development of new systems of relationships, whose organization modalities are not still defined and consolidated precisely. Then, in recent years, to make up this situation, it was looked for to found decentralized interface nets, open toward the outside and, above all, toward Europe, that were able to effect a first diagnostic evaluation of the SME's demands and abilities with the purpose to direct them toward sources of specialized support. The knowledge management, nevertheless, remains a challenge for a lagging region like Campania where it still results more binding in a selective international competitive context.

Aiming at the identification of the structure of the innovation and knowledge networks in the specific case of aeronautical pole in Campania, the study, after a brief description of the territorial context, is focused on: a) the innovation potential of the enterprises through the analysis of the intra-firm relationships within a sample of 15 aeronautical firms b) the relationships in terms of innovation and knowledge of the relationships among these firms and other 20 non industrial organizations; c) the strategies of the governance process in relationship to the points of weakness underlined by the preceding analyses.

The choice of the non industrial organizations has asked for the priority identification of the principal present "nodes" in the networks and of the key- actors in the innovation regional system in Campania. In relationship to the typologies of examined organizations, they can be gathered in four categories:

- *Public Institutions* as the departments of the regional administration related to the development of the industrial politics, the centres of technological transfer created or partially financed by the public authorities, the technological parks, other local bodies etc;

- *Research Institutions*, essentially distributed among university departments, the most greater research centres and permanent formation institutions;
- *Services Organizations*, with particular reference to chambers of commerce, industrial associations, suppliers of engineering, software and management services;
- *Financial Institutions* distributed among national banks, regional banks of averages dimensions focused on the credit to the local SMEs, other public or semi-public institutions, as, for instance, the foundations or the agencies of development with a relevant role in the industrial innovation.

The information and the data related to the enterprises and to the identified non industrial organizations of the select sample have been collected both on desk, by a sector study, both on the field, by a series of interviews and quali-quantitative questionnaires submitted to privileged interlocutors, subsequently elaborating the different case-studies, whose the present report constitutes a preliminary synthesis.

As it emerges from the conducted investigation, a lot of the actors involved in the development of the aeronautical sector in Campania, have matured a deep awareness of the necessity of a "pro-active" economic politics that aimed to increase the competitiveness "not-from-costs" and, therefore, to stimulate the strategic competitive position of the local productive system through a greater quality of products and services.

In answer to the changes of the market and the complexity of the innovation context, besides, the "imposed" objective was to contribute not only to increase the competitive ability of the enterprises by strategies and programs of technological innovation but also by the formation of new professionalisms required by the technological evolution, promoting the use of knowledge patrimony , competences, know how and technologies already present in the region. Therefore, in the last five years, there was been a spontaneous proliferation of initiatives directed to find a point of meeting among the operators demands, compared and sensitive to the specific local needs, and the opportunities offered by structures that, using and involving the abilities on the territory, were able to assume a catalyst role for the cluster development.

In such context, of particular relief appears the Campania Region activity; this institution, in fact, has undertaken the role to aggregate the local competences and excellences, trying to reorganize its expectations to favour its application orientation. Particularly, downstream of an intense partnership process with the research and innovation actors, the Region has individualized and defined, in concert with the MIUR (Ministry of Education, University and Research), a "regional strategy for the innovation", a planning document of the specific interventions turned to promote the research and the innovation in the most strategic sectors, among which it is present also the aeronautical sector. In general terms and in accord with the Regional Operational Program 2000-2006 (POR), the principal interventions concern both the promotion of the innovation demand by the local productive system, and the organization of an articulated technological offer on the territory, through the structures of the regional research system networking.

Particularly, on the side of the innovation demand promotion, the strategy has foreseen for the SMEs an intervention of "animation" by the aid concession for the acquisition of services finalized to the R&D project definition (as the search of technological partners) or for the realization of an industrial research project (art. 11-law 598/94). As regards to the research offer reorganization, the strategy has foreseen the realization of the Regional Centres of Competence that represent both an aggregation on a "demonstrator" project of the present research groups in the Campania region for different sectors and institutions, both an organizational and managerial model to valorise the relapse of the research activities in terms of technological transfer and new entrepreneurship.

The strategy of the sector has been, then, completed by the promotion of the connections among research, local development and new occupational "basins", and, coherently with aims of the European Council in Lisbon, by incentives for the birth and the development of innovative enterprises. The advanced state of realization of the strategy has allowed, later on, a rescheduling, as an extension of the intervention lines pointed out and crossed, on the necessity to promote mixed public-private initiatives and investments in the applied research in the high technological sectors.

