
The Richness of the Training Spillover: When the In-Company and Interfirm Training Systems Get Married

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Abstract

The article focuses on the question: can you create a successful training system between companies geographically close to each other? The topics are: the possibility of a training system within companies (or "intrafirm" training); the positive impact on the performance of training derived from geographical proximity; the nature of the interfirm training group; the role of foreign and multinational companies; and finally the role of training providers. The article looks in depth at training knowledge spillover, the returns on this activity in terms of the cultivation of skills and other measurable factors, and the importance of such elements as the costs involved.

Keywords: *TVET, Technical and Vocational Education and Training, In-company Training, Training Complementarity and Appropriability, Training System Evolution, Training Cluster, Developing Countries, International Companies, Training Providers, Skills and Training Spillovers, Return on Investment in Training.*

1. Introduction

Training in itself is generally not characterised by such constrained means of appropriability as secrecy, patents, continuous ground-breaking innovation and the dominance of complementary assets, as described in similar contexts by Su *et al.* (2013); rather it is eminently discoverable, available, transferable, adaptable and updatable. No matter what the

general firm capabilities and on-site circumstances might be, ideally there should exist a recognised minimum level, content variety and amenable source of the required skills development. If done well and conditions are favourable, skills formation can be built up in stages, leading to increasing returns if carried out continuously and adapted to specific firm-level needs (Hage *et al.* (2013), Anadon *et al.* (2016)).

We can look at this further at the level of the firm, sectoral and non-sectoral cluster. Even if the training system within the firm is well-developed but focused towards in-house needs and practices, it might still possess a high level of appropriability, particularly if its accumulated constituent components are not diffused but are amenable to this. At the same time, some amount of diffusion might have advantages especially if competitive implications are not strong. At the broader interfirm and sectoral levels, if the shared training is extensive and well-endowed, then this indicates that widespread externalities exist: that interactive and diffusion activities – perhaps within selective limits based on competitive fears (Groenewegen and van der Steen, 2006) – would appear to be normal practice. Finally, looking beyond sectoral limits but still at the local level, the existence of a well-developed skills formation regime suggests that diverse local firms and institutions have separately and/or in partnership accumulated training capabilities in a network of localised training externalities.

On this subject of appropriability, the fact that the training knowledge is sourced internally within the industry should mean that it has reduced obstacles to and costs of access, on condition that the accessing firm is sufficiently competent to locate and use the knowledge. Going beyond what Stiglitz (2011) says on the subject, if this knowledge comes from outside the industry, there may be problems of adaptability to a dissimilar environment but one consequence might well be that it enriches the training knowledge stock and inspires innovativeness. Furthermore, new training knowledge may build on current knowledge in a process of cumulativeness.

In this situation, what a firm learns about its pooled skills and skills gaps is delineated by the learning process related to its organisational capabilities and returns on skills formation, and external feedback (Malerba and Orsenigo (2000: 301), Lahiri and Narayanan (2013: 1063-

64). With this clarification, it can with some confidence then invest resources in taking what it hopes is an advantageous trajectory of skills advancement. In the localised context, a primary source of this cumulativeness may come from external agents, through spillovers (which are often now unhindered by distance) and the input of local training providers. Internally, the incremental additions to the training system may be the result of new personnel, new equipment requiring talents not covered by current skills, or (more generally) the institutional habits of continuous skills accretion and innovation, and the associated systemic maturity or immaturity in the field of skills development within the enterprise. A simple factor such as restlessness about the lack or absence of skills, and training remedies for this, may be present among decision-making personnel. These additions could be so novel that they are “new-to-firm” and more broadly “new-to-locality” training components (OECD, *Oslo Manual*, 1992/2005, paras. 199-210).

One of the more socially beneficial aspects of training is that the sort of legal protection relating to property rights, and the tendency not to collaborate or share such knowledge as innovations or best practices that work, do not exist to such an extent in the field of human capital formation. At the same time, however, there may exist a firm-level preoccupation with regard to the loss of trained personnel, perhaps to local competitor firms. One question in this regard concerns the equitable investment in and, following this, distribution of benefits resulting from capacity building, especially if one firm among the co-localised group is investing relatively large amounts of capital and effort in the activity but seeing not only in-house benefits that may be low in proportion to the investment, but actually that aid is being given in effectively subsidised skills formation, and perhaps headhunted individuals, to other firms whose contribution might have been relatively slight.

