Digitalisation and organisational innovation

Lesson 5. Innovative networks

Introduction

- As we mentioned, in recent decades there has been an increase in **collaborative relationships** between economic actors.
- The rapidity of **technological change**, the **uncertainty of its evolutionary trajectories**, growing **international competition**, and the **pluralisation of knowledge sources** have made companies more dependent on **external resources**.
- As a result, **inter-organisational partnerships** — such as strategic alliances between firms, research consortia, and collaborations with universities — have multiplied, especially in the field of research and innovation.
- This trend has drawn scholars' attention to the **social and economic networks** that sustain these collaborations.

- In new economic sociology, this type of analysis has been developed through the structural approach, which applies network analysis to the study of socio-economic phenomena.
- The main assumption is that economic activity is **embedded** in the social relationships among individual or collective actors.
- These relationships — and the social structures they create — influence economic activity by providing access to different kinds of resources and information, building trust, and discouraging opportunistic behavior in transactions.
- However, not all networks are the same.

- Networks are configured differently depending on the types of relationships that connect the actors. These relationships can be:

1. Informal, based on personal ties or membership in the same professional community, or formal, based on contractual agreements, such as business alliances or research consortia;
2. Long-term or short-term;
3. Focused on individual actors (managers, researchers) or collective actors (firms, research organizations);
4. Aimed at specific goals or more open-ended objectives.

- Networks can also:

1. Be purely transactional (as in trade relations) or relational (based on personal and social ties);
2. Have different modes of governance, which can be more or less hierarchical or regulated;
3. Show a configuration that is more or less closed and dense.

- Many studies have examined the impact of networks on **innovation**.

- Research has mainly focused on **innovative partnerships** (inter-organizational collaborations), showing that they promote the exchange of information, the sharing of project risks, access to diverse and complementary resources, and mutual learning about solutions and organizational practices.

- The findings show that, especially in high-tech sectors, **learning networks** often become the true “**locus of innovation**”.

- Innovative networks and partnerships play also a role in traditional **manufacturing** sectors (as shown by the Italian "**industrial districts**") or in the financial sector.

- Two key findings emerge from these studies:

1. There is a positive relationship between collaboration and innovation networks, confirmed by many empirical studies across different industries. A **virtuous circle** develops, where firms' external relationships improve their innovative performance, which in turn encourages further collaboration.
2. However, there is no single or **univocal link** between the type of relationship, the actor's position in the network, and their innovative performance.

Granovetter: The Strength of Weak Ties

- To understand the absence of a clear connection, we can look at several theoretical contributions and studies that have become classic references in this field, starting with the work of Mark **Granovetter**.

- Granovetter became famous for his thesis on the "**strength of weak ties**", based on research on the labour market for technicians, professionals, and managers in the Boston suburbs (1973).

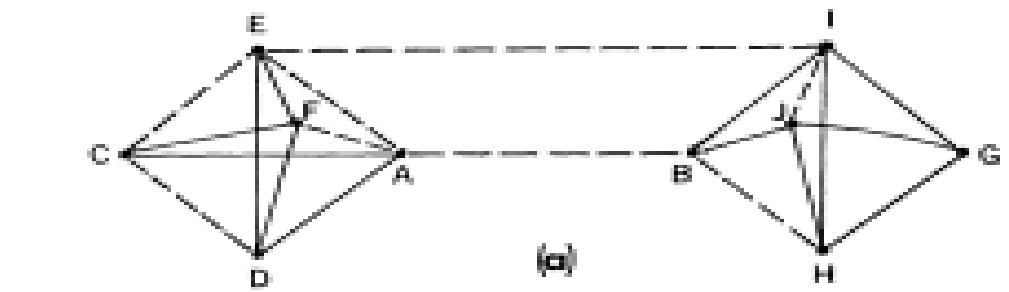
- The American scholar distinguishes between two types of social ties: **strong ties**, which involve close and trusting relationships (such as with friends or family), and **weak ties**, which are less frequent and less emotionally intense.

- His research revealed a seemingly **counterintuitive result**: weak ties are more important for obtaining useful information when looking for a new job.

- The explanation is simple and brilliant at the same time: weak ties (for example, acquaintances made in the workplace) give people access to new information that they could not obtain through strong ties.

- Friends and relatives usually belong to the same '**information area**' as the individual, so they are less likely to provide new or useful information.

