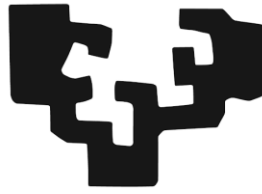


eman ta zabal zazu



Universidad
del País Vasco

Euskal Herriko
Unibertsitatea

Universidad del País Vasco/Euskal Herriko Unibertsitatea
School of Business and Economic (Gipuzkoa)

Degree in Business Management and Administration

Final Degree Project

**HIGH PERFORMANCE WORK PRACTICES AND INNOVATION
PERFORMANCE IN THE EUROPEAN UNION COUNTRIES**

Author: Leire Cid Alonso

Supervisor: Amaia Altuzarra

Donostia/San Sebastián, February 1st, 2023

Course 2022/2023

TABLE OF CONTENTS

ABSTRACT	4
1. INTRODUCTION	5
2. A BRIEF APPROACH TO ENTREPRENEURSHIP AND INNOVATION	5
2.1. ENTREPRENEURSHIP	5
2.2. INNOVATION	6
2.2.1. Concept of innovation	6
2.2.2. Phases of the innovation process	6
2.2.3. Structural Variables	8
2.3. ORGANIZATIONAL MANAGEMENT	9
2.3.1. Formal Structures	9
<i>Structuring Philosophies</i>	9
<i>Types of Structures</i>	10
2.3.2. Reward Systems	11
2.3.3. High Performance Work Systems	12
3. DATA AND METHODOLOGY	13
3.1. DATA	13
3.1.1. Innovation data	13
3.1.2. High-performance work practices	15
3.2. METHODOLOGY	15
4. INNOVATION AND HPWP: UNIVARIATE ANALYSIS	16
4.1 INNOVATION	16
4.1.1. <i>Evolution of the EIS</i>	16
4.1.2. <i>The EIS in 2015</i>	18
4.2. HIGH WORK PERFORMANCE SYSTEMS	24
4.2.1. <i>Organizational Structure</i>	24
4.2.2. <i>Ability</i>	26
4.2.3. <i>Motivation</i>	28
4.2.4. <i>Opportunity</i>	30
4.2.5. <i>Emotional intelligence</i>	31
4.2.6. <i>Synthetic index of HWPS</i>	32
5. HPWP AND INNOVATION PERFORMANCE: HOW DO THEY RELATE?	35
5.1. THE LINK BETWEEN HPWPS AND INNOVATION: A BIVARIATE ANALYSIS	35
5.2. THE LINK BETWEEN HPWPs AND INNOVATION: A MULTIVARIATE ANALYSIS	38
6. CONCLUSIONS	41

7. REFERENCES.....	42
APPENDIX	45

TABLE OF FIGURES

Figure 1. Kline’s Chain-Link Model	7
Figure 2. Measurement Framework based in the EIS	14
Figure 3. Evolution of EU Innovation Index from 2015 to 2022	16
Figure 4. ESI change of the EU groups of innovation. 2015-2022.....	17
Figure 5. ESI change of the EU’s States Member. 2015-2022 (%)	18
Figure 6. EU Member States’ Innovation performance in 2015.....	18
Figure 7. EU Performance change by dimensions. 2015.....	19
Figure 8. EU performance change by Framework Condition	20
Figure 9. EU performance change by Investment.....	21
Figure 10. EU performance change by Innovation Activities	22
Figure 11. EU performance change by Impacts.....	23
Figure 12. Employees can adapt their working hours within certain limits, by countries in 2015	24
Figure 13. Working in teams, by countries in 2015	25
Figure 14. Working in full autonomy teams by countries in 2015	26
Figure 15. Rotation of tasks by countries in 2015	27
Figure 16. Training paid by the employer by countries in 2015.....	28
Figure 17. Perception of Fair Pay of workers by countries in 2015.....	29
Figure 18. “I receive the recognition I deserve for my work” by countries in 2015	29
Figure 19. Work involving learning new things by countries in 2015	30
Figure 20. Good Prospects for Career Advancement by countries in 2015	31
Figure 21. Emotionally disturbing jobs by countries in 2015	31
Figure 22. Discrimination at work by countries in 2015	32
Figure 23. HPWS Index for EU (28) Countries 2015	35
Figure 24. Scatter Plot of Innovation and HPWS in 2015	36
Figure 25. Correlation between Innovation performance and Structure. 2015	36
Figure 26. Correlation between Innovation performance and Ability. 2015.....	37
Figure 27. Correlation between Innovation and Motivation. 2015	37
Figure 28. Correlation between Innovation performance and Opportunity. 2015	38
Figure 29. Correlation between Innovation performance and Emotional Intelligence. 2015	38
Figure 30. Projection of variables in the first factorial planes (1-2)	39