By contrast, there are definite social benefits to this disproportionate sponsorship of the collective training system. There might even be some value for the responsible firm in upskilling neighbouring enterprises. In this respect, business linkages that are clearly advantageous to a firm will encourage that firm to invest more in the training project, even if there is an inevitable high spillover effect, on the basis that compensations in the form of more efficient suppliers, buyers and other business partners will ensue.

2. Metodology

This study was undertaken using the following methods:

- A. A revision was carried out of the most pertinent literature on the topic of technical and vocational education and training (TVET) – with a focus on single firms or groups of firms – employed as a means of raising developing countries from a position of deep poverty, lack of skills, under-utilised natural resources, stunted growth within and among companies, and civic disorder.
- B. A series of visits were made to institutes and companies participating in TVET, in order to identify their best practices through one-to-one interviews, questionnaires, observation of activities and achievements, and collection and interpretation of results. An attempt was also made to interpret enterprise-based TVET using theories and explanations applied successfully in other fields, as a means to achieve an original understanding using transferable and reliable methods of how TVET works, and why and where it is appropriate.
- C. To analyse this research field, raw data was collected for all the published documents on TVET using bibliographic sources such as Scopus. The bibliometric tool was used in order to provide statistical analysis of the quantitative data provided by the scientific literature.
- D. Methodological rigor was attained by placing special attention on overall study design, outcomes evaluation, regional comparisons, analysis of the effects of individual intervention components, measurement of change of attitudes and prestige of TVET. Further emphasis was placed on evaluation of such pivotal but overlooked preoccupations as tacit and codified training, social and institutional cooperation, training spillovers, and others.

3. Results and Discussion

Skills vs. Training Spillover

There are many types of skills and training spillovers emanating from within firms and interfirm clusters, which positively influence both

firms and the local community. We must clarify that they are not the same. There is a difference between skill overflow and training overflow. Undoubtedly, they produce similar consequences in that they involve a certain population of men and women capable of working efficiently and skilfully in a particular productive activity that is subsequently compensated. It may be the case that the training itself spills over into the diffusion of skills; after all, training is the prior activity that leads to the presence of skills in the person who has participated in the applied education process. The skilled person might have reasons – the lure of higher wages, lack of job satisfaction or promotion, and even boredom – to leave their current position and move to another establishment, somehow exporting their skills and knowledge to the new place. To give a concrete example: a company could direct a training provider to create a new mining practice programme, based on customer emphases and preferred techniques, and this could be retained by the same provider and then offered to other customers. This is a type of training spillover.

In the bibliometric analysis we discovered more documents on skills than training spillover (329 vs. 225). In the case of the spillover effects of training, what is striking is the strong influence of foreign direct investment identified in a considerable number of articles. Other important topics were innovation, diffusion of technology, productivity and entrepreneurship, backward linkages, cooperation between participants, and company performance. On the contrary, the issue of skill overflows was related to activities such as human capital, knowledge overflows (which imply its management and tacit and codified incarnations), wage inequality, gender and balance between work and personal life, as well as foreign direct investment, trade and multinational companies.

Fig. 1. Training spillover: results of 225 documents

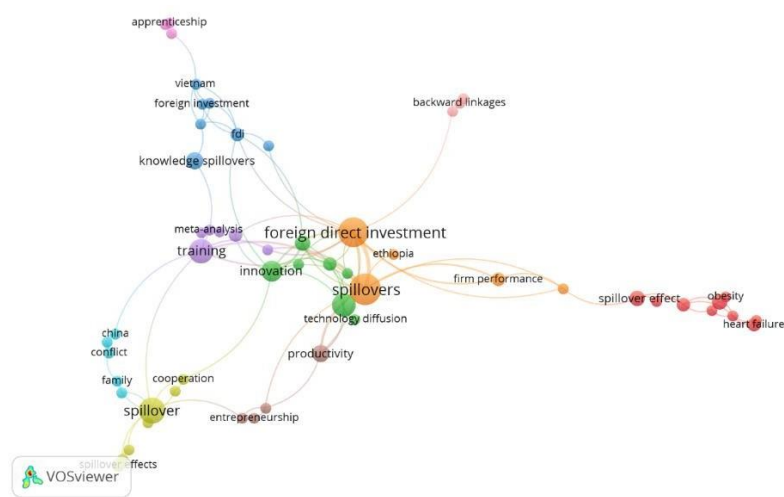
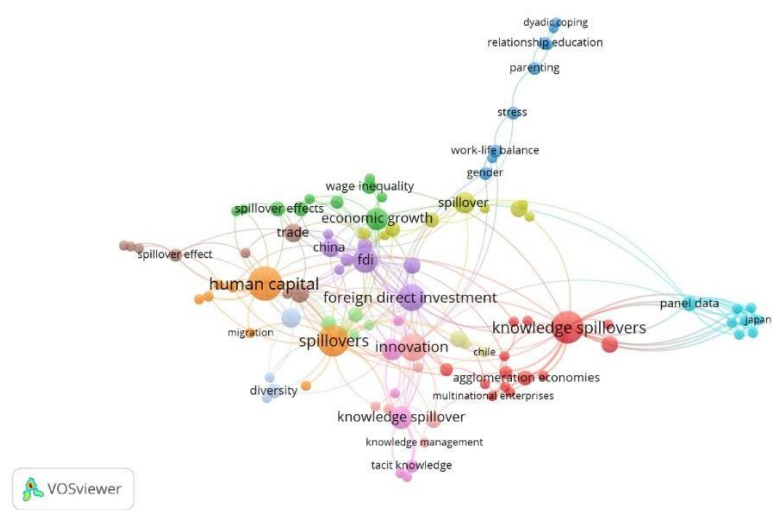


