

# Human resource strategies are the key to bolstering Lifelong Learning circumstances at the enterprise level

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## IMPRESSUM

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# HUMAN RESOURCE STRATEGIES ARE THE KEY TO BOLSTERING LIFELONG LEARNING CIRCUMSTANCES AT THE ENTERPRISE LEVEL

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## Introduction

Key question: Which human resources architectures are productive for lifelong learning processes and enterprise value creation?

In ensuring that the EU strengthens its position as “the most competitive and dynamic knowledge-based economy in the world” (European Parliament, 2000, I.5.) and achieves its Europe 2020 targets (EC, 2011), the LLLight’in’Europe FP7 project has focused research on the enterprise level, examining how enterprises leverage lifelong learning configurations strategically, towards increased performance and value creation.

Following an abductive, empirical methodology, we have examined lifelong learning architectures from past empirical and theoretical work (69 articles, 1990-2012, see Brandi et al., 2013) in combination with our own empirical research, conducted in 194 enterprises (31 EU, 163 EU-competitors), across 53 industries, so as to seize what strategies enterprises are making use of. We have also looked to the 2009 and 2013 European Company Survey (ECS) (Eurofound, 2009, 2013) to further validate our findings. Representing a principal dimension in lifelong learning circumstances – skills development – we explored what enterprises consider as the highest valued employee skills, main triggers for learning and investment in learning, as well as most successful types of learning.

The highest valued employee skills are soft skills, yet investment in soft skills is cautious and unpredictable

Results showed that the highest valued employee skills are soft skills. Yet for the most part, there is a focus on the development of skills that explicitly and directly contribute to new business formation and financial bottom-lines, in ways that are also fast and on-demand (short-term goals). We found that it is primarily the individual’s role to prompt learning in the workplace, with the exception of induction processes and industry standards or regulatory training and development. We have also noted that enterprise size has a significant effect on the configuration of learning opportunities.

Implications lead us to perceive that there is much opportunity for deeper industry-wide collaboration, public-private partnerships, research-practice undertakings and government support for lifelong learning planning and deployment.

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## Key Observations

Human resource practices: organising learning to realise and secure skills development

In examining lifelong learning architecture and composition in 194 enterprises (31 EU, 163 EU-competitors), across 53 industries, we have distinguished skills development as highly central to the choices in lifelong learning configurations in enterprises. Focus is on human resource practices (HRPs), deployed by enterprise human resources (HR) and human resource management (HRM) plans, for skills development that explicitly interlinks with business goals, through learning objectives and productivity targets. There is evidence, however, that indirect links provide value that, although difficult to capture, contribute to business growth and important human development.

For instance, deploying learning programmes that develop fundamental skills such as computer literacy enhances productivity in both direct and indirect ways. As a striking example, one of our participants from Spain made great use of social funds to up-skill employees. Enterprise ES51QSSI2 in the NACE Q – Human health and social work activities industry reported:

Bolstering competencies and skills can happen through leveraging network channels and external funding

*Interviewee: When going through the EFQM [European Foundation for Quality Management] process, one of the things that we identified was the need to improve internal communication. To this end, we set up an IT [information technology] system covering all premises. The implementation of this system was very costly and took a lot of time. In this context, IT training for all staff has been fundamental. The training is for enabling everyone to use our new management software and has been very successful. We have conceived of this training to progress gradually, with very little things to be learned each time. [Because...]*

*We have employees who are 40-50 years old and have never completed upper-secondary education or professional training, [...some] personnel had never used a computer before this training initiative!*

*Interviewer: Within the framework of labour policy in Spain, enterprises may benefit from an economic contribution whenever they carry out training courses for groups of employees or facilitate training/education to an individual employee. Do you take this economic support into account?*

*Interviewee: Yes, every year. Last year, we contracted a company for doing the management of this [particular financial] credit [...]. This year we have decided to use the credit for training in EFQM (Director, Enterprise ES51QSSI2: 4-5).*

Enterprise ES51QSSI2, registered as a not-for-profit charity, is located in a fairly remote part of Spain, which as our four interviewees there explained, poses some challenges with respect to staffing, as well as access to skill development opportunities. Yet by leveraging network channels championed by the Director, creative use of external funding sources enables up-skilling and continual learning. The enterprise successfully achieved ISO certification as well as a certificate of excellent in quality management through the EFQM and introduced new technology, which as our interviewees emphasised, are extremely high accomplishments that strengthened competence, confidence, and even local pride.