Figure 31. Projection of countries on the first factorial plane40

Figure 32. Cluster analysis: group of countries40

TABLE OF TABLES

Table 1. The independent variables, their definitions and expected relationship with innovation 8

Table 2. Framework Condition for Spain, Germany and EU average20

Table 3. Investments for Spain, Germany and EU average21

Table 4. Innovation Activities for Spain, Germany and EU average22

Table 5. Innovation Activities for Spain, Germany and EU average23

Table 6. HPWS Index by EU (28) Countries 2015. Total average and by sub-categories34

COUNTRY CODES

AT	Austria	FI	Finland	NL	Netherlands
BE	Belgium	FR	France	PL	Poland
BG	Bulgaria	HR	Croatia	PT	Portugal
CY	Cyprus	HU	Hungary	RO	Romania
CZ	Czech republic	IE	Ireland	SE	Sweden
DE	Germany	IT	Italy	SI	Slovenia
DK	Denmark	LT	Lithuania	SK	Slovakia
EE	Estonia	LU	Luxembourg	UK	United kingdom
EL	Greece	LV	Latvia		
ES	Spain	MT	Malta		

ABSTRACT

This study investigates the relationship between the so-called High-Performance Work Practices and innovation in European Union countries. We use aggregated data from the European Working Conditions Survey and the European Innovation Survey. We incorporated univariate, bivariate, and multivariate statistical methodologies. In addition, we apply cluster analysis to identify patterns in the link between High-Performance Work Practices and innovation performance across EU countries.

The results confirmed the positive relationship between HPWS and innovation performance. The findings suggest that countries characterized by more advanced HPWP are more innovative. Moreover, the results allowed for identifying three different patterns of behaviour concerning the link between both variables.

Insights from our study are relevant because they suggest that there might be a way to stimulate innovation. This study creates a basis that may lead to further research on the subject. Moreover, the findings of the study extend the understanding of the gap between the European Union countries and the pattern it follows.

Keywords: Entrepreneurship, High-Performance Work Systems, Innovative performance, Organizational management

1. INTRODUCTION

Globalisation has changed society. Economic, social and technological changes as well as the expansion of knowledge are becoming faster and fiercer, as is the competitiveness of companies, markets and countries. Today's fast-paced competitive environment forces companies to be increasingly agile and flexible. Companies must continuously manage change and remain resilient to survive. Hence, internal organisational forms and entrepreneurship are expected to become increasingly integrated to adapt to continuous change. Innovation, on the other hand, is seen as a driver of economic progress, benefiting consumers, businesses and the economy. It creates a competitive advantage by introducing new processes, services, products and ideas.

There is a debate in the literature on the relationship between organisational forms and innovative performance. Some authors argue that some organisational forms may be more compatible with innovation than others may. More specifically, it is argued that firms that use horizontal and flexible organisational forms, known as High-Performance Work Practices (HPWP), are likely to be more innovative than firms with more hierarchical organisational forms. HPWP is defined as a set of human resource activities and decisions that could drive innovation, including flexible working practices and low hierarchical structures. On the other hand, however, it argues that there is insufficient empirical evidence to support such a causal relationship. This study aims to contribute to filling this empirical void. The questions that we would like to answer is: Can the high-performance work system drive innovation? Are there different patterns of implementation of HPWPs in the European Unión countries? We are not going to be able to answer the first question, as it would require addressing the causality between HPWP and innovation, which is beyond the scope of this study, however, we do study whether or not there is a relationship between the two variables.

More specifically, this paper aims to study the relationship between so-called High-Performance Work Practices and innovation performance in European Union countries in 2015 (the most recent year with available data), with a special focus on Spain and Germany. These two countries are selected for cultural, economic and personal reasons. Antonio Machado's famous quote "*La España de Charanga y Pandereta*" has been presented when describing Spain, while "to be Germanic" is someone who is organised, analytical and has problem-solving skills. Although these two countries share a common history, nowadays one could say that they are very different. To conduct this study, we use data from the European Working Conditions Survey and the European Innovation Scoreboard. We apply a statistical methodology based on univariate, bivariate and multivariate analyses. Regarding the latter, we use factor analysis and cluster analysis to identify patterns across EU countries concerning the relationship between innovation and HPWP.

The structure of this study is as follows. After the introduction, section 2 reviews the literature on organisational forms and innovative activity. Section 3 explains the methodology used in the study. Sections 4 and 5 present the results of the univariate and bivariate and multivariate analyses, respectively. Section 6 draws the main conclusions and opens up new lines of research.