Fig. 2. Skills Spillover: 329 documents



There are different types of spillover, some with negative repercussions for the training firm, others with positive ones. It may well

be part of the initial learning project that the training undertaken should be so designed that an internal “skills domino effect” will occur, a spillover phenomenon embodied in the trained employee as a skills model or mentor for his co-workers. Another useful spillover, this time flowing from the firm to another firm or institute and usually quite codified and with medium- to long-term commitments on behalf of the donor firm, is the transfer of a skills development “package” to an organisation (e.g., a competent and firm-specific provider), whose subsequent newly enhanced training knowledge and performance will benefit the firm itself and, expectedly or unexpectedly, other local firms.

At the other extreme, if the firm fears that the training it implements will likely be a passive loss (trained workers leaving to non-competitors) or a negative loss (workers go to competitors), then this expectation (perhaps justified by past experience) may result in underinvestment in training, which effectively involves a vicious circle.

How does the training knowledge spillover work?

There are many types of training knowledge spillover, the following are just examples:

- (i) Spillover of skills knowledge within the firm, through in-company training, formal OTJ, informal imitation of colleague’s working practices, etc.
- (ii) Spillover of codified training knowledge within interfirm complex.
- (iii) Spillover of trained personnel to other firms, local or further afield.
- (iv) “Net loss” spillovers, “net gain” spillovers, “equilibrium” spillovers.
- (v) Spillover that encourages training culture.
- (vi) Spillover that substitutes for training.
- (vii) Incubator spillovers.
- (viii) Private and social spillovers.

Factors such as geographical proximity and sound communication channels between the firm and other firms and providers are important, but these will have limited impact if the knowledge or service offered is of a poor quality or just inappropriate to start with. The challenge would

be to improve this stock, perhaps increase the range of options available, and keep costs within reach, while at the same time maintaining internal learning mechanisms as a source of training needs and firm-specific input, all in a reciprocal relationship (Zhu and He, 2014). In this way, the external training system can likewise potentially be influenced by a firm of an adequate size, capability, dynamism and focus in this interdependent chain.

In a collaborative situation, the transfer of information and skills can be erratic or constant depending on whether it occurs through spontaneous/fortuitous acts or more deliberate cooperation. The presence of mutual benefits for this activity, and clear recognition of this, makes a scenario of at least limited facilitated spillover possible, in stark contrast to other types of collaboration that are underdeveloped due to competitive and ownership issues, or lack of conviction concerning the projected positive outputs. This finds a parallel in the deliberate, managed spillovers of technical information and knowledge that has been assessed by numerous authors (e.g., Caniels and Romijn (2003: 1269-1270) Van Long *et al.* (2014: 1127-1128)).

The nature of the sector in which the firm operates – its sectoral training history and the pool of training components within the sector itself – is another important factor: external to the firm but often deeply ingrained in its internal or localised training system through the people who run the system, their sectoral background previous to the current job, and the range of choices they look at and feel most comfortable with. Other influences may also come into play in this regard, such as the stage of the industry lifecycle (Schmelzle and Tate, 2017) and the achievements of training innovation in other industries applicable to the one in question: in this context, Tavassoli and Carbonara (2014) talk about inter-industry knowledge spillovers.