Formal knowledge and specialised skills are valued and companies understand how to develop them, but there is still a gap in soft skills development, eluding many HR-compositions for lack of financial, time or other resources:

*Interviewer: If you think of last year, did you have more, or less, training than asked for?*

Soft skills are the highest valued competences for enterprises, yet human resource management still explores how to optimise soft skills learning designs

Employee demands for soft skills development is higher than provisions; closing this gap would contribute to both lifelong learning and business goals

*Interviewee: Technical issues, we covered it all. [...] More general issues like language or project management we had significantly more people wanting courses than we offered. Courses about leadership, we had almost as many courses as asked for (Director of Labour Relations, Enterprise DE250C29SSI7: 1-2).*

Enterprises value soft skills the most, yet HRP-compositions are still evolving to meet the challenges. When we asked research participants to describe desired employee skill(s), a mixture of hard and soft skills were mentioned, with notable attention to soft, or transversal skills. Irrespective of how technical our participants' work is, and independent from how highly valued hard skills are (for example, in engineering, medical, accounting and aerospace enterprises), skills such as 'communication', 'creativity', 'customer service', 'interpersonal relations' and 'teamwork' came out as highest valued. 'Knowledge', part of an employee's cognitive hard skills-set was also highlighted, though it is the ability to apply and ability to communicate knowledge that contribute to the valuation of knowledge as a skill:

Figure 1: Highest valued employee skills



\* based on a content analysis of responses to 47 semi-structured interviews and 194 questionnaires

Learning is triggered by work-related, project-related and client-related needs

As for the main triggers for learning, we found that triggers for learning were chiefly prompted by work-related, project-related and client-related needs. On one level, enterprises satisfy regulatory needs with training, and induction needs for new employees, though the mix of offerings for the latter was more varied.

For example, some enterprises have well-formulated mentorship programmes for interns who might eventually stay at the enterprise, such as with one of our participating German enterprises in the machining industry (NACE C25.6.2 – Machining):

Apprenticeships can strategically leverage new talent and simultaneously provide lifelong learning opportunities for long-standing employees

*Yes. In-house. Very successful and we educate per year about, approximately 15 young people. And this is a three-year education, so that means that we always have, on average, 10% of our staff as apprentices (Co-Managing Partner, Enterprise DE51C25SSI15: 3).*

However, we have more generally found that triggers for learning originate from individual employees, who identify needs as well as opportunities for learning, themselves. Broadly amiss, nevertheless, were systematic, internal check-ups on learning needs, in our participating enterprises. So although we perceive that learning activities are exertive, the trend reflects the following example from one of our Spanish participants, which tells the story of individuals taking the initiative and being resourceful in fulfilling lifelong learning needs:

Still, individual employees identify needs and opportunities for learning largely on their own

*And, then, back to what I said before: it is important to be willing to learn. Here, there is a constant need for being updated. And not everybody has the willingness to engage in continuous learning. Not always. For the job you do here, training does not always mean a formal course with defined hours and in a defined place. No! It is many times triggered by new information that requires reading, searches on the Internet, talking to other colleagues, going to certain conferences and seminars. For all of this, one has to have personal initiative (Executive Partner & Development Director, Enterprise ES11M70SSI11:4).*

