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From Marshall's external economies to external economies of transformation in contemporary industrial spaces

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This article draws on Marshall's conceptualisation of external economies as expression of collective efficiency within the realms of industrial organisation and development. Marshall found them clearly expressed in the industrial districts (IDs) of his age, being an alternative to the growing importance of corporate efficiency driven by large firms. An extended literature, pivoting around the re-emergence of IDs and other forms of local productive systems since the 1980s, has acknowledged again the role of an evolved generation of external economies of development (EED), to which we refer as Marshallian EED. The article aims, first, to provide an integrated and comparative view of the sources and types of such EED; and, secondly, to propose an extension to tendencies in contemporary industrial spaces, including but not limited to thriving IDs. We see last ones' sources as featured by cross-sectoral, cross-societal, cross-governance, and cross-territorial processes that help manage continuous transformation in the face of contemporary disruptive challenges. We introduce here the concept of Marshallian external economies of transformation. Incessant change does not prevent the relevance of variations rooted in Marshall's heritage.

Key words: Marshall, Industrial districts and new industrial spaces, Disruptive challenges and transformation, External economies of development and transformation
JEL classifications: L2, O14, O33

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"…We may divide the economies arising from an increase in the scale of production of any kind of goods, into two classes - firstly, those dependent on the general development of the industry; and, secondly, those dependent on the resources of the individual houses of business engaged in it, on their organization and the efficiency of their management. We may call the former external economies, and the latter internal economies.

… we now proceed to examine those very important external economies which can often be secured by the concentration of many small businesses of a similar character in particular localities …"

Principles of Economics, Marshall, 1920a [1890], p. 221, emphasis in original.

1. Introduction

We recall, in the epigraph, the well-known passage taken from Book IV of the *Principles of Economics*, where Marshall introduced the concept of external economies (EEs), which he applied both to his theory of value (Book V of the *Principles*[1]) and his foundational interpretations concerning business, industrial organisation and industrial leadership (Book IV and Appendixes of the *Principles*, and in the later *Industry and Trade*).

The 100th anniversary of Marshall's death offers an opportunity to revisit his scholarly contribution and highlight its relevance to understand, analyse and shape solutions to current challenges. In this article, we focus on Marshall's concept of EEs and assess the evolution of their sources and logic as key expressions of place-based collective efficiency. Although somehow already addressed in the scholarly debate on development paths and space, understanding the evolution of the concept may require extending and updating its categorisation. The main novelties of the article are related precisely to such categorising. We trace three generations of EEs from Marshall's initial definition, culminating in the conceptualisation of Marshallian EEs of transformation in contemporary industrial spaces.

We proceed in three steps. Section 2 starts with Marshall's concept of EEs throughout his work and points out their applications to business organisation and industrial leadership, which we will refer to as Marshall's external economies of (industrial) development (or Marshall's EEDs). Here, we do not propose strictly original concepts but highlight relevant elaborations from contributions in the current (neo-) Marshallian literature focussing on industrial organisation and development (e.g. Becattini, 2004; Becattini *et al.*, 2009; Hart, 2009; Bellandi and De Propris, 2017).

Marshall's theoretical thought presented the unusual characteristic of being embodied in actual spatial and organisational forms, specifically industrial districts (IDs) in Great Britain at the peak of the Industrial Revolution. His work drew on observation, and his interest lay in understanding sources of collective efficiency deeply rooted in the market and socio-economic dynamics of IDs and other centres of industrial life. With Table 1 we connect, explicitly and compactly, the sources of the well-known types of EEs (Hart, 2009) with the general features provided by the main dimensions of any model of local development (Bellandi and De Propris, 2017) drawing on Marshall's IDs (Loasby, 2009). It is just an ideal-typical representation that we propose. In Marshall's time, the evolving worlds of production also presented significant concrete differences, and Marshall was famous for his reticence in making clear-cut classifications regarding the applications of his conceptualisations (Becattini, 2003).

[1] Marshall's *Principles of Economics*, 1920a [1890] and *Industry and Trade,* 1920b [1919] are referenced henceforth as '*Principles' and 'Industry and Trade*', respectively.

Marshall's late works reflected on Britain losing economic and social ground against other leading countries at the turn of the twentieth century (Belussi and Caldari, 2009), whilst many manufacturing IDs fell under the lead of restricted oligopolies (Cooke, 2009). The reduction of EEs to externalities in the theory of value and to economies of agglomeration in economic geography in the 1920s went hand in hand with the disappearance of IDs and similar organisational forms from the international scholarly debates for decades (Becattini, 2003; Konzelmann and Wilkinson, 2017).

Section 3 recovers some suggestions by the late Marshall on evolved sources of EEs amid the growing importance of large firms and connects such considerations to the literature that emerged in the 1980s looking at the resurfacing of IDs and new paths of industrialisation in Italy and other countries (Konzelmann and Wilkinson, 2016). With his foundational papers of 1979 and 1990, Becattini (2004, chapters 1 and 2) proposed to see, in the most significant expressions of such paths, an alternative to mass production and vertical integration and the traits of a model that he called the 'Marshallian industrial district' (MID). Related debates and studies started to look at various types of local productive systems and business clusters, as cases of heterarchical and place-based industrial organisation and development based on collective efficiency somehow similar to the ID models (Garofoli, 2002). Original and evolved forms of Marshall's EEDs featured the Marshallian IDs and other types of local productive systems. We refer to them as a different generation of EEs or Marshallian EEDs (MEEDs), to underline that the two concepts present in our view differences that need to be made more explicit. Some authors have pointed out that Marshall's IDs and MIDs have similar roots but are partially different (Markussen, 1996; Cooke, 2009). We would argue that also the sources of EEs in Marshallian EEDs present differences which we discuss and compare in Tables 1 and 2.