Due to the mix of the sheer size and importance of a particular firm (e.g., a mining company) and its remoteness from alternative sources of modelling and leadership in fields like capacity building, in the best scenario its geographical and employment dominance should lead to positive monopolistic activities and spillovers, such as training. In a similar scenario, if a particular programme of training is created by a firm which subsequently allows the firm to undertake profitable tasks

that others are presently incapable of doing, then this “monopolistic” training advantage might spur these other firms to imitate their rival and implement focused and timely remedial training.

This is an important point: the inevitable differences between upstream and downstream training systems. The structure of incentives and needs that relate to firms specialising in upstream activities – such as a mining company – play a central role in generating a training system that is bound to be different to the one that operates further downstream among firms dealing with finished goods. In fact, this is an area of study that requires more work, progressing further than researchers like Scott and Storper (2007) and Lagos and Rosales (2013), to analyse how training is affected depending on its location in the chain. The upstream-downstream relationship needs to be looked at in some depth. There are vertical externalities affecting the direction, level and rate of training that a firm will offer, particularly ones that are located upstream. This occurs through the dynamics of the division of labour: because an increased demand by downstream industries will lead to increasing levels of division of labour among upstream firms linked to them and from there to higher levels of specialisation that respond to market preferences and volumes (Antonelli (2008), Yu and Oliver (2015)); and this will in turn influence the resulting reaction in the field of skills development. The division of labour may permit the subsequent modularisation of more specialised training addressing changing working domains and the participation of a wider variety and (perhaps) higher quality of training agents (Chan *et al.*, 2017).

Similarly, whatever improvements are made by a firm located upstream in a vertical system may cascade to other firms further downstream or they may spread out horizontally to firms located locally (Van der Panne and Van Beers, 2006). This might arise because the responsible firm is so locally or sectorally dominant (sometimes in ways that may have little or nothing to do with skills enhancement), has developed an exemplary training model, or has training strings attached to doing business with them.

The presence of a sufficiently large single firm (e.g., a huge mining company) or group of firms (perhaps interconnected by business dealings and common sectoral focus), acting as a sort of “anchor tenant”

(Feldman (2003); see also Graf (2011: 173-176)), might lead to an economy of training offer and indeed specialisation directly related to training market demands. For like reasons, these localised firms will attract and, through training patronage of some sort, create a pool of workers with the required skills. One must look at particular cases to assess if this world of functioning pecuniary externalities actually exists and how well it functions if it does. The “geographical coincidence” (as described by Jaffe, 1989) of firms/training providers and the consequent improvement in production requires careful measurement to make it credible and similarly proper assessment to make it capable of growth and imitation (Benjamin, 2018). In addition, this study will also show that, as a type of localised knowledge spillover (surveyed both in terms of intra-industry and inter-industry spillovers by Feldman (1999), Ho (2012), and Gérard and Uebelmesser (2014)), training knowledge has a range of influence beyond which it weakens and dissipates: what Anselin *et al.* (1997) call in the context of the spillover range of university research a “spatially lagged variable”.

There are two possible outcomes to the implementation of a training regime from the point of view of the firm: “train-drain” and “train-gain.” The first involves the following outcome: if the training has been successful, the worker is more capable in terms of skills, knowledge and attitude, and either has sought and found employment outside the original firm, or is poached by another firm (parasitic and unfair to the first firm but making full business sense) – or, indeed, for any reason, has just left. The second embraces not just the worker who now has greater competence and remains in the firm, but also the structure and methods, the training personnel and the current trainees who all exist and are justified to some measure because the training was successful and the expertise of the programme “graduate” was not lost in the end.

Occasionally, a spillover “drain” could be defined as such only in the short-term, with net benefits coming later; or it could involve a misinterpretation, in that what might look like a loss might in fact not be a loss at all but rather a convenience (e.g., the departure of trainees for whom a position in the firm that provided the training was not available at the end of the day). Another aspect of the drain-gain conundrum is the question of utilisation of skills for those employees who stay but who find that the new or enhanced expertise they now possess is not being

properly used because working practices or technology are (for example) at a level lower than their new abilities, or their skills are inappropriate in the context of recently changed organisational, equipment or market circumstances. This could occur because of a lack of communication between the shop-floor and the training outfit, an over-ambitious skills regime, or a deliberate overskilling that anticipates future developments – there exist a multitude of reasons. In addition, the fact that the firm has a reputable training regime could be a factor in attracting recruits, particularly of the more motivated sort. Finally, one has to think of the bigger picture: what is a drain for the individual enterprise could be a local or sectoral gain.