This interview excerpt from Enterprise ES11M70SSI11 (a medium-sized enterprise, NACE M70.2 – Management consultancy activities) informs us that learning is essentially managed by individuals who must be perceptive enough to uncover blind spots in their knowledge, skills and competences and either bring that to the attention of management and/or take the initiative to up-skill themselves. Further on, the interviewee elaborated that for such initiative to add value for the enterprise, it must relate to work demands directly or better, fulfil learning gaps that can bridge onto new business opportunities:

A vital employee competence is the ability to uncover knowledge and skill gaps and prompt solutions

*For example, take the case of a company [a client, in our country] where we are going to develop and implement a software programme and this client tells us that they are planning to expand to Latin America. This information represents an opportunity for us because we also provide services in the areas of expatriation, international work contracts, and so forth. If the consultant [the individual employee] is exclusively focused on the development of the software programme that she was called for, then the opportunity of providing a more comprehensive service than initially expected is lost. So, we need people who can perceive these business opportunities (ibid.).*

In such a line of reasoning, this enterprise leader entwines learning with building business. He looks onto learning as something that expands capabilities and also expands capacities. The extent to which the enterprise invests resources in building capacity was left unclear from interviews in this enterprise, however, there is great emphasis on explorative mind-sets and practices.

Learning triggers can also come from industry standards and/or strategic business goals

Generally, our interviewees echoed similar experiences, less one notable exception from a German enterprise that is very large in size, with thousands of employees, in the C29 – Manufacture of motor vehicles and trailers industry. Enterprise DE250C29SSI7 has a very systematic approach to organising learning opportunities and distributing them across work groups.

The bigger the enterprise, the higher the chance that employees will be given time off for formal learning activities – and this learning investment is on the rise

Needs assessments are performed according to a set plan in this enterprise and there is a dedicated group of HR leaders who also manage a dedicated amount of resources for development and learning, internationally. Triggers for learning here may come from industry standards for example and strategic business decisions that align HRPs to business goals, globally.

From the 2009 ECS (Eurofound, 2009) we find that question MM563 addresses this feature in the skills development dimension by posing: “Have any of your employees been given time off from their normal duties in the past 12 months in order to undergo further training?”. Results show a significant association between enterprise size and whether employees are given time off (a type of enterprise investment) in order to undertake training. Analysis demonstrates that the larger the size of the enterprise, the higher the chance that employees will be provided time off from their normal work assignments to participate in formal or non-formal learning activities, as illustrated in Table 1. Here we can see that the decision to give employees time off from normal work duties is close to being equally distributed between ‘yes’ and ‘no’ replies for SMEs, while about 80% of employees in large enterprises (250+ employees) are granted opportunities, as part of the workplace learning strategy. Compared to responses from the 2013 ECS (Eurofound, 2013), we observe an increase in the average number of enterprises that give time off to provide further training or on-the-job training (non-formal) from about 61% in 2009 to 71% in 2013, which is a promising increase.

Table 1: Have any of your employees been given time off in order to undergo further training? - Question MM563, 2009 ECS

		Time off for further training		
		Yes	No	DK/NA
Size	10 to 19	48,8%	50,6%	0,6%
	20 to 49	56,2%	42,9%	0,9%
	50 to 249	66,0%	32,8%	1,2%
	250 to 499	76,5%	22,3%	1,2%
	500 +	81,6%	16,7%	1,7%

\* size of enterprise in five categories, correlation is significant at the 0.01 level (2-tailed)

New employees tend to be given more chances to undertake formal learning in larger enterprises

Informants that answered 'yes' to MM563 were asked to refine their answer through a related question. MM564\_1, probed whether enterprises prioritise the provision of employee time off from normal work to undertake learning and educational activities, with a particular focus on the vocational adjustment of new employees: "Please tell me for each of the following potential motives of further training whether or not it was an important driver behind the application of these training measures?". Here, we see an analogous association that significantly indicates that the larger the number of employees, the bigger the chance for time off to undertake further training for new employees, as depicted in Table 2.