Section 4 examines collective efficiency in the current context of disruptive challenges, such as those related to green and digital transitions in firms, where the hybridisation of sources of EEDs leads to a further mutation of the concept that we would call Marshallian external economies of transformation (MEETs). Identifying this new generation of EEs is a conceptual novelty that addresses the need to understand what the source of collective efficiency are in contemporary heterarchical and place-based industrial spaces facing disruptive challenges.

Section 5 concludes with some remarks on policy implications and research perspectives related to our categorisation of external economies of development (EED) and transformation. Indeed, various research programmes could pivot on such categorisation and specifically on the last category, for example, coming back to questions on role and identification of paths of regional specialisation.

2. Marshall's EED

Marshall introduced EEs as a fundamental component for reconciling increasing returns with competition (Hart, 2009). Whilst large firms may enjoy what we could call 'corporate efficiency', the observation of competitive forces in localised industries revealed that increasing returns could relate to a division of labour supported by business specialisation and differentiation, expressing a 'collective efficiency' (Schmitz, 1999) and benefitting small and medium-sized firms (SMEs).

When relating increasing returns with competitive forces, it is usual to raise interpretative problems of externality, monopoly, and multi-sectoral scope (Sraffa, 1926;

Hart, 2009). Such arguments are specifically challenging for a theory of value trying to combine (partial) competitive equilibrium, increasing returns and optimality. Interpretative problems, however, extend to applications to industrial development and economic growth. Many authors in the mid-1900s advocated for the primary role of internal business capabilities in supporting increasing returns as a driving force of industrialisation (see discussion in Hayter, 1997, Ch. 2; Langlois, 2007). Similar implications had already been considered by Marshall when he argued that 'a new tradition is in danger of growing up, to the effect that a small business must be out of place in the new age; for that belongs to large businesses' (Marshall, 1920b [1919], p. 581). Nonetheless, Marshall's interest was also to understand the functioning of a model of industrial organisation and development that could be an alternative to corporate efficiency, being based on what we refer to as Marshall's External Economies of Development (EEDs).

2.1. Nature and dimensions of Marshall's EEDs

Marshall, in Book 4 of the *Principles* and in *Industry and Trade*, explicitly argued that some localised industries based on small specialised firms and featuring what he called IDs represented an alternative to concentrated forms of industrial organisation and development by large firms. This point was already clearly stated in an early publication where Marshall (with his wife, Mary Paley) referred to IDs, even if without the conceptual support of EEs (Marshall and Marshall, 1881 [1879]).

As underlined by Sraffa (1926), the connection between the concepts of EEs and increasing returns in Marshall goes together with the concept of 'particular markets' (e.g. Marshall 1920a [1890], p. 379). One could see the localised division of labour between firms as regulated by 'particular' markets, where the density and specialisation of firms ensured differentiated alternatives and limited the adverse effects of monopolistic positions (Chandra, 2023). Similar remarks would extend to labour relations, especially for skilled workers. At the level of the single firm, business efficiency derives from the combination of internal economies of business specialisation (the opposite of internal economies of scope) and the benefits released by locating in an ID (Schmitz, 1999), as a compact centre of enduring localisation of industry: a 'nation within a nation'. The idea of collective efficiency emerges clearly in his writing: 'The trade of one individual with another is mainly of private concern: while the causes which enable large quantities of anything to be made for foreign sale at a profit, generally lie deep down in resources and faculties that are not wholly individual, but are in great part the collective property of a nation as a whole' (Marshall, 1920b [1919], p.4). The industrial leadership of the IDs in national and international markets depends not just on the separate contributions of individual firms but also on their integration within a localised industry and across complementary localised industries (Loasby, 2009).

Therefore, Marshall's EEDs draw on sources of increasing returns coming from the integration of differentiated business and producers' specialisations, together with specific contributions by other locally embedded social and political organisations and actors (Cooke 2009, p. 297). This localised integration can be considered as an alternative to the corporate vertical integration of increasing returns, and rests on organisational mechanisms that support, complement and substitute for particular markets (Cooke, 2009). Some are undeliberate mechanisms, such as customs and conventions complementary to local markets, bringing about a local industrial organisation referred in the literature as the 'communitarian market' (Dei Ottati, 1994). Equally,

deliberate mechanisms, such as private consent within networks of specialised firms and joint private or public–private actions, also contribute to the collective functioning of the localised industry (Hart, 2009). It is worth mentioning that undeliberate and deliberate mechanisms of collective efficiency can only be separated for analytical purposes (Schmitz, 1999).

We take from the discussion above that the sources of EEs combine deliberate and undeliberate mechanisms, and they can be identified under four dimensions underpinning models of local development (Bellandi and De Propris, 2017): (i) the specificities of the local industrial organisation, (ii) the sociocultural embeddedness, (iii) the joint public–private action and (iv) the Smithian concern with the extent of the market (Chandra, 2023).

2.2. Industrial districts

Marshall referred to IDs in his early writings and the concept is already present in the first edition of the *Principles*. They were typical of the proto-industrialisation and the first industrialisation waves in the nineteenth Century (Cooke, 2009). They were compact centres of industrial life, usually corresponding to small regions (e.g. counties) outside the larger cities in the UK and, later, in other industrialising countries of the time like Germany, France and the USA (Sabel and Zeitlin, 1997; Carnevali, 2007; Popp and Wilson, 2007; Belussi and Caldari, 2009; Maitte, 2009). Their general features presented peculiar expressions of the four dimensions of models of local development (Bellandi and De Propris, 2017):

1. A local industrial organisation hosting a simple but increasing multiplicity of nuclei of productive know-how and technology and a related division of labour among specialised firms within one or few related industries;
2. A sociocultural embeddedness of the industry in a place supported by local communitarian ties that had traditional and quite widespread roots outside the larger cities;
3. A good level of public and private initiatives of joint action (e.g., by guilds, workers' unions, entrepreneurs' and innovators' societies);
4. The presence of connections beyond the ID allowing imports of raw materials, export of manufactured products and immigration flows of skilled workers.