2. A BRIEF APPROACH TO ENTREPRENEURSHIP AND INNOVATION

2.1. ENTREPRENEURSHIP

Entrepreneurship is critical and crucial for companies' survival, profitability and growth. Companies are mainly driven by entrepreneurs' activities that stimulate creativity and innovation, bearing in mind that they also foster a culture of risk-taking throughout organizational operations, which can reinforce the company's position in existing markets (Shamsuddin et al., 2012).

In a nutshell, entrepreneurship is regarded as a relevant element of successful organizations. Entrepreneurial behaviour's main characteristics are personal initiative and innovation. On the one hand, individual initiative relates to proactive performance characterized by self-starting

(when the impetus for action comes from the entrepreneur), pro-activeness (focus on anticipating and preparing for the future) and persistent behaviour (being resilient and overcoming barriers). (Frese et al. 2014). Successful entrepreneurs have high scores on achievement motivation, characterized by hope for success rather than fear of failure. (Brandstatter, 2011).

On the other hand, regarding innovation, entrepreneurship can be understood as the effort to pursue innovation in an uncertain environment. Innovation is a process that generates added value and freshness in the company, by developing new processes, solutions, products and services and new marketing methods. (McFadzean et al., 2005).

Unlike personal initiative, entrepreneurial innovation is only partly under the entrepreneurs' control (Ravasi and Turati, 2005). Certain aspects can contribute to the innovative process as the environment (clients, suppliers, among others), the structural characteristic of the company (size, market, technological level, localization, among others), and especially, the management.

2.2. INNOVATION

As noted, the main focus of this study is innovation and its relation to management practices. To do so, first, we will make clear the definition of innovation with which we will work. Second, we will go through the phases involved in an innovation project. Finally, we will carry out an analysis of the relationship between some structural variables and innovation.

2.2.1. Concept of innovation

There is a variety of definitions and different conceptualisations of innovation. If we understand innovation in the sense of “an economic concept rather than a technological one” as Joseph Schumpeter (2003) did, we could understand innovation as it is defined in the Oslo Manual. “An innovation is a new or improved product or process (or a combination thereof) that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).” The Oslo Manual states that knowledge, novelty, value creation and preservation are key components of innovation.

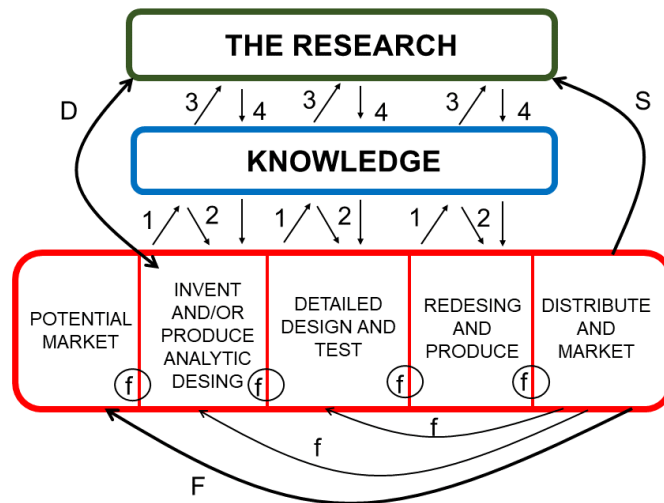
The 4th Edition of The Oslo Manual classifies innovation into two main types: product innovation and business process innovation. The first “is a new or improved good or service that differs significantly from the firm’s previous goods or services and that has been introduced on the market”. The second is a “new or improved business process for one or more business functions that differ significantly from the firm’s previous business processes, and that has been brought into use by the firm”. (OECD/Eurostat (2018), Oslo Manual, 2018).

2.2.2. Phases of the innovation process

Just as there is no perfect way to define innovation, neither is there a perfect way to conceptualize its process. Innovation results from complex activities with many elements and interactions that make it difficult to summarize them in just one process.

As for the complexity of innovation, it is worth mentioning Kline's Chain-Link Model (Kline and Rosenberg, 1986) since, as the Oslo Manual states: “innovation is based on a learning process that draws on multiple inputs and requires ongoing problem-solving” and not only just a simple linear model is needed. As shown in Figure 1, this model consists of different paths of information, communication and cooperation. It proposes five paths that connect three relevant areas in the innovation process: research, knowledge and the central chain of innovation. (Velasco et al., 2007).

Figure 1. Kline's Chain-Link Model



Source: Kline and Rosenberg (1986) and own elaboration.