Table 2: Have any of your employees been given time off in order to undergo further training in the vocational adjustment of new employees? - Question MM564\_1, 2009 ECS

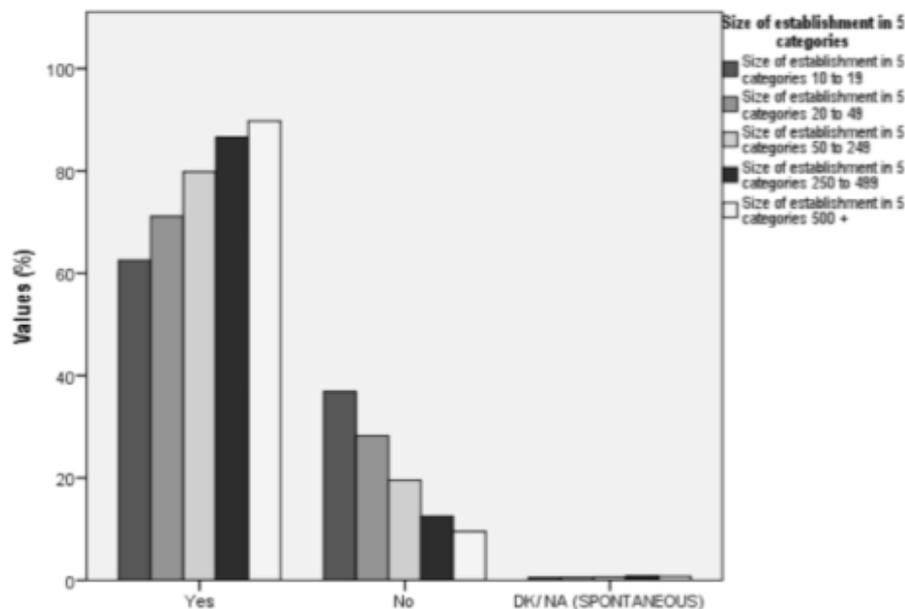
		Vocational adjustment of new employees		
		Yes	No	DK/NA
Size	10 to 19	54,5%	44,5%	1,0%
	20 to 49	61,1%	38,0%	0,9%
	50 to 249	66,0%	32,9%	1,1%
	250 to 499	71,7%	27,2%	1,1%
	500 +	76,4%	22,9%	0,7%

\* size of enterprise in five categories, correlation is significant at the 0.01 level (2-tailed)

Systematised audits of learning needs increases with enterprise size.

We found a comparable pattern looking at another dependent variable, which is to what degree enterprises systematically check the need for further learning and education (MM561), and enterprise size. Analysis of data shows that the strategic and systematic assessment of the need for formal learning and education in and out of the workplace increases significantly with the size of the enterprise, as depicted in Figure 2 below.

Figure 2: Is the need for further training periodically checked in a systematic way in your enterprise? - Question MM561, 2009 ECS



\* size of enterprise in five categories, correlation is significant at the 0.01 level (2-tailed)

The degree of structure and control of workplace learning activities is highly related to enterprise size

Almost 90% of all participating large enterprises (250+ employees) have a systematic practice for monitoring the need for further learning and upskilling, while the number is between about 60-70% for SMEs. Thus, looking at enterprise size, our analysis demonstrates a strong association between size and opportunities given to participate in skills development, with a more systematic management and check of learning. The larger the enterprise, the higher the chances the enterprise will have a more structured and controlled approach to workplace learning activities.

From our analysis, we see no clear pattern in the distribution of formal learning opportunities across sectors following NACE codes, however. Enterprise types have an almost similar proportion of 'yes' answers to time off and systematic checks of learning needs.