As Loasby (2009) pointed out, Marshall found in IDs explicit expressions of forces of differentiation, integration, and collective efficiency in industrial organisations and development, which nonetheless had broader fields of application at various territorial scales (Bellandi, 2011).

2.3. The sources of Marshall's EEDs

Referring to the IDs he was observing, Marshall (1920a [1890], pp. 225–227, 1920b [1919], pp. 286–287) identified three types of EEDs (e.g. Robinson, 1958; Bellandi, 1989; Hart, 2009):

1. The **economies of the division of labour between firms** represent an alternative to the efficient organisation and use of an extended internal division of labour by a large firm. They are achieved by sets of complementary smaller firms able to share or exchange the services of a large pool of workers and technical capital with specialised capacities.

2. The **economies of development of specialised skills** rest on the close collaboration between entrepreneurs and their skilled employees. Outside the firm, a systemic 'industrial atmosphere' favours access to knowledge and information, the 'mysteries' of the localised industry, through business and social relations and vocational/professional schooling.
3. The **economies of collective innovation** are based on free competition within evolving groups of 'particular markets'; on learning-by-experience; on the circulation of ideas among firms with differentiated and complementary competencies; on joint initiatives about the diffusion of the embedded technological and innovation culture; and, finally, on the attraction of migrant entrepreneurs.

Each type suggests a specific outcome and a related set of sources. In Table 1, we present a novel systematisation of Marshall's EEs sources, which intersects the three main types of Marshall's EEDs with the four dimensions of models of local development.

Even if Marshall's EEDs reflect the effects of geographical proximity, they are not, strictly speaking, economies of agglomeration, because spatial agglomeration is at most a supportive condition for them. They are the outcome of the reproductive territorial overlap between a cluster of firms and a community of people. As Marshall (1920a [1890], p. 225) claimed, an industrial atmosphere is 'hard to move'. Space and time combine in the history of places, according to Marshall's evolutionary approach to progress (Caldari, 2006). He found clear illustrations of such combination in IDs that are 'reasonably stable over time' (Marshall, 1920b [1919], p. 286–287), and in general in localised circles of economic and sociocultural relations feeding increasing returns and collective efficiency: 'If the local spirit of any place ran high: if those born in it would rather stay there than migrate to another place: if most of the capital employed in the industries of the place were accumulated from those industries, and nearly all

Table 1. *Sources of Marshall's EEDs*

MLD ***Types of economies***	Local industrial organisation	Sociocultural embeddedness	Public and private collective action	Multi-territorial networks
Division of labour between firms	Substitutive and complementary small and artisan firms within localised industries	Local self-help, reinvestment of profits in the accumulation of local capitals	Support to territorial infrastructure needed by the industry	Specialised skills and logistics for trade with external markets
Development of specialised skills	Direct relations between entrepreneurs and skilled blue collars	Industrial atmosphere for new skilled workers and entrepreneurs	Some social services to workers' families	Attraction of migrant skilled and unskilled workers
Collective innovation	Free competition within evolving clusters of particular markets	Circulation of ideas among entrepreneurs and innovators	Promotion and access to trade fairs and technological institutes	Attraction of migrant entrepreneurs and innovators

Source: Elaborated by the authors.
Note: MLD Ideal-typical dimensions of Models of Local Development.

the income enjoyed in it were derived from its own resources:... Then the people of such a place would be a **nation within a nation**' (Marshall, 1920b [1919], p. 20, emphasis added). Using today's terminology (Barca *et al.*, 2012), one could argue that Marshall's EEDs express 'place-based' collective efficiency or collective efficiency on place-based foundations.

3. Marshallian EEDs in the twentieth century

The evolutive path of the division of labour in Marshall's IDs, through specialisation and differentiation, was marked by a constant change in the organisation and dynamics of production. Such change was usually organic, i.e. following path dependency and incremental innovation. However, the context changed at the turn of the twentieth century. After a century of British industrial leadership, the USA's leading role in new industrial processes and business models emerged, along with progress in Germany and France. These changes were driven by what Perez (2010, p. 190) identified as a 'Third Technological Revolution' starting in in the last quarter of the nineteenth century, and featuring an 'age of steel, electricity, and heavy engineering', and a 'Fourth Technological Revolution', from the first decade of the twentieth century, featuring an 'age of oil, the automobile and mass production'.

Such shifts brought Marshall to reconsider both the relations between large and small firms in industrial development and, related to that, what other sources of collective efficiency could have worked in an age that saw the declining importance of EEDs and IDs as a dominant organisational form (Belussi and Caldari, 2009). Such considerations were later recovered by parts of the literature that flourished from the 1980s on IDs re-emerging after the golden age of mass production. These points are expanded in the next subsections.

3.1. Large and small firms

Marshall incorporated the impacts of the tendencies just recalled in the latest editions of the *Principles* (Whitaker, 2003, pp. 149–153), which overlapped with the incubation and later writing-up of *Industry and Trade*. Technological change led to new forms of organisation characterised by mass production, mass marketing, standardisation, scientific management, the application of science to industry, the emergence of heavy industries and progress in transports, the growing diffusion of international financial instruments and lastly, the rise of giant joint-stock companies, trusts and cartels (Whitaker, 2003, pp. 147–152). The growing importance of large and vertically integrated firms went together with increasing corporate efficiency led by internal economies of scale (and scope). Marshall dealt with internal economies in Chapters XI and XII of Book IV of the *Principles,* and in *Industry and Trade*.