- This thesis has sparked much debate. Later studies showed that the type of relationship most helpful in finding a job **varies** across **countries**, **industries**, and **professional sectors**.



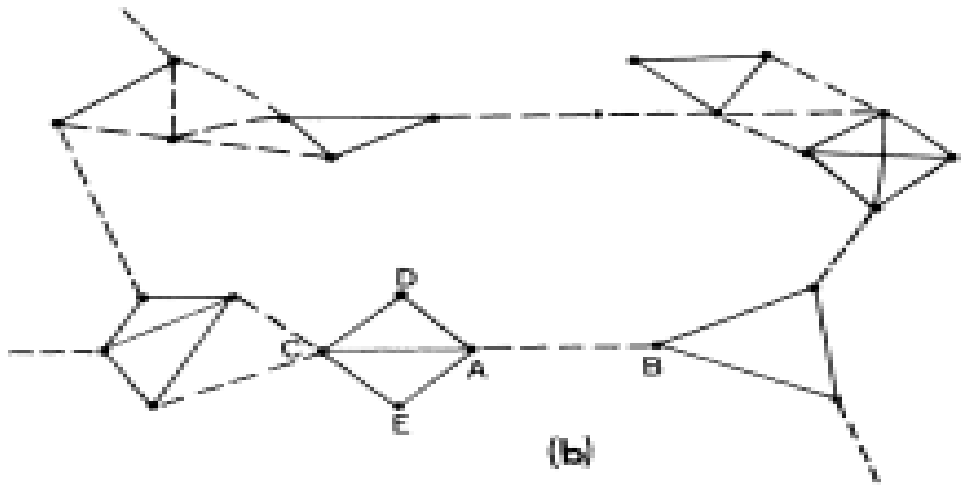


FIG. 2.—Local bridges. *a*, Degree 3; *b*, Degree 13. ——— = strong tie; — — — = weak tie.

Networks and innovation: Thomas Edison

- Granovetter also explored the role of social networks in innovation, for example in the development of the **electricity industry** in the United States at the end of the nineteenth century.

- To explain why Thomas Edison's model — based on building large hydroelectric power plants — became dominant, Granovetter highlighted the importance of Edison's social networks.

- Edison's approach prevailed not necessarily because it was technologically superior to other possible solutions at the time (such as maintaining gas lighting or building local generators), since this was a difficult parameter to assess, especially in relation to its long- term effect, but because it was supported by his strong network of social and professional connections.

- What proved decisive was Edison’s relational skill in promoting and gaining acceptance for a solution that was highly innovative — and controversial — at the time.

- His effectiveness can be explained by the structure of his social networks, which allowed him to mobilize personal contacts with international financiers, entrepreneurs in the electricity sector, and many other inventors and researchers whose opinions influenced decisions about lighting systems in major American cities.

Weak ties, social marginality and new ideas

- Granovetter had already emphasized the role of **weak ties** in spreading innovation, suggesting (as Simmel and Sombart had before him) that **social marginality** can encourage the adoption of **new ideas**.

- Especially in scientific fields, new information and ideas spread more effectively through weak ties, as they enable the flow of fresh, non-redundant knowledge.

- At the same time innovation can also create **conflict,** when it challenges **existing power structures**.

Strong ties, dense network and istitutionalisation

- In contrast, **strong ties** and very **dense networks**, while building trust, mostly circulate familiar ideas. These become **normative ideas**: shared beliefs about the “proper behavior” to follow.
- This pattern makes deviation from group norms harder and non-conforming behavior easier to punish. In other words, it limits highly innovative actions.
- However, this process can at the same time foster the **institutionalisation of innovation**.
- Let us examine these two phenomena (weak ties and conflict; strong ties and institutionalisation) in greater detail.

The istitutionalisation of innovation: the legitimization of financial derivatives

