Mapping organizational capabilities and corporate performances

S. Costa[1], S. De Santis[1], G. Dosi[2], R. Monducci[1], A. Sbardella[2], M.E. Virgillito[2]

[1] ISTAT – Italian National Institute of Statistics

[2] Institute of Economics, Sant'Anna School of Advanced Studies

GROWINPRO Growth Welfare Innovation Productivity

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Background: the stagnation of productivity - 1

- Productivity stagnation: an emerging feature of the current phase of capitalism, shared by most OECD countries (Syverson 2016). It worsened after the 2008 crisis (and it might even get worse following the new Covid-19 pandemic).

- In **Italy** the issue is older and deeper, with substantial heterogeneity within the business system (Calligaris et al., 2016; Codogno, 2009; Daveri and Jona-Lasinio, 2008).

- Also the dispersion of productivity substantially increased, both within Oecd countries (Berlingeri et al., 2017) and even more in Italy (Dosi et al. 2012)

$\Rightarrow$ "**neo-dualism**" in Italian business system (in terms of organizational skills, innovation, presence on foreign markets) and firms' performance: co-existence of a small group of dynamic firms alongside a large group of much less advanced ones: gazelles *vs.* turtles (Dosi et al. 2012); also the best *vs.* the rest (Andrews, Criscuolo and Gal, 2016)

Background: the stagnation of productivity - 2

- The availability of **microdata** allows for granular approaches bringing out the heterogeneity among firms and within industries (Bartelsman and Dooms, 2000; Dosi, 2008; Syverson, 2011)

- The **heterogeneity** increased in the last decade, also questioning the cleansing effect of crises (Foster et al., 2016). This could be an issue, because since 2008 Italy has experienced three recessions.

- If the selection is weak, low-productive firms remain viable, increasing the left tail of the distribution (Dosi et al., 2019)

The theoretical framework

Capability-based theory of the firm *(Winter, 1997; Dosi e Marengo, 2015)*

- The firm is a constantly-evolving place of learning and knowledge, a collection of *(highly idiosyncratic)* technological-organizational capabilities, where organizational routines are put in force to achieve the corporate goals.
- The managerial practices are subjected to the collective knowledge of the organization

  ⇒ There exist no «optimal» industry configurations

  ⇒ extreme heterogeneity of firms' organization and performance

Empirical analysis lagged behind in identifying the "quasi-genetic" traits of organizations (mostly also due to the lack of proper microdata bases).

Aims of the research

- ✓ Proposing a new, comprehensive, set of integrated microdata including wide-ranging information on **firms' structure, behaviour, performance** (integrating register-based dataset with the permanent business census data)
- ✓ Providing a **«genotype-phenotype» map** of the Italian firms (from organizational capabilities to performance)
- ✓ (through these lenses) analyzing the **determinants of the stagnation of productivity** in Italy

The data sources

- We built a comprehensive dataset integrating **two main ISTAT microdata sources**:

  - **Permanent business census** → large multi-purpose survey (MPS) involving over 200,000 firms with 3+ persons employed (reference universe: ≅ 1 Mln firms). Information on firms' strategies about:
    - ✓ Governance (ownership, management, belonging to groups)
    - ✓ Human capital (investment, skills, competences etc.)
    - ✓ Inter-enterprise relations (contracting/subcontracting, partnerships, etc.)
    - ✓ Competitiveness instruments (price, quality, innovation, location, network, etc.)
    - ✓ Technology (use of Ict, I4.0 technologies, platforms, etc.)
    - ✓ Finance (sources, bank-firm relationship type and conditions, etc.)
    - ✓ Internationalization (international outsourcing, via offshoring or agreement; number and type of counterpart etc.)

  - **Frame-Sbs** → business register that for all 4.3 million firms operating in Italy reports information on:
    - ✓ Structure (size, industry, location, belonging to a group, composition of workers)
    - ✓ Performance (profit-and-loss account; international trade)

The dataset

The **resulting dataset** is an example of the potential of the Istat “dualistic approach” to official statistics (integrating administrative and statistical data sources, with full consistency between micro and macro results):

- ✓ about 110,000 firms with 10+ persons employed (our target size), representative of a universe of about 215,000 units (51%)
- ✓ 9 million persons employed (54.7% of the total)
- ✓ 557 billion euros of value added (71.4%)
- ✓ 3,700 large enterprises (250+ p.e.), generating 38.5% of the overall employment and 45% of total value added

The empirical analysis

Multivariate, multi-stage analysis:

- Factorial analysis on the relevant variables of MPSurvey
- Map of most relevant factors to grasp firms' heterogeneity
- Identification of clusters on the basis of factors' distribution: characterizing performance
- Mapping firms and sectors

Result 1- Three business practices profiles

3 main profiles (factors) among Italian firms with 10+ p.e., concerning their internal/external, competitive/cooperative choices:

- 1st factor (46% of total variance) → **complexity of firms' organizational capabilities**.
- 2nd factor (13% of total variance) → **managerial strategies**
- 3rd factor (10% of total variance) → **relational side**: relation-related strategies, both on internal (i.e. related to workforce) and external (i.e. related to inter-enterprise relationships) sides.