The dominant interpretation at the time was a progressive reduction in the importance of IDs and small firms (Becattini, 2003, p. 22). To Marshall, things were more complex than that, as ever (Konzelmann and Wilkinson, 2017, pp. 8–9). As recalled by Whitaker (2003, pp. 152–153), Marshall remained persuaded that there were still competitive spaces for small firms and for new entrepreneurs emerging from the ranks of the working class. This had to do with the impact of some general

progress in technology (e.g. electric machinery implied a larger divisibility of production processes in many sectors, and diffusion of technical standards had similar effects), communication (e.g. the progress in technical press made information on innovations more accessible), marketing (e.g. the standardisation of differentiated small scale productions created market niches), and education (e.g. a larger portion of the labour force with technical and management skills could support small entrepreneurship).

3.2. Evolved sources and fields of Marshall's EEDs

In *Industry and Trade*, Marshall (1920b [1919]) hinted to EEs being an evolving concept and offered some clues on how and where IDs could thrive under the new tendencies:

(a) in niche markets of 'light products' (*ibid.*, p. xv and pp. 286–287);
(b) with more robust support of 'associated action' aimed at 'constructive cooperation' at various territorial scales by business associations, consortia, chambers of commerce, and other collective bodies providing smaller firms access to high-scale services (*ibid.*, Book III, Ch 12);
(c) in conjunction with cross-local complementarities, specifically within integrated multi-sectoral 'industrial regions' (*ibid.*, 1920b [1919], p. 601).

Firstly, pointing to niche markets of either luxury products for elites or highly specialised professional tools, Marshall claimed that populations of SMEs could thrive in markets not dominated by the economies of mass production and mass marketing. He also saw the expansion of such opportunities in the differentiated needs and increasing buying power of the working classes. This suggests that spaces of place-based collective efficiency could be related, even in the rising age of mass production, to an industrial organisation able to manage sets of differentiated particular markets. As an example, we recall that the aggressive US competition with mass production in watches forced the Swiss watch district to shift from being a cottage industry to a larger scale featuring greater efficiency combined with their traditional 'attention to details and style' (Glasmeier, 1991, p. 471).

Secondly, Marshall focussed on the public hand and joint action. More robust sets of specific public goods should rest on higher deliberateness within small firms and in joint action at the ID and upper levels, allowing for more effective coordination of allocations and adjustments in collective resources. In some recent research referring to British IDs at the end of the nineteenth century, the role of governance and the ability to coordinate agency has been argued to matter significantly across Midlands districts, such as Coventry, Sheffield or Manchester (Popp and Wilson, 2007). Good agency helped the Birmingham Jewellery Quarter (a sort of ID embedded in a large urban area) to address the entry of new competitors in the market (De Propris and Lazzeretti, 2006). Instead, in a typical Marshall's ID, such as the Potteries in Staffordshire, the tight-knit business and social relations failed to translate into collective actions, leading to an inability to overcome common challenges (Hervas-Oliver *et al.*, 2011; Tomlinson and Braston, 2014). Recent research concerning historical districts in countries like France or Italy raises similar remarks (e.g. Maitte, 2009).

Finally, the third clue concerns Marshall's idea of districts as being 'a nation within a nation'. This suggests that the circular processes of increasing collective efficiency with the accumulation of private and public capital that characterise compact centres

of industrial life, such as IDs, are also nested across territorial scales, i.e. regional and national (Bellandi, 2011). Drawing on this, E.A.G. Robinson, one of Marshall's main disciples, proposed a distinction between 'immobile' and 'mobile' EEs (Robinson, 1958, p. 124). One may recall again the Birmingham Jewellery Quarter at Marshall's time or the industrial region of Lancashire, to which Marshall referred explicitly, with its many textile districts around Manchester, which allowed extended economies in manufacturing and trade. The Midlands, with its mechanical and engineering districts around Coventry and Birmingham, also supported path transition, as was with the West Midlands Black Country areas from coal mining to metalworking, transport industries and, later, automotive (Rees, 1946). Beyond Britain, studies have identified similar historical patterns, such as in the Providence Jewellery cluster in the USA (Carnevali, 2007).

3.3. Marshallian EEDs

Marshall's EEDs and IDs provided a conceptual support to the literature that developed from the 1980s on resurgent local productive systems and IDs together with debates on alternatives to mass production and Fordism (Piore and Sabel, 1984). Becattini (2004) (including his seminal papers of 1979 and 1990) refers to 'Marshallian industrial districts' (MIDs) as the theoretical and practical core of his analysis, drawing on the observation of paths of 'light' industrialisation in Tuscany, thanks to the presence of localised industries that resembled those Marshall wrote about. These contributions intersected with studies on new paths of diffused industrialisation that were emerging in other Italian regions (Trigilia, 1989; Fuà, 1991; Brusco, 1992), as well as in other regions across Europe and around the world (Storper and Scott, 1992; Garofoli, 2002). MIDs contrasted with large urban systems and industrial poles of large firms typical of the golden age of mass production (Perroux, 1970), driven by corporate business cultures, shareholders' financial interests, extended monopolistic power and bringing about fractured social relations and place-blind localisation choices (Cowling and Tomlinson, 2011; Barca *et al.*, 2012).

Becattini (2004) tied EEs in MIDs to a highly developed local industrial organisation combining specialised SMEs with cultural proximity and openness to competition in national and international markets featuring highly differentiated and variable demand. The flexible use of highly differentiated human resources and skills distributed across the pool of specialised firms and the complexification of inter-firm relations of collaboration and competition was supported by specialised mediators or brokers, also promoting the versatile integrations of different knowledge bases for innovation and quality upgrading. The organisational and cultural proximity of businesses, cemented by the communitarian sociocultural embeddedness of economic activity and the local political traditions of social progress (either from Catholic or socialist premises), helped trust-based contracts, firms developing around life projects and innovators enjoying social pride for their creativity and market success (Trigilia, 1989; Dei Ottati, 1994; Becattini, 2004). MIDs and similar types of local productive systems exemplified a model of capitalism where the cultural heritage of a local community and its industrial identity contributed to creating the capability to develop collective efficiency and an auto-reproductive localised division of labour (Sforzi, 2015).