The path starts when a new idea is created due to a need in the market. Creativity can play an important role in this phase. While creation involves the generation of new combinations of ideas, innovation consists of the input of resources to implement that creation. The level of creativity in organizations could be different depending on the organizational structure and the importance the organization gives to the creativity. Having specialized creative departments, flexibility and group projects could make a difference. May also be important to consider the environment of the organization: Fitting and clear goals, an appropriate information collection and communication (formal or informal), encouragement to explore from new angles, the feeling of support, a comfort environment, a fair evaluation and development, for example (Kono, 1988).

However, at the heart of the matter is human resources. Employees are the “hands and brains through which the whole organizational process comes to life” (Mehmood et al., 2013). A company needs to get its full potential out and create job satisfaction, and this could only be possible when employees perform efficiently and are motivated. Studies have found that the best and most effective strategy is having a fair and significant reward system (Mehmood et al., 2013).

The second path consist of sequence of feedback links where all the phases are connected between each other: The one with the previous (f) and all of them with the end-product (F). They share information about the need the market have that helps to improve the process (Velasco, et al. (2007).

The third path joins the research and knowledge with the central chain of innovation. If any issue comes up, existing knowledge is used (1). If the knowledge has a solution, the information is returned to the idea (2). If not, a research is needed (3) and later, the new information will be added to the “knowledge” (4) (Velasco et al., 2007).

In the fourth path, the research and invention are connected (D). The relation is two-way. On the one hand, new findings can affect and improve the idea, or the idea can drive the investigation with the creation of new needs (Velasco et al., 2007).

Finally, the connection between the market and research in created in the fifth path (S). In this linkage support of scientific research by instruments, machines, tools and procedures are given (Velasco et al., 2007).

2.2.3. Structural Variables

Innovating is not only about having an idea, implementing it and making it grow. We must take into account a set of variables when talking about innovation, as well. Some of these variables can relate positively or negatively to innovation (Damanpour, 1991). These main variables are specialization, differentiation professionalism, formalization, centralization, technical knowledge and slack of resources, external communication, internal communication and vertical differentiation. Table 1, made by me and inspired by the seminal paper by Damanpour (1991), who presents an overview of definitions of each variable and the expected relations with innovation.

Table 1. The independent variables, their definitions and expected relationship with innovation

INDEPENDENT VARIABLES	DEFINITIONS	EXPECTED RELATIONSHIP
Specialization	Different specialities within an organization	Positive
Functional Differentiation	Represents the degree to which an organisation is divided into different units.	Positive
Professionalism	Reflects the professional knowledge of the members of the organisation, both in terms of training and experience	Positive
Formalization	The following rules and procedures used on the organisation's activities	Negative
Centralization	Concentration of power (decision-making) and authority	Negative
Technical knowledge and slack of resources	The level of availability of resources, technical knowledge and potential to manipulate them	Positive
External communication	Ability to connect with the environment	Positive
Internal communication	The communication among the organization	Positive
Vertical differentiation	The levels of hierarchy	Negative

Source: Damanpour (1991) *Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators*. And own elaboration

- Relating the **specialization**, the wider the variety of specialists is the broader the knowledge base and the brainstorming. (Damanpour, 1991)
- **Functional differentiation** seems to be positively related to innovation. This is because we relate it with actions that lead to innovation such as value of constructive conflict, absence of a single professional ideology and cross-fertilization of ideas. (Damanpour, 1991)
- **Professionalism** is positively associated with innovation because it brings knowledge, self-confidence, power, professional standards, external ideological input, extension of boundaries, and a commitment to move beyond the status quo. (Damanpour, 1991)
- Low **formalization** gives openness to an organization, which is necessary for developing innovation. Written rules and regulation can obstruct creativity. (Damanpour, 1991)
- **Centralization** makes the organisation more hierarchical and rigid. Flexibility and dispersion are needed to innovate properly. (Damanpour, 1991)

- A great **technical knowledge and slack of resources**, can allow the organization to purchase innovation, absorb failure, cover the costs, understand, and develop easier the procedures of innovation (Damanpour, 1991).
- **External communication** is essential because exchanging information with the environment can be crucial for decision-making and innovation (Damanpour, 1991).
- Without a proper **internal communication**, the dispersion of ideas and the amount of diversity decreases. In addition, a good internal connexion strengthens and improves the environment (Damanpour, 1991).
- **Vertical differentiation** makes the communicating and innovating more difficult due to the increase of hierarchical levels (Damanpour, 1991).

2.3. ORGANIZATIONAL MANAGEMENT

Organizational management is an analysis of specific components and their influence in the company when designing the organizational structure. This analysis aims to achieve the most effective design for the organization. There are multiple designs and each of them has different strengths and weakness.

In this section we will explore two structural philosophies and some of the most popular and important formal organizational structures. We will also examine the effect of a reward system in innovation.