Resources can be put towards both extrinsic and intrinsic motivational factors

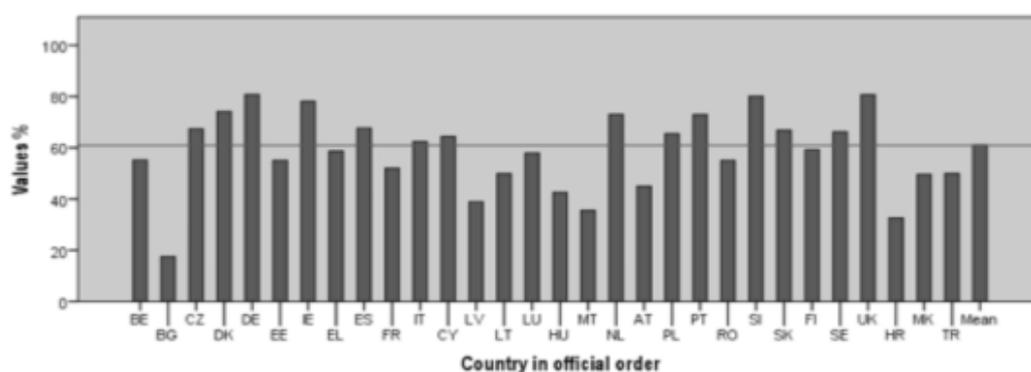
It seems though that knowledge-intensive industries, e.g. ICT and financial, have a tendency to be more strategic and systematic with their learning activities, and have greater provisions for employees to take time off for training. Enterprises from e.g. manufacturing and construction sectors are less systematised with their workplace learning activities.

Analysis indicates that knowledge-intensive industries seem to be more strategic in their approach to learning

When we analysed data on a country level, we observed quite a high proportion of 'yes' to the question of whether enterprises intermittently check for further learning and education systematically. On average, 74% report that they check for further learning opportunities, which illustrates a general distribution of replies for this variable. In contrast, the proportion of enterprises that give employees time off to undertake formalised learning and education activities is quite different from country to country, illustrated below in Figure 3.

Data shows variance between countries for whether employees are given time off for continuous learning

Figure 3: Have your employees been given time off in order to undergo further training? Yes answers - 2009 ECS



The countries with the highest proportion of enterprises responding 'yes' to providing employees with time off for continuous learning and education are Germany, Ireland, Slovenia and the United Kingdom, where about 80% of all enterprises give employees time off.



Informal, workshop-type seminars and online contexts are also important learning types fitted for continuous learning

The most effective learning happens on demand

A great example comes from a Project Manager of Software Development, at one of our German, medium-sized (120 employees) enterprises, Enterprise DE51M69SSI3 (NACE M69.2 – Accounting and auditing activities):

*Interviewer: Alright... this is difficult... so you don't have any training... okay, so the people on your team, if they needs something, like books, or an online course, or... Does the company provide that for them?*

*Interviewee: If they ask for this, I think they would, but I think that it's not necessary at the moment. For example, looking at how I learn... In the past, I had often bought books without using them. For example if [...] you want to programme or implement a special [software] thing, if you want to manipulate 'xml', that's some technical stuff, you have to look at what kinds of classes [training options] are responsible for this. [...] I think you cannot learn such things from books. Books, [...] are just for the introduction of a topic; a brief overview [...]. So it's better to look on the Internet, but easier, is to look at what other programme developers are doing in this region [on this topic]. So many sources, from [database name] to blogs and... These present you with some solutions, and you can select what is best.*

*Interviewer: Okay, so [...] you are using these blogs and these online networks then to get answers if you have questions?*

Human resource architectures' core role is to support and bolster access to knowledge and social communities where the know where to find solutions on-demand has primacy over the know what

*Interviewee: Yeah [...]. That's right, but it's an incremental process, it's not like 'you have a session for two days', like a guerrilla camp or something [...]. It's more that it's 'learning by doing'. [...] So, if you have a problem, you have to look at how you can solve it and afterwards, maybe you can select good solutions for it. You have to look for it yourself of course. But it's not... formal. [...] I think the main source [for learning] is the Internet right now (Project Manager of Software Development, Enterprise DE51M69SSI3: 6-8).*