Particularly, the Campania Region has undertaken, as further priority, the specific objective " to favour the enterprises internationalization and the promotion of the trans-border and trans-national economic integration ." To such intention, together with the Ministry of the Productive Activities, the ICE (National Institute for the External trade), SACE (Institute for the Assured Services of the External Trade), SIMEST (Italian Society for the Enterprises in the foreign countries) and the regional Chambers of Commerce, has stipulated, in May 2001, an operational convention for the constitution of SPRINT, a regional organism of innovative services finalized to the support of the enterprises internationalization, whereas companies, institutions and representative corporate bodies can find nowadays a single interlocutor which to advance proposals and to signal dysfunctions and problems.

As regards, particularly, the aeronautics, the phase of realization of such strategies has favoured (over that the promotion and the support to the enterprises through activity of animation, scouting and incubation) continuous processes of contamination and integration among the stakeholders, public and private, involved in the development of the sector. In this context, of notable interest results the testimony constituted by the CARN - Campania Aereospace Research Network, born in 2002 under the auspices of the Campania Region, whose activities, see the share of other privileged interlocutors within the development of the sector as the University (Department of Aeronautical Planning, Faculty of Engineering, University of the Studies in Naples "Federico II") and Research Centres (CIRA – Italian Centre of Aerospace Researches, and the IMCB-Institute for the composite and biomedical materials of the National Research Council) as well as of some majors among the enterprises as Alenia, Avio, Piaggio. The principal objectives of the CARN are:

- Information interchange and dissemination;
- Systems of training by programs of specialised formation, financed by the regional funds and specific incentives of the Region, that answer to the demands of the network members;
- Development of pre-competitive research.

In the research collaboration activity, the members of the network share a same interpretation of the needs and answer to its maintaining own identity. This happens through the realization of specific shared projects, at middle-long term, that allow the realization of strategic industrial innovations, and, at meantime, they furnish enough resources to the expansion, by the base research to the applied one, of the most promising themes, assuring, finally, the transition of technology in products and industrial services. The network offers, besides, both the opportunity to form a critical mass (human and financial resources, infrastructures) with the purpose to furnish remarkable technological innovations, both the possibility of growth in the scientific competitiveness thanks to the sharing of costs and job and the management optimized of the resources of the same net.

Another of the principal tools to develop the actions strengthening the ties between research and enterprises (so that to reach conditions of "breakup" with the preceding models of local economic development) it is considered "technological district." With this expression we intend a geographical concentration of people, firms and public and private institutions that collaborate and compete in a specific industrial sector, characterized by an elevated technological content. These

new models of agglomeration born and develop under the push of four well recognizable factors: the engagement of the public institutions, the intervention of innovative firms, the share of the private investors and the presence of talents.

In this optics, the Campania Region, in agreement with the MIUR, has promoted in 2003 the birth and the growth of a technological district on the Engineering of the Polymeric and Composite Materials-IMAST, consortium among enterprises and research centres, which attend the University Federico II, the National Research Council, the ENEA and CIRA, technological and industrial partners, and, for the first time, financial structures as S.Paolo IMI-Banco di Napoli, Fondazione Banco di Napoli and the Meliorbanca. In the operational centre have been equipped 2500 mqs of research structures and 1300 mqs of laboratories, shared by the public and private partners. In IMAST work over one hundred researchers, there are installed research centres of different firms and there are studied, projected and realized innovative materials for the sectors of: aerospace, naval, automotive, biomedical, polymeric electronics, building. The consortium has the mission to realize a research, training and technological innovation system in which are integrated the objectives of knowledge development and growth of the know-how to apply to the products and industrial processes above all for the companies partners. The initiatives of the Technological District, that has the role of national leading, have the general objective of the territory growth and are focused on three macro-lines:

- To reach the international excellence in the research, becoming leader in the engineering of the materials and in its industrial application, through the cooperation Academy-Firm;
- To attract and to form the talents, becoming a pole of attraction for the best international talents in the field;
- To promote new technological entrepreneurship, creating new enterprises that "food" the technological development of the region and spread the innovation created in the industry.

Therefore, it clearly emerges as the University and the Research Centres, privileged places of knowledge production and development, have a dominant position in the process of public-private sharing related to the aeronautical sector. In fact, if in the case of the Research Centres the pursues objectives are coherent with the national strategies and with the demands of the enterprises, the interaction between didactics and research, at the bottom of the universities mission, assures a constant tie among production, transmission, diffusion and use of knowledge and information.