2.3.1. Formal Structures

In **Formal Structure**, the official roles and positions of all members of the system are clearly defined and demarcated from each other; social relationships within organizations are institutionalized and legitimized first and foremost, if not exclusively, as hierarchical relations (Zeitlin, 1974). How an organization is structured depends on the degree of centralization, the chain of command, the extent of control and the degree of specialization. We will analyze, first, two structuring philosophies (mechanistic and organic), and second, some types of structures, such as, functional, divisional, matrix and holacracy.

Structuring Philosophies

An organizational structure is the formal system of task and authority relationships that an organization establishes to control its activities. Different structures give to the company different cultures. The Mechanistic Structures are tall, highly centralized and standardized, this gives people little personal autonomy and behaviors such as being cautious, obeying and respect. On the other hand, Organic Structures are flat and decentralized and allow people more freedom and control over their own activities and incentivizing creativity and risk taking (Jones, 2013).

In **mechanistic structures**, people behave predictable and stable. With a clearly defined hierarchy, decision-making is centralized, subordinates are closely supervised with little personal autonomy, and information flows mainly in a vertical direction down. There is a one-to-one correspondence between a person and a task. Standardization is one of the main points of this structure. (Jones, 2013). In this kind of organization, promotion is normally a slow and related to performance. The rigidity of a mechanist structure is the best one to face stable environments. The procedures fit the mature development stage because cost reduction and productivity become the key for competitive advantage.

Organic structures are the opposite of the mechanistic structure. They promote flexibility, are decentralized so decision-making is distributed and roles are loosely defined. Employees from different sections work together, they get involved in another's activities and make mutual adjustment. This high level of integration allows employees to develop new kinds of job skills. (Jones, 2013).

From an innovative point of view, which of both organizational structures is most suitable? Based on previous research about innovation, an organic structure seems to be most appropriate. Results indicate that, in general, there is a link between higher levels of innovation and more organic structures. Firms characterized by flexibility in administrative relations, informality and vested in situational expertise appear to fuel innovation. Nevertheless, mechanistic structures, characterized by rigidity in administrative relations, formality and strict adherence to bureaucratic values and principles, were said to impede innovation (Shamsuddin et al., 2012). In addition, an organic structure impulses pro-activeness and risk-taking thanks to the high level of integration and flexibility.

However, is an organic structure better than a mechanistic structure? As we have mentioned in the beginning, both have different implications and objectives. *“Would you want to use an organic structure to coordinate the armed forces? Probably not”* (Jones, 2013). This is because stability, authority, predictability and standardization are used to prevent disasters and empower cooperation. On the contrary, companies like Google cannot work properly in a mechanistic structure since they focus on innovation, creativity, self-thinking and proactivity.

Types of Structures

In 1983, Mintzberg defined five structures: Simple Structure¹, Machine Bureaucracy², Professional Bureaucracy³, Divisional Form⁴, and Adhocracy⁵. However, as our society has evolved, and the environment has changed, this taxonomy has collapsed towards a classification made up the following four structures. (Dr. Stefanie Habersang, 2021)

The first structure is the **Functional Structure**. It is defined as *“a design that groups people together on the basis of their common expertise and experience or because they use the same resources”* (Jones, 2013). This type of structure divides groups by functions or departments to increase the effectiveness to achieve the company's goals. It focuses on specialization of employees' skills and abilities for increasing productivity. Norms and values are developed to allow employees to become more efficient at what they do. However, the main disadvantage of this type of structure is the success, that is, the more the company grows and differentiates, the more problems are created such as, communication, measurement or location due to becoming more distant and losing control. If growing is a problem, innovation it is too. (Jones, 2013). The functional structure is not compatible with innovation. There is no flexibility, the centralization is high, and it is too formalized.

Secondly, according to Jones (2013), a **Divisional Structure** is a structure in which functions are grouped together according to the specific demand of products, markets or customers. The objective is to create smaller and more manageable subunits. The first type of divisional structure is the Product Structure, where products (goods or services) are grouped onto separate divisions according to their similarities or differences (Jones, 2013). The second type is the Geographic Structure, in which divisions are organized according to the requirements of the different locations

¹ Simple Structure. Coordination through direct supervision from the top.

² Machine Bureaucracy. Coordination through standardization of work processes.

³ Professional Bureaucracy. Coordination through standardization of skills.

⁴ Divisional Form. Coordination through standardization of outputs.

⁵ Adhocracy. Coordination through mutual adjustment

in which an organization operates. Lastly, the Market Structure that aligns functional skills and competences with the product needs of different customer group (Jones, 2013).