Skill development is tied to how responsive human resource architectures and practices are in facilitating a flexible and need-based learning platform

This example, which is representative of today's configuration of skills development strategies, reinforces the premise that enterprise lifelong learning is prompted by individuals in response to immediate and work-/task-related needs and that cognitive learning has evolved into a more social and community sphere through online networks and the like. Having access to knowledge within an enterprise (e.g. knowledge repository, networks, etc.) as well as beyond the enterprise, to relevant communities of practice (Wenger, 2000) for instance, bolsters connectivism (Kop & Hill, 2008; Siemens, 2004) and also emphasises individuals' skills to know where to find solutions – quickly – rather than know the solutions first-hand. Being resourceful and problem-solving on-demand outrank knowing vast amounts of information, particularly since information is in a continual cycle of renewal and update.

Overall, we find that there are a variety of lifelong learning configurations that point to the need for learning that is responsive to a flexible, learner-centred workforce, in ways where a business case can be made for initiatives. Nevertheless, there is evidence that less formalised learning design and more generic learning and training is highly beneficial, the composition of which rests on both employee and enterprise needs as well as enterprise size.

## Recommendations for Policy-Makers

Changes are needed  
in order to optimise  
lifelong learning  
strategies aimed at  
skill development

In order to reap the benefits from lifelong learning strategies mediated through human resource, aimed at optimising skill development, the European Commission, national bodies and stakeholders must focus on lifelong learning architectures. In supporting successful architectures and circumstances at an enterprise level, we recommend:

...further empirical mini-studies that assess 'optimal' architectures and HR-configurations that bolster skills development. We notice a scarcity between the valuation of soft skills and investment in soft skills development; there is also a gap between the demand for soft skills training and provisions. As such, funding mini-case studies across Europe will yield lessons learned about how to close these gaps, helping to innovate learning, beginning in the public sector and promoting such activities in the private and third sectors.

...promoting policies that enhance learner-centred lifelong learning architectures in enterprises including: a) an explicit policy agenda that targets soft skills development; b) funding for soft skills development (e.g. short-/mini-workshops), which may also entail mobile courses so as to emphasise intercultural competence development; and c) social incentives through increased and more diverse public offerings in soft skills development.

...greater dissemination of valuation methods for informal learning and generic skills development, as our empirical findings underscore that this directly contributes to enterprise growth. Our findings also show that enterprises understand there is a connection between soft skills and business, but that they are still largely ill-equipped to measure/explain how. As a result, greater attention to this issue is pressing and imperative.

...specific research on the valuation (measurement) of soft skills training and development, in cross-cultural and cross-industry contexts, drawing on both quantitative and qualitative data. Through this, enterprises can better glimpse and will become better equipped to identify and leverage soft skills development needs and processes.

...fostering greater industry-wide collaboration through the implementation of public-private scaling platforms, particularly in communities of practice (e.g. profession-specific), and most especially for SMEs. Through this, best practices can be more easily shared and lessons learned from both researchers and practitioners can be consolidated. As noted by our participants, learning on-demand and online is a crucial strategy so using these spaces for future collaborations is key.

...strengthening support for research and practices that highlight problem identification and problem-solving competences. From our data, we perceive that learning is largely triggered by individuals who must be able to uncover knowledge and skill gaps, and prompt solutions, still largely on their own. As such, supporting lifelong learning activities that strengthen one's ability to uncover 'blind-spots' in one's own knowledge, skills and competences are fundamental.

...creating innovative industry standards that bolster skills development, as our participants cite industry standards as triggers for learning. Also, our data shows that time off for learning, for example, varies per European country, demonstrating that national policy has influence on this aspect, even in the private sectors.

...greater promotion of available social funding and social schemes for skills development in particular, as awareness of these is lagging. Although we noted that one of our participating enterprises made use of social funds in bolstering lifelong learning circumstances and opportunities, our respondents are mostly unaware of EU-/public-funding opportunities. We therefore recommend that local and national agencies must strengthen the visibility of associations, networks and public opportunities.