These sources of EEDs expand Marshall's original conceptualisation by explicitly considering the production worlds of light and differentiated products against the

market and technological power of large firms, which was indeed one of the routes that the late Marshall suggested to achieve a competitive advantage and collective efficiency in niche markets alternative to mass production. We would refer to these evolved forms of Marshall's original EEDs with a specific term, or Marshallian EEDs (MEEDs), considering the association with the MID.

Indeed, we recall important scholarly contributions that elaborated on the other evolved sources of EEs suggested by the late Marshall. Brusco (1992), Markusen (1996) and Schmitz (1999) stressed the increasing importance of deliberate joint action on collective ('real') services, like the provision of standards and professional education, governance of essential technological facilities and innovation centres, as well as provision of social services for out-of-work well-being. Such collective services were meant to complement local markets with highly specialised and specific public goods supported by deliberate concerted actions (Bellandi, 2011). Fuà (1991) also underlined the benefits of promoting the growth of managerial skills and culture in SMEs as a way to develop their organisational strength.

The third evolved source of MEEDs is concerned with cross-territorial networks. Cooke (2001) saw successful regional innovation systems tightly connected with successful IDs and clusters, whilst Dunford (2006) referred to the 'magic circles' of complementarities across some of Italy's IDs, and between them and nearby cities of culture and high-quality services like Milan and Florence, as key in the contemporary international success of made in Italy fashion (see Trullén, 2015, for an application to the Barcelona area).

We summarise the main sources of MEEDs in Table 2, which originally expands on Table 1 by framing the sources of Marshallian EEDs recalled just above within

Table 2. *Sources of Marshallian EEDs in Marshallian IDs*

MLD ***Types of economies***	Local industrial organisation	Sociocultural embeddedness	Public and private collective action	Multi-territorial networks
Division of labour between firms	Original sources *plus* flexible specialisation for light products and specialised SMEs	Original sources *plus* differential role of local trust-based contracts	Original sources *plus* joint action for standards and essential facilities in local market	Original sources *plus* clusters of specialised IDs and central cities in industrial regions
Development of skills	Original sources *plus* specialised spinout from local firms	Original sources *plus* local firms as life projects	Original sources *plus* joint action for professional schools and local social services	Original sources *plus* talent attraction and mobility within industrial regions
Collective Innovation	Original sources *plus* versatile integration of multiple know-hows in business networks.	Original sources *plus* local pride as reward of local innovations	Original sources *plus* joint action for specialised local innovation centres	Original sources *plus* trade centres and knowledge pipelines

Source: Elaborated by the authors.
Note: MLD Ideal-typical dimensions of Models of Local Development.

again the matrix that crosses the EE types with the four dimensions of models of local development.

The competitive advantages of business clusters, as envisaged by Porter (1990), the economies of local 'production' systems envisaged by the French literature (Courlet and Pecqueur, 1992; Courlet, 2001), or these of the 'hub-and-spoke' districts (Markusen, 1996) and of innovative milieux (Camagni and Maillat, 1995), intersected with some of the MEEDs sources with an important role played by larger firms and leading entrepreneurs. The combination of collective and corporate efficiency logic remained, however, quite implicit, if not marked by the subservience of the first to the second.

4. Marshallian EEs of transformation

In the 1990s, with the fall of the Soviet block and the emerging Washington Consensus, neo-Fordist and neo-technocratic models, epitomised by multinational corporations, found efficiency and competitive advantages in new sources of cheap production factors in the Global South. The early 2000s saw the continuous rise of China and other new industrialising countries thanks to dirigiste industrial and mercantilist policies liaising with the increasing presence of global value chains in many industries (Cowling and Tomlinson, 2011). Some of the new centres of manufacturing production organisation adopted ID-like models (Lu and Ganne, 2009). The global manufacturing shift that took place hollowed out extensive parts of the manufacturing capacity in Western economies (Tregenna, 2014), while knowledge-intensive activities were expanding the control functions of global value chains and science and digital-based clusters. Meanwhile, the increasing mobility of people and information challenged local socio-cultural embeddedness and identity in many mature local productive systems.

Since the 2008 Global Financial Crisis, the pace of globalisation has started to slow down, also battered by other severe shocks, like Brexit, the Covid pandemic, the Russian invasion of Ukraine and climate change. Tendencies such as reshoring, friend-shoring, near-shoring or de-risking have started to emerge, with increasing evidence of the value of recoupling production activities with innovation processes and local demand (Buciuni and Pisano, 2018; Pegoraro *et al.*, 2021). Meanwhile, we observe a shift in the techno-economic paradigm driven by an acceleration in the adoption of digital and green technologies (Bailey *et al.*, 2018; De Propris and Bailey, 2020).

All forms of local productive systems have again been challenged to adapt. Specifically, the unfolding shocks call for more than just a pure organic evolution of models of local development (Bellandi *et al.*, 2019), as Sabel (2002) had already suggested looking at changes in structures and strategies of old and new IDs in advanced countries at the beginning of the 2000s. One wonders if such technological and societal disruptions are allowing place-based collective efficiency to emerge in industrial spaces populated by adapted forms of heterarchical and place-based industrial organisation and development, evolving IDs included. The next subsections introduce the concept of new industrial spaces and a new generation of EEs.