Divisional Structure has multiple advantages in corporate entrepreneurship. As we have said before, entrepreneurial behavior mainly consists on pro-activity, innovation and risk-taking. This structure gives the chance of increasing the efficiency of activity of the organization in general due to that this structure allows the company to adapt to certain markets and reduce the decision-making time. (Gurianova et. al, 2015). This easy adaptation of the market allows the organization to be more innovative. Mintzberg (1983) also argues that it promotes independence for each of the divisions and reduces global level risk. The only disadvantage could be the lack of control. (Jones, 2013)

The third type of structure is the **Matrix Structure**. Jones (2013) describes it as “*a structure in which people and resources are grouped in two ways simultaneously: by function and by project or product*”. The matrix structure is seen as the best structure for innovation. This structure captures both efficiency and specialization from the functional structure and flexibility from the divisional structure. With the Matrix, the functional and communication barriers between functions are dissolved and this gives the opportunity to employees to learn from each other and develop new skills. According to the literature, with this structure the companies can adapt and reduce the decision-making time as efficiently as the divisional structure. The Matrix is a complex and risky but an innovative structure. (Saunila et al. 2014). This can also be a disadvantage since the control structure is still quite low (Jones, 2013).

Finally, one of the newest types of structure, **Holacracy or Self-Managing Teams** (Robertson, 2015) takes the idea of the adhocracy one step further. This system is based on separating people from functions, assigns activities to specific roles, adjusts roles as companies/environments evolve, and makes sure roles have great clarity, in short, a “no boss” system with a radical decentralization and self-organization. We could say that it is a super flexible organic organization that boosts innovation with thinking on purpose, process approach, autonomous autonomy and working intelligently (Chen, 2017). It incentives innovation and creativity without suffering from bureaucracy.

2.3.2. Reward Systems

As we have mentioned regarding innovation, a key for innovating is the brain that will think, the hands that will work, and the mouths that will communicate the employee. The implementation of fair and appropriate reward systems will increase employee’s self-efficacy and as a result their pro-activeness and tendency to innovation.

A reward system is not only about money but also about training and development, compensation and recognition. Talking about training and development, competence and skills can be developed in various topics such as know-how (product know-how, technological trends or legal context), creativity (techniques, problem solving skills or design thinking), social capacities (teamwork, conflict management or networking) and implementation of innovation (project management, resource acquisition or business planning). The second type of reward is compensation, when remuneration and firm’s goals, individual responsibility and feedback are linked. And finally, recognition, when acknowledgement of an employee or team ether behaviour, effort or business result that supports the organization’s goals and values, which has clearly been beyond normal expectations. For instance, “the best employee” wall, non-monetary treats or appreciation events.

However, which type of reward system fits the best? According to Social Exchange Theory⁶ there are two types of rewards: economic exchange and social exchange. The economic one refers to formal transactional contract and the social it is about relationships. (Janssen, 2000). In the investigation by Yousaf et al. (2014) about the impact of financial and non-financial rewards, they conclude that both are equally important in motivating the employees. *“When efforts are fairly rewarded in such a social exchange relationship, employees are willing to reciprocate by discretionary behaviours like innovative activities that go beyond contractually determined job achievements”* (Janssen, 2000).

Different companies apply different reward strategies considering their environment, culture, experiences, goals, mission, etc. but all of them need to find a balance between the reward they get and the performance. Rewards are tools that increase the performance and can change the behavior in employees and therefore boosts the entrepreneurial behavior.

Proactivity is vital to the promotion of an innovative workplace and *“research has demonstrated that proactive behaviors are likely to occur when employees have role bread self-efficacy”* (Lee et al., 2019). Self-efficacy, according to social cognitive theory, can be trained and developed by the rewards system. (Schunk et al., 2009).

2.3.3. High Performance Work Systems

Employees are essential for a proper innovation. It makes sense to advise the organization to focus on the human resources management and investigate how to improve it and make it full efficient. That what are about the High-Performance Work Systems (HWPS).

The HWPS are management techniques that supposedly increase the overall performance and/or effectiveness of the organization by making better use of the skills of employees and improving their commitment to the organization (Heery et al., 2008). HPWP practices are pictured as a separate set of Human Resources (HR) practices focused on expanding employees' capacities, improving their inspiration, and developing possibilities for employees to be more interested and engaged at work. Regarding the Social Exchange Theory, with the implementation of these HPWS, workers may feel listened and considered giving them motivation and reasons for getting more involved at work, be more faithful and show better performance as in return. (Zreen, et al., 2021). Being more entrepreneurial or innovative can be trained and developed. A personal initiative training approach which teaches and promotes a proactive/self-efficacy mindset that focuses on entrepreneurial behaviors can have more success than traditional business training. (Campos et al, 2017).