The opening to the international dimension of both, besides, qualifies subsequently their function of interface, able to report the world of the enterprises with the different competences and experiences present at micro (local), macro (national) and trans-national level. In general terms, the relationships with the enterprises of the aeronautical cluster are, in fact, consolidated and, in the most greater part of the cases, formalized through contracts and conventions and/or the joined share to initiatives and events. They concerns both training of specific professionalisms required by the firms, both the research and technical advices or services. The participation at network and consortia contributes to valorise the research relationships already implemented, and to create new opportunities that can allow the synergism realisation on the side of the research demand, over that, obviously, on the side of research activity offer. It also establishes, additionally to the accords of collaboration stipulated with other institutions and national and international organizations, a sort of integration between the short nets and the long ones that already characterized the system.

To this intention, exemplificative appears the case of the Department of Aeronautical Planning (DPA)- University Federico II of Naples, that has been one of the promoting subjects of the CARN and the IMAST. The DPA, having a solid tradition of excellence of its graduates, based on a narrow and profitable tie with the industry and the scientific aeronautics community, participates, through the Italian section, presided by Finmeccanica, to the Advisory Council for the Research on

the aeronautics in Europe (ACARE). ACARE is composed from 39 members coming from States of the EU, from Eurocontrol, from the European Committee, from representatives of the European aeronautical industry and its customers. It has the mission to define and to effect the strategic Agenda of European research in the aeronautical sector. ACARE-Italy has produced in March 2005 a programmatic document " The Italian Vision on the research and the technological development of the aeronautical sector", introduced to ACARE-Europe, in which it is defined a strategy for the activities of technological research and development (R&D) of the Italian aeronautical sector, considering its relapses on the efficiency and quality of the aerial transport system and, also, the social importance, the economic value and the contribution to the comfort and the safety of the Country. The document, in agreement with the strategy fixed by "European Aeronautics-A Vision for 2020", has the goal to maximize the efficiency of the national system of R&D, positioning it coherently with the lines of the European research in the sector, and, at meantime, safeguarding and promoting the specific development of the Country.

As regards the services organizations with particular reference to the Chamber of Commerce, the Industrial Associations and other societies involved, it is to underline, above all, the importance that derives from their nature of intermediate institutions, deep-seated on the territory. In the process of definition and realization of knowledge management strategies and in the sector development, they represent and/or connect different interests. Therefore they have the possibility to mediate among different subjects, as the enterprises (companies and SMEs) on the one hand, and the public institutions, the university and the research centres on the other. In the relationships system among the different stakeholders, such organizations are, therefore, in a dimension able "to exalt" the horizontal and vertical articulation of the responsibilities and of the decisional centres, assuming, overall, the role of "system integrator ", with the mission to activate and to strengthen the synergism and the cooperation processes among the actors.

In this direction, there are a lot of tools and activities realized by the different organizations, often within common and connected initiatives also with the other actors of the system. In general, they concerns the promotion of sector studies, workshop and meetings among enterprises (particularly among the local SMEs and the homologous ones of the aeronautical pole of Tolosa), and other initiatives articulated mainly in three principal issues:

1. training finalized to the intersection between demand and offer of the professional figures in the considered sector;
2. the services production according to a model of "knowledge and internet organization" based on organization criterions for processes of knowledge management, comakership (involving "suppliers" and customers) and learning organization;
3. the institution of "permanent observatories", constituted with the objective to pursue every opportune action to promote the development of the aeronautical sector.

As regards the first issue, the activity of Industrial Union of the Province in Naples (U.I.) is particularly relevant to estimate the relationship system relapse on the local development. This organism has promoted for a long time the link among firms and University, carrying out it, since 1990, through conventions with the Athenaeums. Particularly, the first level of integration has been that related to the availability of the entrepreneurs in partnership with the U.I to develop training courses for undergraduates in their firms. From 2003, the U.I. has started a connection of own website with SOFTEL, a structure responsible for the promotion of the University apprenticeships, so founding by informatics a "Counter University Apprenticeships".