4.1. New industrial spaces

The more forward-looking chapters of Becattini *et al.* (2009) introduced conceptualisations of new industrial spaces of place-based collective efficiency, including evolving

IDs. Iammarino and McCann (2006) and Belussi and De Propris (2013) proposed similar variations referring to 'new social network systems' and new forms of IDs. Bellandi and De Propris (2017) proposed the concept of 'IDs Mark 3' as a third generation of IDs (after the Marshall's and the Marshallian IDs of the 1990s), combining place-based sociocultural embeddedness with cross-local learning and innovation processes and open and robust place-leaderships to support technological transitions. Porter and Kramer (2011) suggested the possibility of clusters led by larger firms' anchored strategies in creating 'shared value', which is a possible evolution in hub-and-spoke districts (Markusen, 1996) towards inserting or recovering hybridisation with collective efficiency. Finally, Katz and Wagner (2014), referring to cases of 'innovation districts' and Jacobsen (2006) referring to eco-industrial parks based on 'industrial symbiosis', suggested that zones of industrial and urban regeneration related to projects of circular economy and digitalisation can become magnets for sociocultural development and skill pooling within the polycentric structure of large cities (Chertow and Ehrenfeld, 2012).

These new industrial spaces feature a high heterogeneity of business models within the local industrial organisation, more complex learning and innovation processes, variable channels of participation in global value chains, continuous renewal of the skill base, flexible combinations of collective action for the provision of specific public goods and a further strengthening of the role of a deliberate organisation of proximity effects, the so-called 'organised proximity' (Torre, 2008). The nature and the driving forces of such new industrial spaces allow businesses to adjust and thrive in a technologically fast-moving market. Here, EEs are likely to look quite different from what was observed before.

4.2. Trespassing boundaries and sources of Marshallian EEs of transformation

We argue that local business agents and communities in new industrial spaces of collective efficiency benefit from forms of EEs that we call Marshallian EEs of Transformation or MEETs. They still reflect a Marshall's descendancy. Nonetheless, their sources extend to relations that trespass systematically the sectoral, societal, governance and geographical boundaries that feature in the four dimensions of local development models associated with Marshall's and Marshallian EEDs. Trespassing traditional boundaries in sources of efficiency is key for any process of innovation and structural change, but at times of mature technology, when innovation is predominantly incremental, trespassing as well does not need to have a considerable span and rate of progress within and across the dimensions of local development's models. Instead, MEETs accommodate a flow of firm-based and system-wide transformations, i.e. non-incremental changes, within the new industrial spaces, e.g. in their digital-based and greening processes, driven by overarching disrupting global challenges. The need for transformation becomes the new normal, and MEETs contribute to preserving and improving collective efficiency and well-being more than development as such, at least in advanced post-industrial regions and countries. In what follows below, we propose to identify trespassing sources as cross-sectoral, cross-societal, cross-governance and cross-territorial.

4.2.1 Cross-sectoral sources. The pervasive disruption brought by the current digital and green revolutions forces all industries to a change that marginal adjustments

cannot address (De Propris and Bellandi, 2021). They inevitably alter the organisation of production inside the firm and between firms, along the value chain and across sectors, with greater relevance of specific knowledge sets linked to digital and green technologies, which are in most cases distant from the knowledge sets of traditional manufacturing specialisations. Much of the literature on Industry 4.0 has indeed praised an efficiency-driven technocratic rationale, advocating for natural monopolies due to large internal economies of network, scale and standardisation. This argument risks justifying both the market dominance of 'big tech' and energy companies and any abuse of such market power (Bianchi and Labory, 2022).

A different stream of contributions has started to voice concerns over the social impact of such structural change—see for instance, the emerging literature on just transitions (Bianchi *et al.*, 2024). Along this line, De Propris and Bailey (2020) envisage the possibility of an Industry 4.0 *plus* model, whereby new technologies are deployed to the service of a significant mobilisation of labour and entrepreneurial energies, good jobs and attention to environmental sustainability. More recently, this has been associated with concepts such as Industry 5.0 and Society 5.0 (EC, 2021).

At the core of these alternatives are hybridised sources of place-based collective efficiency that stem from the cross-sectoral dimension of local industrial organisation of contemporary industrial spaces. Digital technologies applied to production (e.g. cyber-physical systems, internet-of-things, digital twins, artificial intelligence) can be deployed to enable smart micro-manufacturing production plants or digital neo-makers that combine craftsmanship with digital know-how: these meet highly customised demand with extremely versatile solutions on top of complementary frames of automated production and trade flows (De Propris and Bellandi, 2021). Pervasive processes of dematerialisation have dovetailed the 'making of things' with knowledge-intensive competences. What is new, with respect to traditional Marshallian IDs, is not the increasing presence of services within the complementary pools of specialisations of IDs but the blended intertwining of manufacturing and services all along the value chain, the so-called territorial servitisation (Lafuente *et al.*, 2017).

In the 1980s, with the purpose of promoting a circular economy, the concept of industrial ecosystems (Frosch and Gallopoulos, 1989) emerged as a form of localised industry that mimicked how natural ecosystems operate. The Kalundborg eco-industrial park (Denmark) has been emblematic of a strategy of 'industrial symbiosis' exchanges (Ehrenfeld and Gertler, 1997) whereby companies from various sectors work together to share resources. Thermal waste from a power plant is used to heat a fish farm, and organic waste from the fish farm is used as fertiliser on nearby vegetable farms (Jacobsen, 2006). Equally, the technology is ready for the production and consumption of energy (e.g. solar and wind energy or geo-thermal) to be capillary at the level of the place or building, empowering individuals and firms to control costs and achieve energy security. The novel notion of 'territorialised circular ecosystems' (Bourdin and Torre, 2024) allows understanding of how circular economies can be developed at a territorial level by leveraging local actors, institutions, policies, and practices to optimize resource flows, reduce waste, and collaborate around eco-industrial values.