Despite the accumulation of research papers and the generally positive findings, there is a lack of databases combining information on innovative business practices, work organization characteristics and human resource practices. (Castrillón et. al, 2004). On the one side, some researchers think that the HPWS are a collection of multiple practices with no connections, and on the other hand, others think that these practices complement and support each other (Obeidat et. al, 2016). Strategic HR researchers emphasize the superior value of HPWP systems over individual HPWPs. According to Boselie et al. (2005) review, the three most commonly used theoretical perspectives are the **contingency view** (e.g., Balkin and Gomez-Mejia, 1987; Schuler and Jackson, 1987), the **resource-based view (RBV) of the firm** (Barney, 1991), and the **ability motivation- opportunity (AMO) framework** (Appelbaum et al., 2000).

The Contingency View states that outcomes depend on contextual conditions. In other words, effectiveness is the result of adjusting the characteristics of the organisation, to the contingencies that reflect the organisational situation. These contingencies could be the environment, the size

⁶Social Exchange Theory: a model that states that relationship between two people is created through a process of cost-benefit analysis. By Homans (1961), Blau (1964) and Emerson (1962, 1972).

or the strategy. “*Because the fit of organizational characteristics to contingencies leads to high performance*” (Donaldson, 2001).

Based on the Resource-Based View (RBV) (Barney, 1995), the firm has to focus on the internal resources of the firm as the determinant competitive success. Barney defined internal resources as “all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness”. Barney also adds that these resources must be rare, valuable, imperfectly imitable and non-substitutable to ensure competitiveness. In connection with HPWS, the theory perceives workers as valuable, self-managing and improvement-oriented, whose performance can be trained and developed. (Özçelik et al, 2016).

Last but not least, the AMO Framework by Appelbaum et al. (2000) states that employees will perform well when they are able to do so, they are motivated or if the environment provides the necessary support. (Obeidat et al., 2016). The model describes three dimensions:

- Ability-Enhancing, the degree of investment in HR practices to improve the knowledge, skills and abilities, for example, offering courses (it is likely to enhance financial performance and productivity).
- Motivation-Enhancing, the degree of investment in HR practices functioning to motivate employee behaviour, for example, incentives or feedback (it could lead to productivity).
- Opportunity-Enhancing, practices that provide workers with opportunities to participate in decision-making and increase confidence, for example, information sharing or quality circles (It can enhance performance).

3. DATA AND METHODOLOGY

3.1. DATA

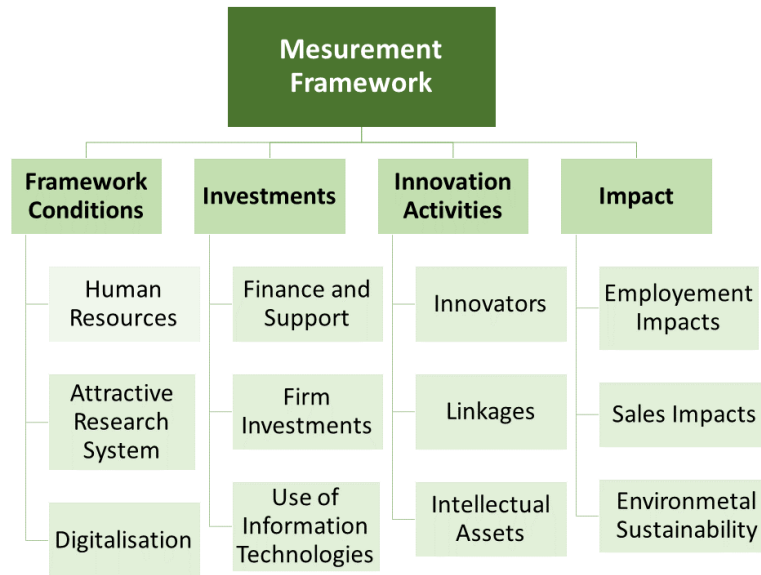
In this study, we use two complementary sources of information for European Union (EU) countries. The first provides information on the innovative performance of European countries while the second provides information on the so-called High-Performance Work Practices implemented in European manufacturing companies.

3.1.1. Innovation data

For the analysis of innovation, the European Innovation Scoreboard (EIS) drawn up by the European Commission is used. This survey provides a comparative assessment of the research and innovation performance of the EU Member States and the relative strengths and weaknesses of their research and innovation systems (European innovation scoreboard 2022). We have collected information on the EIS from 2015 to 2022. As we will explain later, the reference year for our study will be 2015. However, in order to present updated information on the EIS, we believe it is timely to present the evolution of this indicator during the period 2015-2020.