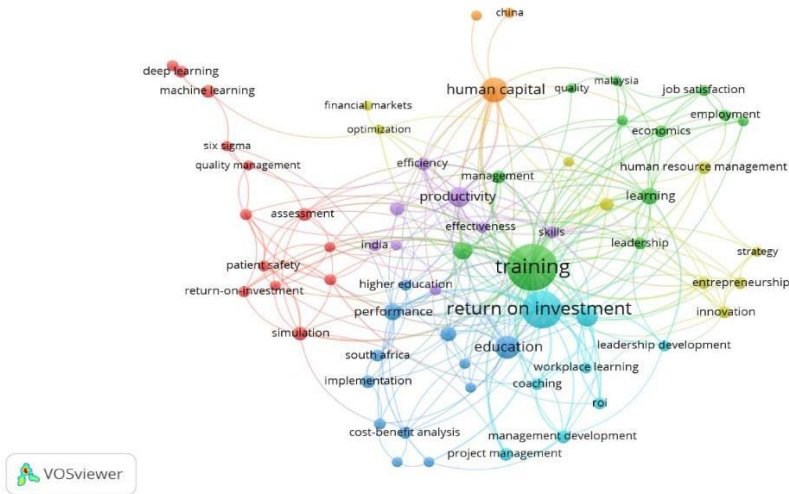
What are the dynamic increasing returns on training spillovers?

A well-run company will assess their training needs with at least three approaches:

1. What skills will you need to improve performance and ensure profitability?
2. What provision of training will you need to accomplish this and where will it come from (internally or externally)?
3. What will this activity cost and is it worth it in terms of subsequent revenue projections?

The published literature on this topic is relatively extensive (1,389 results). A wide range of approaches are of more or less equal importance: productivity, effectiveness, efficiency and skills can be grouped together; likewise, the analysis of performance, implementation and cost-benefit; quality management and return on investment are also somewhat linked, as are optimization and financial markets. Learning in the workplace, coaching, and leadership development are also represented, as are entrepreneurship, strategy, and innovation.

Fig. 3. Return on investment and training: 1,389 document results



On the subject of spillovers, the question of the level of “dynamic increasing returns” as a network effect is important as it involves the capacity building of trainees internally and directly by a firm or interfirm-level system; and, from a wider perspective, also those from outside whose skills development is the result of the linked domino effect of the original training provision. The difficulty here is an obvious one: how does one definitely relate the outside capacity improvement as being a result of the firm-level provision? One misunderstanding to do with training spillovers is to interpret a simultaneous but unconnected training project and its results in one firm as the consequence of tapping into the system and personnel of a neighbouring and perhaps rival firm (Thomä and Zimmermann, 2013).

Another difficulty here concerns the imitation of a particular training activity or model, which is not in fact the best option, simply because it is used by a dominant firm or, in the context of a dearth of other alternatives and guiding criteria, it appears to be the best option – this is reminiscent of studies of comparatively inefficient technologies that were “locked in” because of apparently high returns (see Paul David (1985), John Hall *et al.* (2011)). This represents one of the systemic weaknesses of a network relationship in which one or a small group of capacitating firms may be leading the follower firms in the wrong direction, at least

when judged in the context of the specific circumstances of the latter. The choices made by training opinion leaders, after all, may be more believed than alternatives tested through certain criteria to be better suited to current conditions.

If it is the case that spillovers are highly localised and quickly decay over distance (Rosenthal and Strange (2003), Freedman and Kosová (2012)), then the implication is that the more remote the firm, the lesser the spillover effect; or equally, the spillover effect is reduced if the pool of firms nearby are few in number, or are incapable of participating or uninterested in the spillover. Of course, one spillover effect is the encouragement of new training offer growth and the development of existing offers. This distance-sensitive, training-knowledge sharing can operate at the same time and place with agglomeration effects that include labour market pooling and input sharing (Breschi and Lissoni (2001), Arzaghi and Henderson (2004), Veeramani (2014)).

One aspect of the spillover effect that should not be overlooked is that it does not have to be only in one direction: for example, it may be the case that a dominant firm produces spillover effects much more than other organisations (firms, public bodies and training providers) at the beginning, but there may be a return on spillover investment for the same firm in the long-term, perhaps if only in terms of the much improved localised training system constructed on networks and shared norms (Huggins and Thompson, 2015), and the reconfigured skills pool and community mindset.