The second level of integration has been activated for some degrees of particular importance for the economy of Campania region and Piemonte region by the Project "Campus Nord South", producing the first graduates in three innovative curricula in Aerospace Engineering, Electronic Engineering

and Science of the Materials/Packaging, required by the local firms in Turin, Alexandria and Naples. The third level of the possible synergism has been activated, in experimental way, by the program "Campus One" that, in the training courses founded, has resorted to entrepreneurial testimonies, integrated between them; a further level of the didactic integration Union-Athenaeums is represented by the university Master and by the education and superior technical formation (I.F.T.S) that Union promotes through agreements among firms in partnership, schools, professional institutes and university, answering to POR (regional operative programme) and using regional funds. Further testimony of a certain relief in formative context is constituted by the CONSAER - Consortium for the development of the Aeronautical Firms. Born in 2000 under the auspices of "Sviluppo Italia s.p.a.", a national agency for the south –Italy economic and entrepreneurial development of the Ministry of Treasury, the Consortium is sustained by partners as ATITECH s.p.a (Alitalia group), Avio, Officine Aereonavali Venezia (Finmeccanica group coordinated by Alenia), etc. CONSAER essentially deals with activity of formation and training in technical-managerial context, serving as interface among demand of specialized personnel by the enterprises and offer by training societies.

Also for the services related to second issue (*production of services according to a model of "knowledge and internet organization"*) the offer is manifold and different, from the tools proposed by TECHNAPOLI - a Scientific and Technological Park (PST) of the metropolitan area of Naples and Caserta- in research activity, technological transfer and training, to the others ones realized by CESVITEC- Centre for the promotion and the technological development of the SMEs in South of Italy- a Chamber of Commerce Special Agency , active in Naples since 1972 in the field of connection research-firm, innovations diffusion, support to the technological transfer, valorisation of the research products and services. Among these last ones, it appears of particular utility the product "*Symbiosis*", a service realized by the" Program of agreements among SMEs in South of Italy" promoted by the Chamber of Commerce in Naples and co-finances by the funds of the Chambers of Commerce Italian Union. "*Symbiosis*" has the objective to develop the fundamental information interchange among large and small enterprises on the respective demands, ability and competences, so facilitating the collaboration relationships, as, for instance, the traditional sub-contracting opportunities or more advanced forms of cooperation and partnership, and the knowledge diffusion.

As regards the institution of "permanent observatories", the Engineers Association in Naples is particularly active to support the aeronautical sector through the activities of the Committees of Technological Innovation Research and of Aerospace and Telecommunications. In this domain there is also the Aerospace Observatory, founded by the local Industrial Association in March 2005, with the objective to promote the enterprises aggregation in the sector by constituting consortia at local, national and international level. To this intention, on August 26 2005 it has been signed an agreement protocol among the Campania Region, the Chamber of Commerce, the AIAD (National Industries Association for the Aerospace and the Defence), the Engineers Association Aerospace Committee and the Confederate Labour Unions, that have constituted with the Industrial Association of Naples a permanent "Table " on the Aerospace.

Among the interlocutors considered by the investigation, aren't missed the financial institutions, characterized, nevertheless, by a scarce interaction with the others actors, above all with the industrial management, whereas the relationships are almost exclusively established on the base of individual social capital, developed over various years. Overall, according to the entrepreneurs, some of the most greater obstacle to affirm trust relationships between enterprises and financial institutions appears the practice of higher rates of interest, diversified among the north and the south of the country, operated by the banks. According to these last ones, on the contrary, the most greater obstacle is the lack of interest by the entrepreneurs to involve the banking system in the

project financing of their firms. Currently, nevertheless, there is a turnabout: S. Paolo- Imi Banco di Napoli, one of the most greater bank localised in Naples, and the principal banking groups have levelled the rates and, according to the norms BASEL 2, they are equipped with a series of financial products for the enterprises. These "products" are finalized to the innovation, internationalisation and aggregation development and are based on an intense interchange with the firms and on the supply of additional services.

3.1. Weakness and strategies in the governance of the relationships system

The new theories on the growth insist on the fact that it is very important in a local economy the knowledge and the technological changes diffusion rather than the pure and simple accumulation of capital, identifying the "knowledge" as an answer to the complexity. In such context, public powers can influence the bases of the economic growth participating as a whole in the knowledge creation and diffusion processes . Therefore a satisfactory evolution of the "participatory environment" and a multilevel governance process requires some pre-conditions as for the public authorities are concerned: first of all they should be endowed with competencies about negotiation processes and management; secondly, they should pursue results and networks building, not just the defence of their prerogatives.

Moreover, a continuous active participation by the other shareholders (like the private sector and the other local intermediate institutions) implies a full involvement during all the phases of analysis, co-decision, evaluation and control of a project or plan lifecycle. This means that these subjects must have an adequate access to information, to advisory boards and to negotiation with the relevant public bodies. The case studies show how far these conditions are met in different organizations.