Profiles	Main key actions					
Technological-organisational capabilities	Staff training activities (for new recruits, or continuous training and retraining)	Investment in the workers' digital skills	Investments in advanced automation and interconnected machines	Investments in technology, digitalisation, R&D, work organisation	Use of management softwares (ERP, CSM, SCM)	Use of remote management services (cloud)
Managerial strategies	Product quality as competitive strength	Market power (in setting prices)	Expansion strategies (products diversification, extension of activities)			
Relations	Adoption of good practices for the staff professional development and equal opportunity protection	Adoption of measures for work-family balance (leave, furloughs leave, hourly flexibility)	Articulation of inter-enterprise relations (contracts, subcontracting, agreements)			

Result 2 - A new taxonomy of Italian firms - I

From the combinations of the three profiles, a four-class taxonomy of firms emerges:

Basics → very simple organizations: low organizational capabilities, medium relations, tend to have varied managerial strategies

Managerials → relatively simple organizations whose strategies are mostly directed outside the firm, especially in terms of market strategies

Interdependents → relatively complex organizations, mainly inclined to activate inter-enterprise relations

Complexes → Complex organizations, with *complex*, rather than *strategic,* behaviours; multiple actions, organizational-technological processes implemented to increase the firm's collective know-how

Clusters		Organizational-strategic profiles		
		Technological-organisational capabilities	Managerial strategies	Relations
Cl_1	Basics	14.2	69.8	62.5
Cl_2	Managerials	25.6	75.5	64.5
Cl_3	Interdipendents	36.3	73.1	64.3
Cl_4	Complexes	49.4	65.8	61.5
Total		27.4	72.4	63.6

Result 2 - A new taxonomy of Italian firms - II

Each cluster has its peculiar strategies:

(co-occurrences of firms' strategies within the cluster)

Basics

Managerials

Result 2 - A new taxonomy of Italian firms - III

(co-occurrences of firms' strategies within the cluster)

Interdependents

Complexes

Result 3 - From the genotype to the phenotype of firms - I

	Firms		Persons employed			Esporters		Value added		Productivity (val add./workers)		Profitability (Ebitda/Turnover)		Average salary (pers. costs/employees)	
	N.	%	N.	%	Average	%	Exp./turn. (average; %)	€ Mln	%	Average (€)	Coeff. of Var.	Average	Coeff. of Var.	Average	Coeff. of Var.
Basics	60,380	28.5	1,282,830	14.4	21.2	10.7	6.5	47,370.0	8.7	36,926	2.1	7.0	149.9	29,403.3	0.7
Managerials	77,040	36.4	2,106,065	23.6	27.3	22.1	10.7	103,816.5	19.2	49,294	1.1	7.4	60.9	34,714.9	0.5
Interdependents	54,267	25.6	2,595,343	29.1	47.8	36.7	15.6	159,340.2	29.4	61,395	1.3	7.9	3.5	40,543.2	0.4
Complexes	20,070	9.5	2,947,326	33.0	146.9	48.1	22.0	231,373.3	42.7	78,503	1.4	10.1	35.8	49,655.7	0.5
Total	211,757	100.0	8,931,563	100.0	42.2	25.0	16.7	541,900.0	100.0	60,672	1.2	8.7	73.0	40,434.8	0.5

- Nearly 2/3 of Italian firms with 10+ p.e. are Basics or Managerials, but together they generate less than 1/3 of total value added
- Complex firms are very few (less than 10%) but account for 42% of total value added
- Higher complexity is associated to a higher propensity to operate internationally
- The productivity of Complexes is twice as high as that of Basics (78K € and 36K € respectively).
- Large heterogeneity between (but not within) the classes in average salary