A network effect of a firm- or interfirm-level skills development system are “dynamic increasing returns” involving the capacity building of trainees. This concept is used in many related fields (Aharonson *et al.* (2007) Ottaviano (2011), Nordhau (2014), Binder and Bound (2019)) and could usefully be employed here. All the preceding could be described as involved in increasing returns to positive training externalities (Nordhau, 2014). Another aspect of this issue involves the question of the timeframe for developing an operation (e.g., a mine) and the activities associated with establishing and operating it. If there is a certain hurry and a training system is established very quickly through local sources, then due to the concentrated amount of time and limited geographical involvement, the effect will inevitably be localised. Over a

longer period, and perhaps buttressed by positive information externalities (Aharonson *et al.*, 2007: 89) and the patronage of local political or business leaders, a wider effect could occur.

One positive consequence of having skilled and unskilled/semiskilled workers together is that, very likely, the marginal productivity of the latter will grow, not because they have taken formal instruction as such but rather because they are operating in an interdependent productive situation with more skilled colleagues. This is the most common type of intrafirm spillover. This would be the case, for example, if skilled employees were assessed to be cost-effective in a knowledge-producing (conceptual) role, and worked in conjunction with unskilled fellow workers active in direct production (execution).

What then are the ways of measuring the intensity of each firm's training activity?

- (i) Spending on skills development; sources of financing.
- (ii) Number of people with a role in training, either full-time or part-time, from both inside and outside the firm (with a breakdown to analyse this in detail).
- (iii) Number of courses, range of skills, levels covered, continuity arrangements, etc.
- (iv) Age of training system; its growth and fluctuations.
- (v) Existence of strategic plan; place of capacity building in overall firm strategy.
- (vi) Importance of internal inputs; in-company vocational and technical education system (should this exist): organisational structure, personnel, course design methods, course content, assessments methodologies, etc.
- (vii) External inputs: existence and suitability of local regional stakeholders, their relationship to and influence on firm.
- (viii) Effects of training: return on investment, employee and training staff retention, productivity increases (including mean labour productivity), average skills level, labour harmony, training reputation, changes in wage bill, net output, real value added per employee or per worked

hour, total factor productivity (see Dosi and Grozzi, 2010: 180-1), adaptability to technological progress and other types of innovation, discounting non-training factors such as equipment automation.

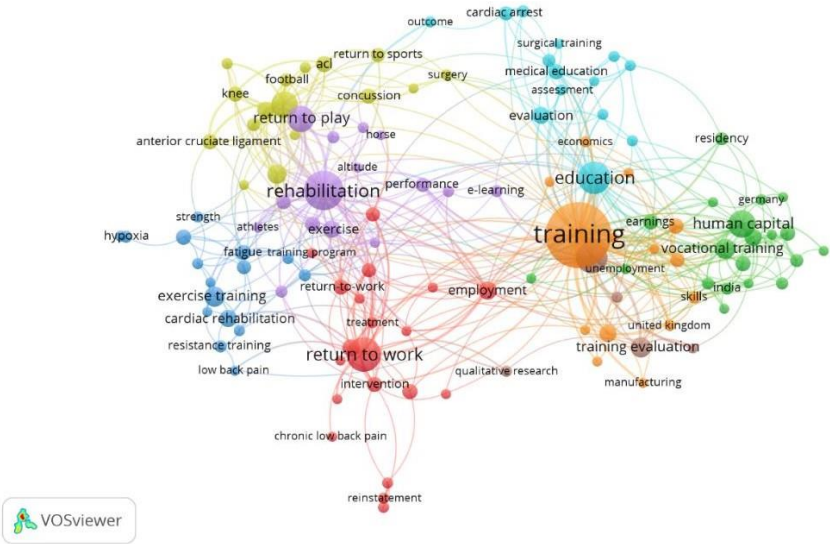
- (ix) Spillovers/external effects.
- (x) Number of trainees, their initial and current levels, number of graduates from training programmes, percentage still in firm, continuous learning support, quality feedback.
- (xi) Recruits from outside; their skills level and needs.