Particularly in our analysis we firstly focus on the topology of information and knowledge networks established in the local area, assessing their structural characteristics, as to unveil their texture and inner properties; then we analyse to what extent actors' linkages are based on strong or weak ties. The next step of the analysis is to investigate whether and how they are fragmented or polarised. In fact, the partition of networks in either few or many communities (i.e subgroups, partitions, core-periphery structure, etc) is an important issue because it may affect the extent to which knowledge and information circulate within the local system. Finally, in such context, we conclude analysing if the participation of public authorities , on one side, and intermediate institutions, on the other side, makes possible to guarantee margins of efficiency to the operational contexts within which stakeholders act and, at meantime, to rationalise and plan the reproduction processes of economic, social, and political relations on a wider scale (national and international).

About the nets structural properties, we have considered different measures of densities: our empirical findings suggest that in the analysis of networks in local production systems the conceptual distinction between the *mutual* density, that counts only reciprocated contacts, the *non-directional* density, wherein all contacts matter even if they are not reciprocated, and the *value* density, based on *valued* relations, which takes into account not only the number of linkage but also the quality strength of each relation, is very relevant. In fact, comparing the above densities within the network we firstly observe that the mutual density is rather low. In general terms, it regards only the linkages of some specific non industrial organization like public authorities, the principal research centres and universities with the large and medium enterprises. In this case the relations are formal, institutionalised on research and training projects and characterised by a knowledge sharing. Conversely, when also not-reciprocated contacts are taken into account, there is a substantial increase in the network density but in this case the relations are informal, concerning, above all, the SMEs, based on an individual social capital and on information's exchanges. These findings are

interesting because provide a preliminary evidence supporting the argument that knowledge is shared by a relatively smaller number of actors with respect to information, confirming the degree of reciprocity. Another key element to qualify the features of the network is, in fact, the strength of the ties and, therefore, the value density. According to our results, we observe a dominance of weak ties in the information exchanges and a prevalence of strong ties in knowledge network, whereas reciprocity entails high stability and trustworthiness and it is commonly associated with strong ties while in information exchanges the degree of reciprocity is always lower.
The above results also suggest that we are analysing a networks where relational capability is much higher for some actors than for others but also that knowledge and information are not appropriated and controlled by one single actor . This means that the network is far from a typical configuration where a central "leader" actor controls all the flows, and the relatively high degree of heterogeneity of the stakeholders proves that there are different abilities to participate to formal and informal exchanges, in particular those concerning knowledge. Nevertheless it further indicates that exists a differential access to informational resources in the local system, suggesting the existence of a core of actors dominating the network.

In our case studies, therefore, we find that the *hard core* - sharing a great amount of local knowledge- is populated above all by large and medium enterprises, public and private research centres and some universities while, more in general, we have monitored the weakness, and sometimes the inexistence of SMEs and the intermediate institution role in influencing and stimulating the multilevel governance process within the network. In terms of impact – even noticing the exception of some isolated cases in the actions of regional authorities and some private organization – the difficulties found to realize common plans underline the need to focus on individual and collective mentality's change and to consolidate structures and institutions able to support this change.

In this perspective the network expansion becomes very important, since, in most cases, it is blocked at a regional and local level; and so are the density properties and the diversification of the relations.

Particularly, to promote the growth of the cooperation ability in the territory and to consolidate in effective way the territorial innovative system is necessary to demolish some invisible barriers as the scarce mutual knowledge diffusion in the local context; problems of communication and language between the different actors; difference of the systems of values and discrepancies of competence and technology among large companies and SMEs and between firms and others non industrial organization.

It is necessary, besides, to activate in the nets governance such mechanisms that allow to obviate to the almost total absence of financial partner and to a scarce convergence of the policy options, an insufficient cohesion in the strategic lines of the different organisms at local and national level. In fact, despite the manifold initiatives and the tools realized by different organizations, it notices still a certain fragmentation of decision-making centres, dispersion of authority, reduction of responsibility. This implies an insufficient level of coordination among the actors and, above all, the absence in the governance process of a public subject as a strong catalyst, capable to promote, to mediate ant to represent the collective affairs.

In conclusion, on the base of these considerations, it is necessary a consolidation of the actual context, strengthening the long-term evolution of the politics and the strategic approaches of the different stakeholders and reciprocally recognizing as source of competitive advantage. In this way could be possible to increase the strength of the nets and to produce new knowledge for the

cooperative innovation among local and regional systems, stimulating, at meantime, the trans-national partnership between agencies of innovation and transfer.