The crucial point here is that cross-sectoral relationships inspire applications beyond the specific cases or the gates of industrial symbiosis parks and energy communities (Desrochers, 2004; Veyssière *et al.*, 2022). For example, in an ID, the productive activities not related to the main local specialisation could become a source of value in cross-sectoral business collaborations on resource use and saving, but also on skill,

technology, and product development. Cerceau *et al.* (2018) point out the territorialisation of 'industrial ecology' (optimisation and sustainability flows and stocks of material and immaterial resources within a multi-level system) looking at 'eco-sites' (e.g. industrial parks, port areas), 'eco-regions' (e.g. metropolitan areas including a set of local systems enjoying structured senses of belonging), and 'eco-networks' (i.e. collaborations between organisations of eco-sites of different places within the eco-region, also related to broader flows). The examples of the city of Dunkirk or the metropole of Aix-Marseille suggest that eco-sites could be used as basic units of planning, in which projects of industrial ecology have the objective 'to create ecosystems of skills or activities, small cells or small solutions which, if multiplied, could actually make sense' (*ibid.*, p. 38).

4.2.2 Cross-societal sources. Sociocultural embeddedness is needed for place-based collective efficiency, laying the ground for trust, personal relationships and a shared sense of belonging. Nonetheless, we argue it needs to be augmented by what we define as cross-societal relations, involving a more diverse matrix of partners, actors and institutions activated by communities of competence and social media. Greater scope for large and small firms' collaborations allows novel forms of exploration and experimentation phases of innovation. New combinations of formal linkages and informal networks of knowledge sharing are activated in co-working spaces, makers spaces and fab labs or through cross-stakeholder education-work programmes. For example, the city of Barcelona has developed a network of nearly 300 co-working spaces, which relies on super-fast WiFi, affordable public transport and reasonable prices to accommodate a large population of professionals and citizens (Coll-Martínez and Méndez-Ortega, 2020).

The conservation of local resources and the reduction of environmental impacts by minimising transport distances and by recovering local waste as a resource recalled above is supported not only by cross-sectoral geographical proximity but also by co-ordination and trust between participants able and willing to identify circular solutions for local development and transformation (Jambou *et al.*, 2022; Niang *et al.*, 2022). Cross-societal sources can be activated by a convergence of interests between businesses and social actors, so much so that they hybridise their strategies (Cooke, 2015), like in cases where the circuits of energy, heating networks and waste management are enlarged thanks to relations between the local production and civic society (Cerceau *et al.*, 2018), and to the emergence of new skills and productive know-how based on technical education and learning by living the territory and its local natural environment (Veyssière *et al.*, 2022).

4.2.3 Cross-governance sources. Industrial spaces need more than ever a competent territorial and multi-level governance (Torre 2019, 2023), whereby specific public goods support actors' participation in evolving value chains (Crescenzi and Harman, 2023) and the transition to new configurations of division of labour and business models that are capable of delivering socially fair and sustainable outcomes (De Propris and Bailey, 2020; Bianchi *et al.*, 2024). They go beyond the joint action sources of evolved MEEDs, which were characterised by separate, although well-coordinated offers, of 'real services' that interested activities within-the-work or in the community (Brusco, 1992).

In contemporary industrial spaces, the public and private collective action dimension is defined by a fluidity of multi-scale governance mixes, where open place-leaderships and experimental learning support brokering and hybridisation of institutional, scientific, production, societal, and environmental knowledge that also develop at regional,

national and international levels (Sotarauta and Beer, 2021). Local collective initiatives target needs of transformation within the localised industries, providing facilities and services dedicated to training and upskilling with the help of networks of cross-regional education institutions, as well as specific local infrastructure for technology transfer, innovation adoption and proof-of-concept operated by cross-sectoral and cross-disciplinary intermediaries and integrators (Buciuni and Pisano, 2018). To exploit education upgrading, training, and skilling, as well as research and technological adoption, and to involve local populations in the current process of changes requires an 'organised proximity' in the collaboration processes as a standard governance method (Torre, 2008).

An example is the Motorvehicle University of Emilia Romagna (Italy), which connects, with the support of a regional policy oriented to industrial development and transformation, four regional universities and the businesses of the Motor Valley (centred on the local productive system of Modena and extending to other areas and IDs of the region), for high-level training and skill upgrading (Bianchi *et al.*, 2024).

4.2.4 Cross-territorial sources and digitisation. Contemporary industrial spaces are wired in multi-territorial networks that integrate their local development paths, sometimes within large cities, themselves plugged into global networks. The spatial continuum between urban and sub-urban spaces will likely become more prevalent as inter-sectoral activities combine functional and geographical proximity. The constant search for external connections, coupled with the eagerness to anchor transnational business and competences, place new industrial spaces in a continuum of local and global scales with all its trade-offs. Industrial zones or eco-parks and eco-sites (see above) move from a place-blind and technocratic logic to become more like small cities within larger cities (Pomponi and Moncaster, 2017). Place-based sources of economies of the division of labour are reaffirmed again in dense cross-territorial production, urban and governance networks. Innovation and technological adoption processes have become systematically multi-territorial, thanks to digital platforms, social media and artificial intelligence. Such technologies enable small producers to access international networks of designers, customers and suppliers and allow a distributed realisation of prototypes and the hybridisation of knowledge and expertise in partnerships across sectors and territories (Cooke, 2015). Equally, larger firms strengthen their open innovation strategies by anchoring in industrial spaces with specific and advanced competences in unrelated domains to absorb knowledge from local innovative actors (either highly innovative firms or high-tech giants). For example, the launch of smart wearable devices hit the Swiss watch-making cluster in the Jura Valley. The convergence of a range of digital technologies has transformed watches into 'computers on the wrist'. Swiss watch makers lacked however the necessary digital competences. So, they looked outwards and connected with Silicon Valley-based tech firms to fill the gaps: Tag Heuer, for instance, started collaborating with Google for software and Intel for hardware (Moon and Sprott, 2016).