Training could be described as a public good, defined as such because it is relatively non-rival and non-excludable. Where then do competitive forces exist in the training system? The type and quality of training is competitive if the result is a productive level higher than that of rivals, a situation to which the latter will normally have to react. It is also competitive if a training provider has to offer a range of services that are market-specific at a level of price that places them in first place as a provider from the firm's point of view. Certain dynamic providers could have the interactive ability and high-trust relationship that allows them to be preferred over others, perhaps leading to a species of partnership based on norms of cooperation (discussed in detail by Porter and Stern (2001), Owen-Smith and Powell (2004), and Hage et al. (2013)). In terms of spillover, training procedures and practices might well be the least patentable of all essential and generic activities of a firm, which from a social-benefit point of view is not such a bad thing.

How can returns to training be measured?

This topic is one of the most important in the context of various considerations: of course, in terms of the question of the existence of technological and vocational education and training (TVET) *per se*, as well as other factors such as its sophistication, modality, duration, and benefits for all participants, among many issues. The number of documents on this key topic – 10,888 – clearly shows the role it plays in TVET's analysis and development in real terms.

Fig. 4. Returns on training: 10,888 document results



The topic is linked to various large fields in the literature: employment and unemployment, human capital, vocational training and income, education and evaluation/counselling, and return to work.

In the case of skills development, there are two general categories of training performance assessment. The first involves the evaluation that takes place during the actual training itself. This can be either quite simple if for example it involves informal mentoring of an apprentice; or it could embrace the structured, real-life- and criteria-based, uniform and transparent assessment system that the firm or network has created for itself, or has accepted and perhaps adapted from an outside source: for example, the qualifications framework of an awarding body or that of the local Department of Labour or Education (Keep (2015), European Training Foundation (2019b)). The second category is related to the post-training application of skills learned: the behavioural and pecuniary consequences, the pre-and post-training differences measured numerically and by observation.

Both focuses have their own merits and can in practice be supported equally or disproportionately. They are strongly linked, in the sense that

a high evaluation result in a course of training loses its credibility if subsequently the same worker underperforms. Indeed, this reflects very negatively on the reliability of the evaluation mechanisms in general and may lead to the conclusion that what is being delivered is not suitable for firm-specific tasks. There is thus a perennial potential for conflict whose emphasis is dependent on how much credence is given to each category. Of course, if both methodologies agree, there is mutually assured credibility.

The task of measuring returns to training is problematic:

- (i) Firms and indeed regions at different levels of development make comparisons difficult and deceptive (Bosch and Charest (2008))
- (ii) The relevant training attainment data may not be available or indeed trustworthy. There may also be specification errors.
- (iii) Can the presence, expansion or improvement of the training offer be directly related to subsequent growth? There appear to be problems of relating training (and particularly continuous capacity building) to productivity improvements. The more advanced the training, perhaps the less clear are its effects or in fact the lesser its effects are (in other words, decreasing training returns).
- (iv) Is the investment in training the best use of funds in order to increase and solidify productive growth? Alternative training methodologies (e.g., on-the-job training or OJT) might be better than more costly and codified classroom-based instruction.
- (v) What are the objectives of training in the first place? For example, does the firm wish to increase the range, complexity and quality of the products and services produced? Does it wish to advance into more skills-intensive activities, or require adaptive talent and knowledge, etc.?

These and other questions also relate to the measurement methodology applied to judge whether skills development is necessary in

the first place and, when in operation, whether it is helpful in supporting the economic well-being and labour discipline of the firm. The methods that have been used, on their own or in combination, include: return on investment (ROI), gross value added, quality improvement, wastage reduction, performance comparison between the unskilled/semi-skilled and skilled, accumulated training time per trainee, qualifications attained, intra- and inter-organisational labour productivity/training comparisons, training enrolment rates versus attainment outcomes, workforce ability to adopt and use new technologies (Greenhalgh and Rogers, 2010), and regression of productivity growth related to education (this last theme is discussed at length by Hsiang and Jina (2015)).

There might exist a situation in which a certain minimum level of skills – a threshold level – is required as a necessary condition for a firm to survive and grow. Training that achieves this level could then be described as indispensable. Again, the conundrum here for the firm is actually working out when this is needed and the best methods to implement it. In certain places and in the case of certain firms, basic or “primary” training could be the most important vocational education variable in creating the conditions for growth: for example, basic literacy and numerical skills in primary schools as the basis of all that follows in future learning (Shrivastava y Shrivastava (2014)).