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## Research Parameters

LLLight'in'Europe,  
enterprise-level research

The research was designed according to an abductive methodology, examining lifelong learning institutions (enterprises) as actors that actualise lifelong learning strategies through HRPs, towards value creation and high performance.

Three sources of data  
to triangulate and  
validate data, using  
an abductive research  
approach

The empirical data triangulates three sources, three phases of research: 1) past empirical and theoretical work (1990-2012, see Brandi et al., 2013), resulting in a total of 69 publications; 2) LLLight'in'Europe's empirical data from 47 semi-structured interviews and 182 questionnaire responses in a total of 194 enterprises (31 EU, 163 EU-competitors), across 53 industries; and, 3) 2009 and 2013 European Company Survey results.

An abductive research design is characterised by a transaction between data and theory as a way to account for empirical findings (Bertilsson, 2004; Charmaz, 2000; Dubois & Gadde, 2002; Locke, Golden-Biddle & Feldman, 2008; Timmermans & Tavory, 2012). It is known as a third distinct scientific research strategy, as compared to deduction and induction, developed by the American mathematician and pragmatist Charles S. Peirce (Anderson, 2005; Bertilsson, 2004). Abduction is a form of reasoning by which researchers observe the studied phenomenon or unit of analysis from a situational fit between observed facts and theory and rules.

The abductive inference is aimed at developing theory and hereby validates the categories into which observations falls (Timmermans & Tavory, 2012). Morgan (2007: 71) accentuated, that an abductive analysis alternates between induction and deduction from converting observations into theory, and then evaluating these theories from observations from practice.

Our starting research proposition was the observable phenomenon of enterprise success in LLLight'in'Europe's participants, as a function of lifelong learning

The consequence of choosing an abductive research design is to base the analysis on concrete facts that need to be analysed, interpreted and understood. Our starting proposition was the observable phenomenon of enterprise success in LLLight'in'Europe's participants, as a function of lifelong learning. Building on this proposition, the underlying premise for our study is tied to the understanding of enterprise lifelong learning strategies as a significant factor and tentative principle for value creation and the actualisation of success. Our analytical focus was to study and explain how lifelong learning strategies contribute to creating the conditions for competitive and successful enterprises, framed in the context of value creation. Thus, our main analytical objectives for WP4 were to analyse collected data in order to elucidate lifelong learning strategies as contributions to the phenomenon of enterprise success, to generate observations by use of revelatory examples, and conclude with theoretical insights into value creation.

We used a three-pronged validation by cross-analysing three sources of data

Our abductive analysis employs a three-pronged validation, by way of cross-analysing our three sets of data from data collection Phases 1, 2 and 3. Our first step in this validation process was to conduct a review of lifelong learning strategies and analyse empirical studies – Phase 1 data (see Brandi et al., 2013). The review process followed an inductive line of reasoning in that we had to identify themes and dimensions for lifelong learning strategies and value creation at the enterprise level, strongly linked to the empirical studies themselves. We therefore conducted our inquiry without trying to fit findings into a pre-existing analytical framework.

Phase 1 data:  
Empirical studies,  
1990-2012 (see  
Brandi et al., 2013)

The review resulted in a conceptual model for how to interpret lifelong learning strategies at the enterprise level, in connection to what characterises HPWS – enterprise success. This conceptual model guided the construction of questions for our Phase 2 research interviews and questionnaires, triangulating data with the 2009 ECS.