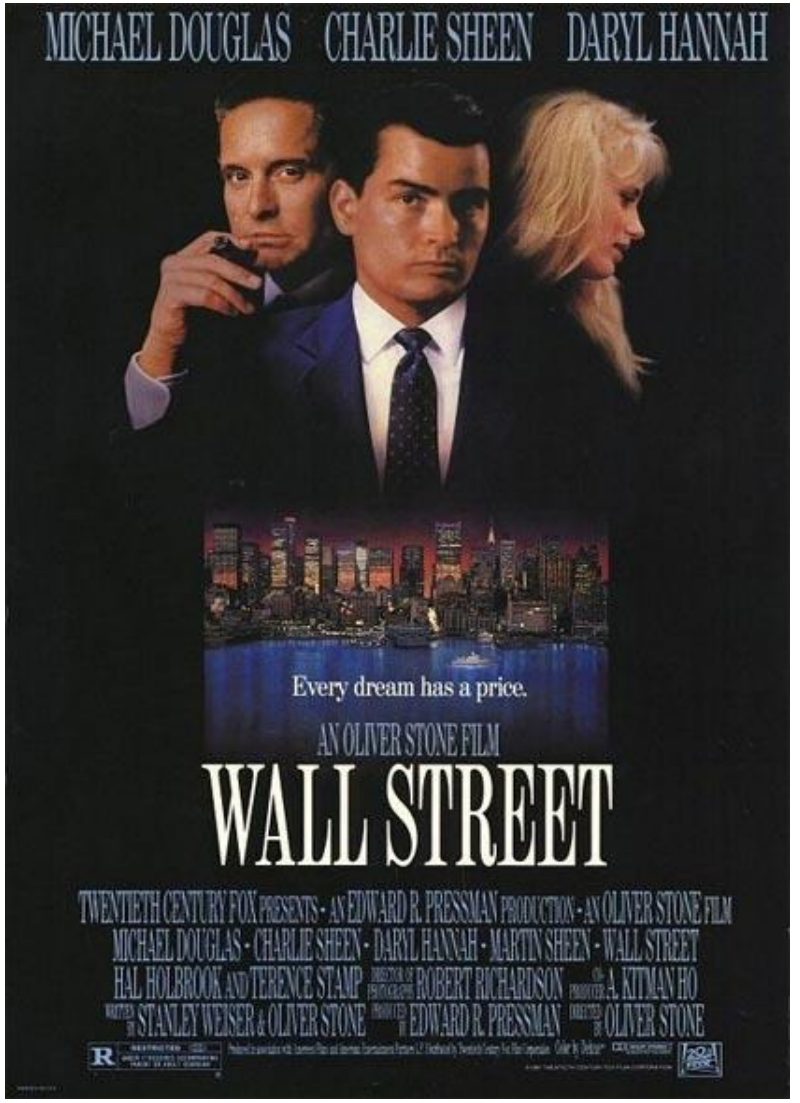
- Granovetter illustrates this idea with studies on the creation of new high-risk financial products, first seen as a form of gambling and later either accepted as legitimate financial instruments or rejected and banned by the financial elite.
- A study by MacKenzie and Millo (2003) on the introduction and legitimization of financial derivatives on the Chicago Stock Exchange clearly shows the role of social networks in institutionalizing innovation.
- The Chicago financial community was highly structured through personal relationships that separated insiders from outsiders.
- The institutionalization of this financial innovation was possible only through the mobilization of cohesive insider groups, supported by actors from other institutional fields, such as economists and politicians.

Weak ties, social marginality and new ideas: the junk bonds

- Granovetter also shows that the most **radical innovations** often come from **marginal individuals**, who can more easily distance themselves from **conformist behavior**.

- One example is that of **junk bonds**: risky but highly profitable financial instruments.

- In the 1970s, these bonds were promoted and widely used by a young American trader, **Michael Milken**, who worked for a small financial company.



- Junk bonds soon became a **symbol** for medium-sized firms excluded from the **traditional financial elite** and a tool for launching **hostile takeovers** against established companies.

- However, **insider firms** within the financial elite mobilized **political allies** who introduced laws in several states to restrict the use of junk bonds.

- These measures eventually led to Milken’s **legal prosecution** and his permanent disqualification from financial activities.

- This research shows that innovation means breaking **established routines** (as Granovetter argues) and combining previously **unconnected resources** to create **new economic value** (as Schumpeter suggests).

- The creation of **new institutional forms** requires **crossing conventional boundaries**.

- Therefore, an actor positioned between different networks, separate exchange circuits, and distinct institutional spheres "**is well placed to innovate**".

The structural holes

- The conclusion of Granovetter refers directly to Ronald Burt's (1992) argument about "structural holes".
- Social relationships tend to form **clusters** of individuals who interact frequently and intensely. These clusters become "**islands of opinion and behavior**" that can create barriers to information that challenges dominant beliefs and practices.
- Within the social structure, there may also be **gaps** (a lack of connections between clusters that remain isolated from one another).
- These gaps form "**structural holes**", an areas that block information flow but also create **entrepreneurial opportunities**.