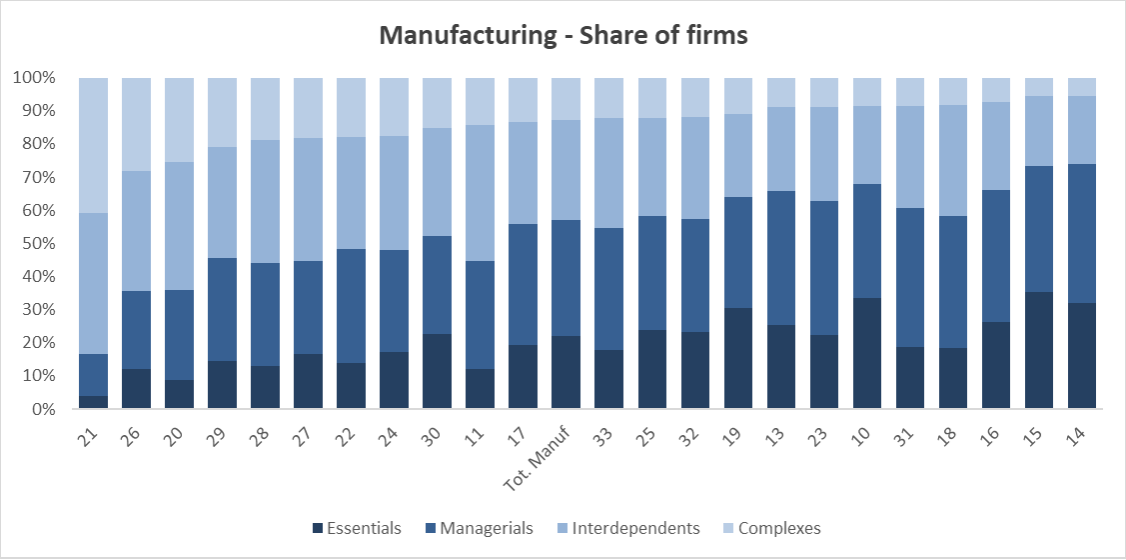
Result 3 - From the genotype to the phenotype of firms - II

- A noteworthy result: *a more "complex" profile may allow smaller firms to partially overcome the limits of size*:

- **7.3% of small enterprises (over 14,000 firms) are "Complex"**. They:
  - ✓ display a value of "technological/organizational capabilities" higher than those of 3/4 of medium and large enterprises;
  - ✓ have levels of labour productivity higher than those of the larger enterprises belonging to the other three clusters;
  - ✓ display high profit margins (despite high salary levels), slightly lower than those of medium and large complex firms

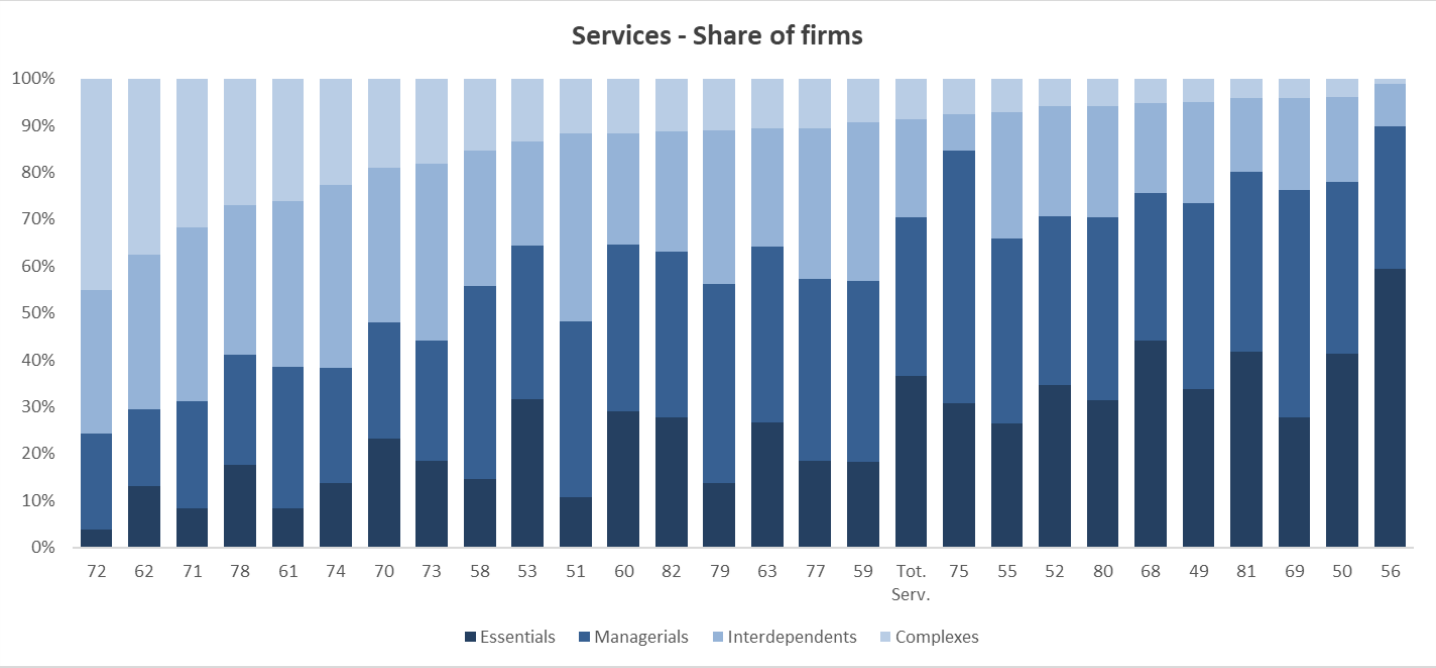
The distribution of clusters - Manufacturing