Table 3 summarises the sources of MEETs by crossing the three types of EES with the four dimensions of trespassing.

5. Conclusions

While Marshall's work is still the subject of sustained attention 100 years after his death, in this article, our interest lies in the actuality of his contribution concerning collective

Table 3. *Sources of Marshallian EEs of transformation in new industrial spaces*

MLD ***Types of economies***	Local industrial organisation ***Cross-sectoral***	Sociocultural embeddedness ***Cross-societal***	Public and private collective action ***Cross-governance***	**Multi-territorial networks** ***Cross-territorial***
Division of labour between firms	Place-based servitisation of manufacturing and digital transition. Green and circular economy-related services, expanding opportunities of industrial symbiosis etc.	Social relations supporting cross-business collaborations (e.g. neo-makers ventures and spinouts)	Fluid territorial governance, open place-leadership, experimental learning and organised proximity as a new normal to support collaborations between firms and with other civic, public and private actors in new division of labour	Integration of industrial spaces within large cities and regions plugged in global networks
Development of skills	Provision of training services and upskilling by cross-sectoral business networks	Continuity education-work programs within apprentices, internships, traineeships	Collective facilities for training and upskilling supported by cross-territorial educational institutions	Multi-territorial education upgrading
Collective innovation	Productive activities not related to the main local specialisation become a source of knowledge for innovation in cross-sectoral business collaborations on resource use and saving, but also on skill, technology and product development	Communities of competence in knowledge-intensive services, networks of co-working spaces, neo-makers and fab labs, joint action between business and residentiary actors for sustainability enable creative dialogues within a matrix of different societal actors	Cross-discipline and cross-sectoral intermediaries and integrators operate specific local infrastructure for technology transfer, innovation adoption and proof-of-concept.	Small producers access international networks of designers, customers and suppliers, allowing a distributed realisation of prototypes and the hybridisation of knowledge and expertise in partnerships across sectors and territories

Source: Elaborated by the authors.
Note: MLD Ideal-typical dimensions of Models of Local Development.

efficiency. We argued that Marshall's External Economies of (industrial) Development (EEDs) are the basis for concepts and analyses on the sources of collective efficiency in old and new industrial spaces, such as different forms of IDs evolving from those observed by Marshall to the contemporary worlds of production. We presented a novel systematisation of EEs' sources throughout an integrated and original set of comparable conceptual frameworks exposed in Tables 1, 2, 3. Those frameworks allowed us to trace both continuities and variations in what we proposed as three generations of EEs: from Marshall's original EEDs to the Marshallian EEDs (MEEDs) associated with the local productive systems and the Marshallian IDs of the second half of the twentieth century (MEEDs), to finally the MEETs observed in contemporary new industrial spaces navigating persistently troubled water. MEEDs and MEETs still reflect Marshall's origin in the conceptualisation of EEs because their sources all pivot around place-based processes of differentiation and integration in industrial organisation and development. Identifying the sources of MEEDs and MEETs allows researchers and policymakers to articulate their understanding of the complex dynamics driving collective efficiency and what windows of opportunity they might open in comparison to worlds of production dominated by corporate efficiency, social and geographical polarisation and monopolistic power.

Concerning MEETs specifically, we pointed out that current disruptive challenges, pushing green and digital innovations, are redefining relationships between global and local scales and impose processes of continuous transformation as a new normal for thriving heterarchical and place-based industrial spaces, including contemporary IDs. Underlining its possible transformational purpose, we introduced a new understanding of collective efficiency in processes that feature discontinuity and transition more than the progressive accumulation of resources, larger division of labour and extending markets along regular processes of development. This is what MEETs are about and why their sources rest on sectoral, societal, governance and geographical boundaries being trespassed.

Transformation policies in advanced and industrialising economies and regions can be drawn precisely from the vantage point of MEETs. In the face of the current challenges and conflicts, especially in relation to green and digital transitions, we have no doubts of an increasing centrality of what Schmitz (1999) referred to as a mixed joint action between private and public actors, and Torre (2023) as territorial governance. They express today as deliberately focussing on fluid and trespassing forms of support and enactment of collective efficiency in new industrial spaces and paths of local transformation. However, as Becattini (2003) would have remarked, considering the core of Marshall's view of social and economic progress, any such advancement in organisational methodologies, technological solutions and related competencies for collective efficiency cannot substitute for or dispense with the engine represented by the mobilisation of energies and the aspirations for a better life of the working people and civic society with their cultural heritage and their communities. These energies, heritages and social ties are still broadly place-based, and when aligned with a vision of some basic common good, they might enable transformative and resilient place-based expressions of a more deliberate collective efficiency in new industrial spaces.

The categorisation of EEs proposed in this article leaves the door open for further research opportunities that engage related disciplines such as, for example, economic history to expand on the specificities of the three generations of EEs in various historical contexts. Equally, further research could assess merits and criticalities of the proposed EEs categorisation within industrial economic debates concerned with firm

efficiency, territorial performance (e.g. productivity), and social welfare. Opportunities for further research might enrich the debate with empirical case studies of MEETs that renew arguments in favour of the contents and effects of specialisation in regional development (Bathelt and Storper, 2023). Cross-sectoral relations and trespassing do not contradict the importance of regional specialisation. However, specialisation should be understood as a context-dependent and evolving collection of know-how (Bellandi *et al.*, 2019) characterising an industrial space that relates with different specialisations across constantly changing multi-territorial networks. Finally, methodologically, further research could shed light on the spatial identification of new industrial spaces using new data management methods with data analytics and big data.

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