- Their value lies in the fact that “they separate non-redundant sources of information”.

- Individuals who position themselves in these spaces act as bridges between different communication circuits. They benefit by gaining access to more **diverse** (non-redundant) and **timely** information and by **controlling** the flow of knowledge between clusters.

- These actors are the **entrepreneurs of networks**: real brokers who mediate between relational circuits and gain **competitive advantages**, especially in innovation and creativity.

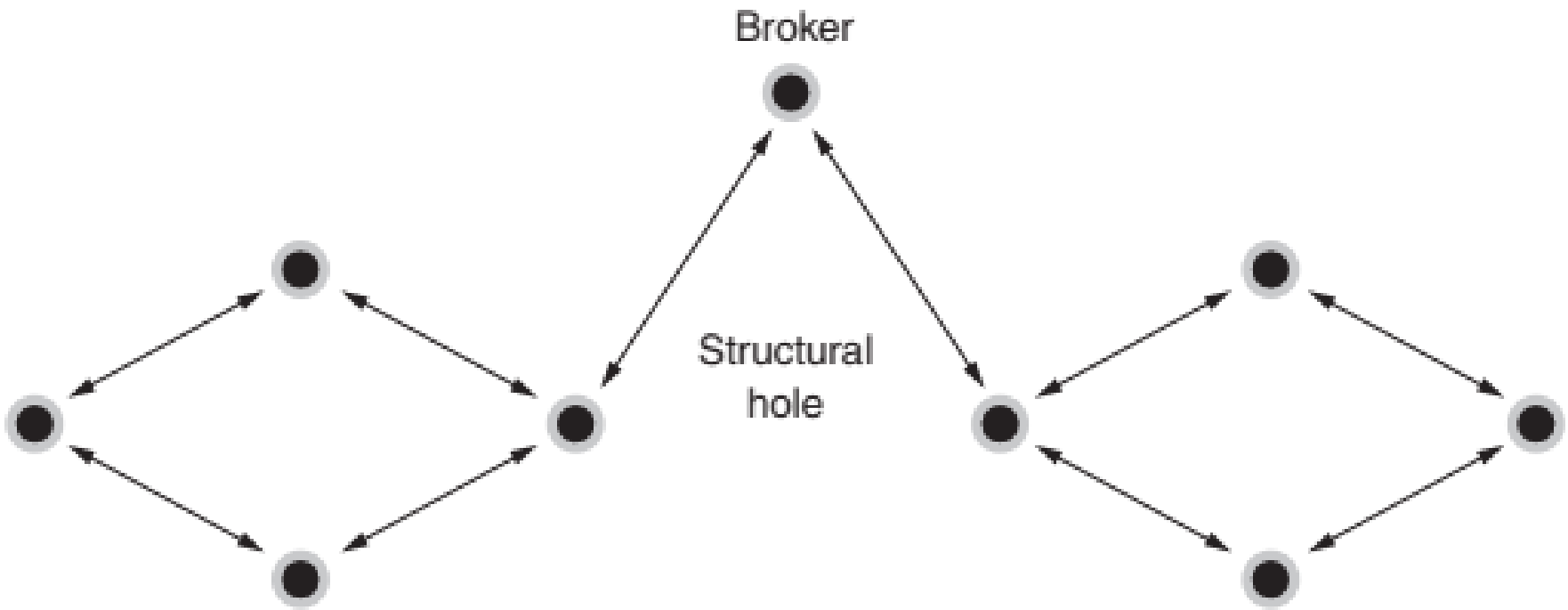


Figure 1.1 Structural holes and relational brokerage.

- Burt explores this idea by studying the “**social origin of good ideas**”.
- In his analysis, he shifts attention from how ideas are produced to the value they gain when transferred into new contexts. Their valorization depends on the exchange of information between distinct and separate groups.
- In other words, creativity works as a form of information brokerage: an import–export process where “**creativity by brokerage**” means moving an idea that is ordinary in one group to another, where it is new and valued.
- To support this argument, Burt analyzed suggestions from 673 managers in the supply network of a large U.S. electronics firm. The **ideas rated highest** by top management came from managers who accessed less redundant sources of information.

- Another important line of research involving the role of networks in innovation comes from **Walter Powell** and his colleagues in the **field of biotechnology**.