- **Basics** and **Managerials** (cluster 1 and 2) are more numerous in traditional manufacturing, e.g. Textiles (13), Wearing appareal (14), Leather (15), Food (16)
- The incidence of **Complexes** is higher in sectors with higher technological content and learning processes – e.g. pharmaceuticals (21), and electronics (26), chemistry (20) -, and scale-intensive industries, such as automobiles (29) and machinery (28)



The distribution of clusters - Services

- The incidence of **Basics** and **Managerials** is higher in small-size dominated activities, e.g. Food/Beverage services (56), Veterinary (75), Serv. to buildings and landscape (81), Water transport (50)
- **Complexes** prevail especially in knowledge-intensive services, such as R&D (72), Computer programming (62), Arch./Engineering (71)



Higher complexity ≅ higher productivity

- More complex organizational practices are associated with higher levels of labour productivity
- This effect increases as we move from Managerials to Complexes
- This applies to the overall sample and within SMEs classes
- Among large enterprises, differential of productivity is significant for Independents and Complexes

Dep. Var.: **Levels of productivity**; *Benchmark:* **Basics**				
Covariates	**All sample**	**10-49 p.e.**	**50-249 p.e.**	**250+ p.e.**
Managerials	0.087 ***	0.083 ***	0.094 ***	0.026
Interdependents	0.131 ***	0.124 ***	0.145 ***	0.110 **
Complexes	0.147 ***	0.133 ***	0.192 ***	0.187 ***
Additional firm-level covariates/controls	yes	yes	yes	yes

Higher complexity ≅ better dynamics

In the 2016-2018 period:

- Interdependents and Complexes experienced higher **growth of productivity and employment**
- This applies to small-sized enterprises
- For medium and large firms, organizational capabilities accompanied **employment growth** rather than productivity one.

Productivity dynamics (2016-2018); *Benchmark:* **Basics;** Covariates at 2016

Covariates	**All sample**	**10-49 p.e.**	**50-249 p.e.**	**250+ p.e.**
Managerials	0.019	0.036 **	0.028	0.081
Interdependents	0.033 ***	0.051 ***	0.030	0.110
Complexes	0.042 ***	0.059 ***	0.034	0.137
Additional firm-level covariates/controls	yes	yes	yes	yes

Employment dynamics (workers; 2016-2018); *Benchmark:* **Basics;** Covariates at 2016

Covariates	**All sample**	**10-49 p.e.**	**50-249 p.e.**	**250+ p.e.**
Managerials	0.093 ***	0.070 ***	0.529 ***	0.804 ***
Interdependents	0.119 ***	0.087 ***	0.589 ***	0.110 ***
Complexes	0.162 ***	0.121 ***	0.621 ***	0.880 ***
Additional firm-level covariates/controls	yes	yes	yes	yes

Conclusions

- The firm **technological-organizational knowledge override managerial strategies** in explaining the heterogeneity between firms within the Italian business system.
- **Going beyond firm size**: higher technological-organizational capabilities help small firms partially overcome their size limits
- **Clues of neo-dualism**: Managerials are closer to Basics; Interdependents to Complexes.
- **Industrial policy**: this type of analysis may support more effective measures to encourage firms to increase their technological-organizational capabilities. Intermediate groups are mostly important for policies aimed at favouring the exit from the stagnation of productivity and the convergence toward “the best” segment of business system. Clearly the difficulties in transition are different for Managerials and interdependents, if only as the formers still account for over 1/3 of Italian firms with 10+ employees.

Further (ongoing) developments

- **Further effects of taxonomy on**: link productivity/salaries, access to foreign markets, …
- **From micro to macro**: from firms' to countries' organizational capabilities

THANK YOU

Stefano Costa
scosta@istat.it