Phase 2 data:  
Semi-structured  
interviews and  
questionnaires

The second step of our analysis involved collated data from Phase 2 data, in light of our findings from Phase 1. Analytically, we were driven by the theoretical dimensions from the conceptual work in Phase 1 and conducted analysis following a theory-driven thematic analytical strategy (Braun & Clarke, 2006). We coded data from Phase 2 interviews for quite specific research questions, which centred on how enterprises understood and actualised lifelong learning strategies and value creation. Thus, our analysis in this step follows a deductive logic as we used the three dimensions of HRPs, derived from Phase 1 research to structure and corroborate findings from our Phase 2 interview data. In this way, we constructed a more detailed and in-depth body of knowledge of our HRP dimensions through how interviewees expounded on lifelong learning strategies. More specifically, to estimate the distribution of beliefs, attitudes and knowledge about lifelong learning strategies and value creation, we verified interim findings from a thematic analysis of our interviews. Based on this, we formulated the questionnaire along the three main dimensions of HRPs, broaching interview themes and sub-features. We analysed the questionnaire results by calculating summary scores for agreement between statements made in the questionnaire and interim results from our interviews, linked to selected dimensions, sub-features, enterprise size, industry type and country. The steps we followed for this analysis were inspired by Claassen et al. (2014).

Phase 3 data: Data from the 2009 ECS, with some references to the 2013 ECS (where applicable and where cross-referencing data is available)

We conducted our analysis of secondary data from the 2009 ECS through cross-tabulation analysis among relevant and selected dependent variables for our research study on lifelong learning strategies: skills development; learning systems and incentives; and, work design and the organisation of work. Independent variables were industry type, size and country. We used SPSS v.21 to analyse data. In the cross-tabulation analysis, we focused on shared distributions between selected variables from the 2009 ECS data and incorporated a simple bivariate analysis with two variables. We also calculated data from using Chi-square tests for all cross-tabulations, in order to test the significance of our findings using the .01 level to assess the strength of the association between observed lifelong learning dimensions and selected independent variables.

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## Project Identity

LLLight'in'Europe is an FP7 research project supported by the European Union, which has investigated the relevance and impact of lifelong learning and 21st century skills on innovation, productivity and employability. Against the background of increasingly complex tasks and jobs, understanding which skills impact individuals and organizations, and how such skills can be supported, has important policy implications. LLLight'in'Europe pioneered the use of an instrument to test complex problem solving skills of adults in their work environment. This allowed for the first time insights into the development of professional and learning paths of employed individuals and entrepreneurs and the role that problem solving skills play. Additionally, LLLight'in'Europe draws on a series of databases on adult competences from across the world to conduct rich analyses of skills and their impact.

These analyses were conducted in concert with different disciplines. Economists have been analyzing the impact of cognitive skills on wages and growth; sociologists have been investigating how public policies can support the development of such skills and lifelong learning; innovation researchers have been tracking the relationships between problem solving skills, lifelong learning and entrepreneurship at the organizational level; educational scientists have investigated how successful enterprises support their workforce's competences; cognitive psychologists have researched on the development and implications of cognitive skills relevant for modern occupations and tasks; and an analysis from the perspective of business ethics has clarified the role and scope of employers' responsibility in fostering skills acquisition in their workforce. The team has carried out its research and analyses on the value of skills and lifelong learning in EU countries, USA, China, Latin America and Africa.

The result is a multi-disciplinary analysis of the process of adult learning and problem solving in its different nuances, and of the levers which can support the development of these skills for both those who are already in jobs, and for those who are (re)entering the labor market, as well as the development of effective HR strategies and public policy schemes to support them.

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This policy brief is part of the publication suite of the FP7 Project LLLight'in'Europe. The publication suite consists of 21 policy briefs, 6 thematic reports and 1 synthesis report. The 21 policy briefs discuss findings and policy implications proceeding from the project's research; they are organized along three level of analyses (persons; enterprise; country) and seven topics.

01	Resources of society for learning
02	Institutions of learning
03	<b>Circumstances of learning</b>
04	Role of transversal skills
05	Role of job-specific skills
06	Productivity of skills
07	Outcomes of skills

This policy brief discusses findings related to **Circumstances of learning** at the analysis level **enterprise**. For further publications and multimedia material related to the project, please visit [www.lllightineurope.com](http://www.lllightineurope.com)