- Studies in this area show that inter-organizational partnerships give firms a significant advantage in innovation. Two key elements emerge:

1. The success of partnerships depends greatly on trust and the ability to **absorb new knowledge**. Building and managing external collaborations is therefore strategically important. A central position in the network and experience in managing partnerships both have a positive effect on innovative performance.

2. The capacity to learn from external relationships also depends on a **company's internal resources** — especially its knowledge base and technical skills.

- An interesting aspect of these studies is their **diachronic** approach.
- The structure of networks **changes over time,** both at the individual level (in the life of a single firm) and at the industrial level. For example, in biotechnology, connectivity between firms and other organizations increases as the sector grows.
- Furthermore, networks are analyzed within **specific industries**, and the importance of **contextual factors** is recognized.
- To explain why biotechnology firms tend to **cluster geographically**, researchers highlight the complex economic and institutional infrastructure that supports the transfer and commercialization of scientific knowledge, including top universities, technical and legal consultancy firms, and venture capital companies.

The diffusion of innovation

- Another line of research focusing on social relations examines the **diffusion of innovation**.
- These studies show that the adoption and spread of innovation depend on interpersonal relationships and the structure of the social network.
- Everett Rogers (2003) defines diffusion as “the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system.”
- One of the best-known findings from this research concerns the **speed of innovation adoption**.

- Many studies show that the rate of innovation adoption usually follows an **S-shaped curve**, although its exact shape may vary from case to case.

- This pattern is easy to explain: at first, only a few people adopt the innovation. Over time, as positive experiences spread through word of mouth, adoption grows rapidly (the curve rises), and then slows down as fewer individuals remain who have not yet adopted it.