The subject of benchmarking in skills development is a complicated one. Certain bodies place the emphasis on quantitative data when judging training success and perhaps copying it, others on qualitative inputs and results. Something as unscientific and perhaps incomplete as anecdote can come into play when a decision is being made. A firm may well be regarded as a good training model for reasons that have little to do with actual training performance: age, size and sectoral prestige, amongst others, are very persuasive considerations. As such, its influence in this field might be greater than it should, distracting attention from more worthwhile models (Strang (2010), Zuckerman (2012) and Wang *et al.* (2012) all evaluate this in terms of prestigious firms, top performers, and a lack of internal skills-creation mechanisms even in successful organisations, respectively).

Another entirely practical aspect of this theme embraces the question: What are the costs incurred in training? The subject of costs is

central to a firm's ability to participate in the training process. There exists in effect an economics of skills development which embraces the investments made in capacity building set against the returns on this effort. There may be some assistance from government or other sources. There is a very wide range of costs associated with training, some of which are easy to identify and quantify, others not: outlay to establish the training system and subsequent running costs, infrastructural costs, loss of productivity costs in the short-term, networking costs, absorption and motivation costs, transaction costs to search for and purchase external training knowledge (be this codified or tacit), and access costs to local training knowledge pool (this last theme is explored by Patrucco (2009) as well as Zhao and Anand (2013)).

Of course, the fact that we can talk about costs of training components emanating from external sources indicates that, though there may exist on occasion some degree of appropriability, proprietary training knowledge is not usually that restrictive, and that there is a relatively good flow of information concerning such matters as best practices. The peculiar competitive environment that firms find themselves in may affect their propensity to share their training knowledge but there may be sectoral/interfirm advantages for all participants in collaborating in a networked training system, for example in creating what might be called a "critical training mass" in remote regions.

Training systems taken from an outside source have both imitation costs (Biswas, 2015) and absorption costs (Cohen-Goldner and Eckstein, 2008). Furthermore, to this should be added other governance costs embracing transaction, interaction and communication outlay (Antonelli (2006), Ibrahim *et al.* (2009)). The good news, though, is that reproduction costs less than initiation or generation (both Felin and Hesterly (2007) and Dosi and Grazzi (2010) discuss this issue at length).

4. Conclusion

Training has as its objective a series of outputs that are defined by how they are measured: return on investment, productivity increases, quality improvement, widening of firm-level capabilities, etc. These are

in turn the result of selected inputs that create, sustain and control qualitatively and quantitatively the training system itself: physical and financial capital; administrative organisation, managerial and pedagogic capability, and different types of knowledge (of human formation, market, technology, etc.). Another knowledge input is consciousness of more skills development components than the firm is actually putting in, as a contextualising device to allow assessment and to identify comparative best practices at any given time (Brusoni *et al.* (2001), Yang *et al.* (2010)). How well these idiosyncratic elements are identified, configured and made to interact will help determine the ultimate efficiency of the training system.

Technical co-operation between donors and local partners – taking the form of donor-provided material, equipment and services, and capacity development of a given partner – has been said by several commentators to be unsuccessful in building and strengthening local capacities (Berg (1993: 244), Kraak *et al.* (2016)), and that it even has a tendency to “displace or inhibit local alternatives” (Fukuda-Parr *et al.*, 2002: 4-5). Donors have to some extent learned their lesson and are now refocusing their “knowledge aid” to help develop institutional and regulatory environments and policy. The other kind of “knowledge aid,” that of fortifying productive capacities, still takes somewhat of a backseat: Bell (2007: 10-11) describes this aid as “limited” and sometimes only present in activities such as project-embedded technical assistance. In terms of where donor support (or for that matter government support) could be best targeted, it appears to be prudent (given experiences in similar circumstances (as described, for example, by Hausmann *et al.* (2005: 14)) to support competent entrants or training leaders, especially if they are generating skills-supportive spillovers for emulators.

The effect of a spillover depends on the scale, “fit” (in terms of needs and absorptive capabilities), and the structure in place to organise this transfer either through managed or unmanaged means, in the sense that, for example, a formal relationship exists to effect the spillover or a random spillover occurs in an accidental way. A training/skills spillover can be facilitated by informal networks that can operate reasonably efficiently over short distances but would be diluted, disconnected or even contaminated should the distance be too great. A formal network

would be more likely to pass it on intact and clear over longer distances and possibly to more targeted destinations. There are at least two other factors relevant to this particular aspect of training/skills spillover: the effect is greater if the receiving organisations actually have a specific or complementary need for this input and if they operate in a related field. Naturally, the lack of complexity and specificity, and the adaptability of the knowledge involved are central considerations in this topic.

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