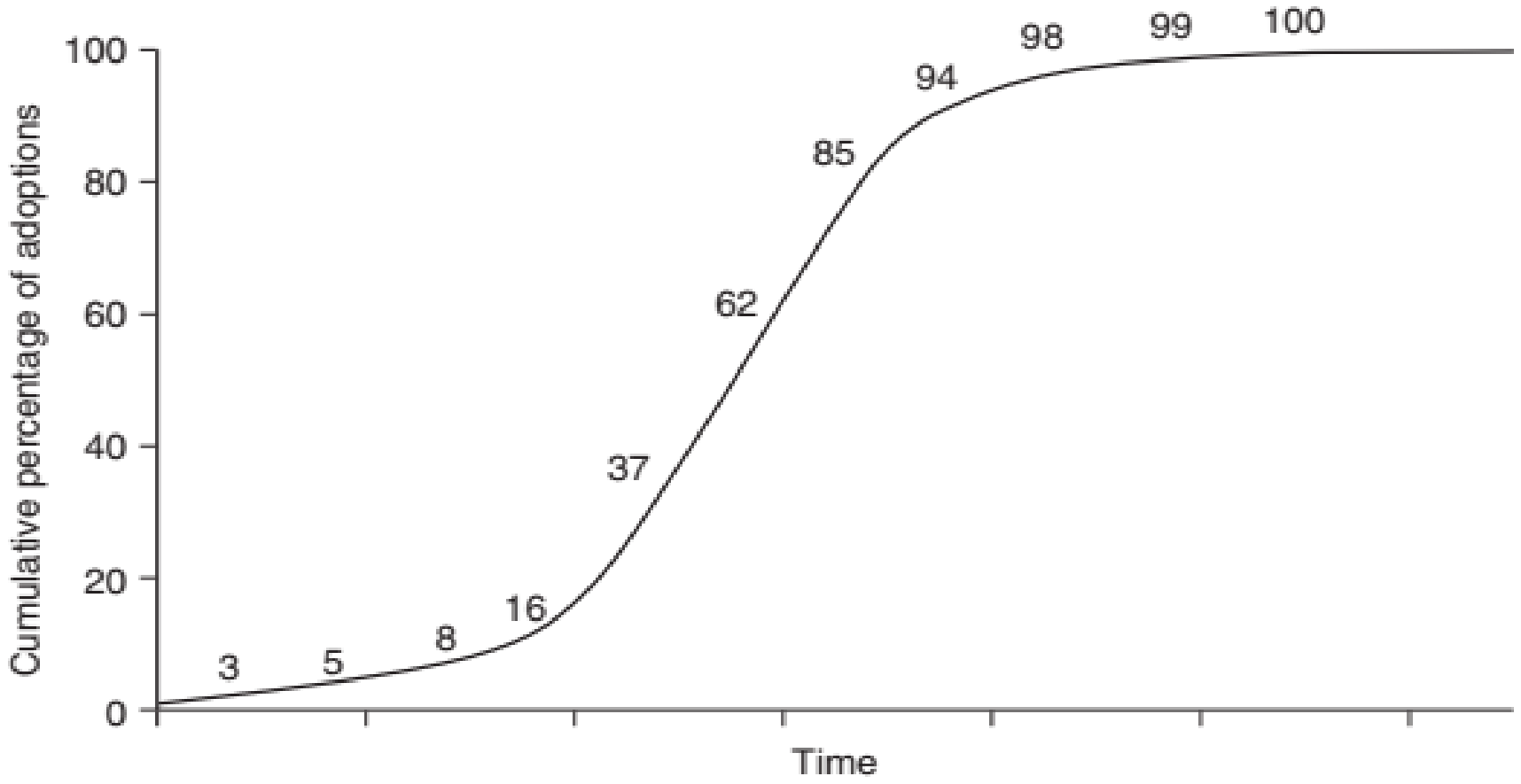


Figure 1.2 The process of innovation diffusion: the S-curve of the adoption rate.

Information and Knowledge

- Other studies have examined how **information** and **knowledge** useful for innovation spread, focusing on the role of different kinds of social ties.
- Strong ties are seen as more reliable and better for **sharing tacit, complex, and interdependent knowledge**, while weak ties are more effective for **codified knowledge and non-redundant information**.
- However, this process is not automatic. There is not always a clear link between weak ties and non-redundant information.
- Therefore, analyses must distinguish between the form and content of ties, as well as between socio-cognitive aspects (variety of knowledge shared) and socio-normative aspects (trust and frequency of contact).

- There is also variation depending on **production specialisation**. In traditional and slow-tech sectors, strong ties play a more important role, while weak ties are more relevant in high-tech industries.

- Some studies have shown, however, that the type of ties employers use varies widely depending on their functions and activities.

- In terms of innovation, research highlights that firms need to balance strong and weak ties, combining internal cohesion with diversity in external relationships — in other words, using complementary connections and resources to support innovation.

Conclusion

- In conclusion, studies on social networks highlight the importance of interpersonal and inter-organizational relationships for innovative performance. However, the relevance of networks is highly **contextual**: their presence, effectiveness, and structure depend on multiple social and institutional factors.

- In other words, innovation is a **complex process** in which institutional and social-relational factors play a central role.

- Moreover, the sociological perspective emphasizes that innovation is not just technological change, but it also involves the broader **structures of capitalism**.

- These observations link directly to the theme of **social change** and raise key questions about **power**, **legitimacy**, and **conflict** in the innovation process (as we will see in the final part of the course, when discussing **big data** and **algorithmic management**).

What will we cover in the second part?

- In the first part of the course, we introduced an initial definition of economic innovation and its main features.

- We then examined the theoretical and empirical evolution of the debate on post-Fordism and globalisation, showing how firms have gradually become more open to collaboration with local actors. This has led to new forms of cooperation in both production and research, in high-tech as well as in low-tech sectors.

- However, the characteristics, timing and extent of these transformations vary from country to country, and depend strongly on the institutional context.

- We therefore explored how the comparative political economy literature has explained the different innovative performances of firms since the 1980s (VoC) and how, with the growing process of globalization (since the 2000s), the debate has shifted toward growth models.

- At the same time, the growing role of networks — both productive and research-based — at local, national, and international levels (through GVCs) has brought the relationship between structure, agency, and outcomes back to the center of the discussion.

- The result is a complex and multi-layered picture, where macro-level dynamics (from comparative political economy) and micro-level ones (from network research) interact to produce unexpected outcomes.

- Thus, while the strength of weak ties remains an important insight, its effects depend on contextual factors (such as the sector or institutional framework) that define structure, and on the agency of different actors.

- This first series of lessons has therefore set the stage for the next steps on:

I. The distinction between **entrepreneurs-innovators** and **inventors** (Chapter 3).
II. The **evolution of networks** from a multidisciplinary perspective (Chapter 4).
III. The role of different **innovation systems** (Chapter 5).
IV. The role of **territorial perspective**, reshaping the geography of innovation (Chapter 6) and becoming a tool for local development (Chapter 7)
V. Finally, at the end of course, we introduce the themes of **big data** and **algorithmic management**.

Thanks for the attention

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