The European Innovation Scoreboard uses the *Summary Innovation Index* as measurement in which we can distinguish 4 types of indicators: Framework Conditions, Investments, Innovation Activities, Impact. (Figure 2)

Figure 2. Measurement Framework based in the EIS



Source: European Innovation Scoreboard 2022 and own elaboration

- **Framework Conditions:** gather the main factors driving the external innovation performance: Human resources (availability of high-skilled and educated workforce), Attractive Research System (measurement of international science competitiveness) and Digitalization (level of digital technologies)
- **Investments in innovation** in both public and business sector: include Finance and Support (private funding, universities R&D and government R&D tax support), Firm investments (R&D and Non-R&D invest to generate innovation) and Use of Information Technologies (captures the use of them)
- **Innovation Activities:** cover different dimensions of innovation in the business sector: Innovators (share of Small and Medium Size Enterprises (SMEs) that introduced innovations to the market), Linkages (innovation capabilities looking at some collaboration efforts) and Intellectual Assets (Intellectual Property Rights)
- **Impacts** of innovation in Employment, Sales and Environment.

In this paper, we follow the classification of EU countries used in the EIS, which groups the EU member states in four groups according to their innovation performance.

- **Innovation Leaders** composed by states, which their innovation performance is 125% above the EU average. In 2015, the leaders were Sweden, Denmark, Netherlands, Finland, Luxemburg and Austria.
- **Strong Innovators** includes Members between the 100% and 125% above the EU average: Belgium, Ireland, Germany, France and Slovenia.
- **Moderate Innovators** are the State Members whose innovation performance rate is between 70% and 100% above the EU average, that is, Spain, Portugal, Malta, Estonia, Italy, Czechia, Cyprus and Lithuania
- **Emerging Innovators**, less than the 70% of the EU average. Composed by Hungary, Slovakia, Greece, Croatia, Poland, Latvia, Bulgaria and Romania.

3.1.2. High-performance work practices

For the analysis of High Work Performance Systems (HWPS), we use the information from the European Working Conditions Survey (EWCS) drawn by Eurofound. This survey collects data on the working conditions of European workers (from both EU and other non-EU countries, but we will only consider the European countries (EU28)). The survey we use is the one published in 2015. In 2021, a new survey was conducted, but the data were not available at the time this study was written.

From all the information contained in the survey, we chose the following questions that we considered most relevant for our purposes since they best capture the HPWPS. These questions were classified as follows:

ORGANIZATIONAL STRUCTURE (F1)

- *F1.1. How are your working time arrangements set?*
- *F1.2. What level of autonomy does your team have?*

BASED ON THE AMO MODEL

- ABILITY (F2)

- *F2.1. Does your job involve rotation of tasks?*
- *F2.2. Have you had training paid by your employer?*

- MOTIVATION (F3)

- *F3.1. Considering all my efforts and achievements, I feel I get paid appropriately*
- *F3.2. I receive the recognition I deserve for my work*

- OPPORTUNITY (F4)

- *F4.1. Does your work involve learning new things?*
- *F4.2. My job offers good prospects for career advancement*

EMOTIONAL INTELLIGENCE (F5)

- *F5.1. Does your job involve being in situations that are emotionally disturbing for you?*
- *F5.2. Have you been subjected to discrimination at work in the last 12 months?*

3.2. METHODOLOGY

The methodology used in this study is a combination of univariate, bivariate and multivariate analysis. The univariate analysis consists of the individual study of the variables of interest. The bivariate analysis studies pairs of variables, particularly, we analyse the relationship between HPWPs and innovative performance in EU countries using correlations. Finally, the multivariate analysis examines the relationships between a set of variables. There are different ways to perform

this type of analysis, in our case; we have adopted Principal Component Analysis (PCA). PCA is a form of Factor Analysis used when the variables of interest are quantitative. The PCA aims to establish the interrelationships between a set of variables that identify a given reality intending to reduce the complexity. The variables selected are those listed in Table A1 in the Appendix.

We have completed the PCA with a Cluster Analysis that allows us to classify individuals (countries in our case) into groups, which are internally homogeneous, but significantly different from the rest of the groups. One of the virtues of this methodology is that it is visual as it allows the variables and countries to be projected on factorial planes, making it easier the interpretation of the results. The software used is SPAD.

4. INNOVATION AND HPWP: UNIVARIATE ANALYSIS

In this section, some preliminary results obtained from the European Innovation Scoreboard and the European Working Conditions Survey are presented. In order to do so, we first study the global evolution of innovation performance of European Union member states during the period 2015-2022. Second, we focus on the result in 2015 and analyse them more deeply dividing the information into the following dimensions and indicators: Framework Conditions, Investments, Innovation Activities and Impacts. Later, with a light emphasis on Spain and Germany, we shall give some findings about the High Performance Work Practices.

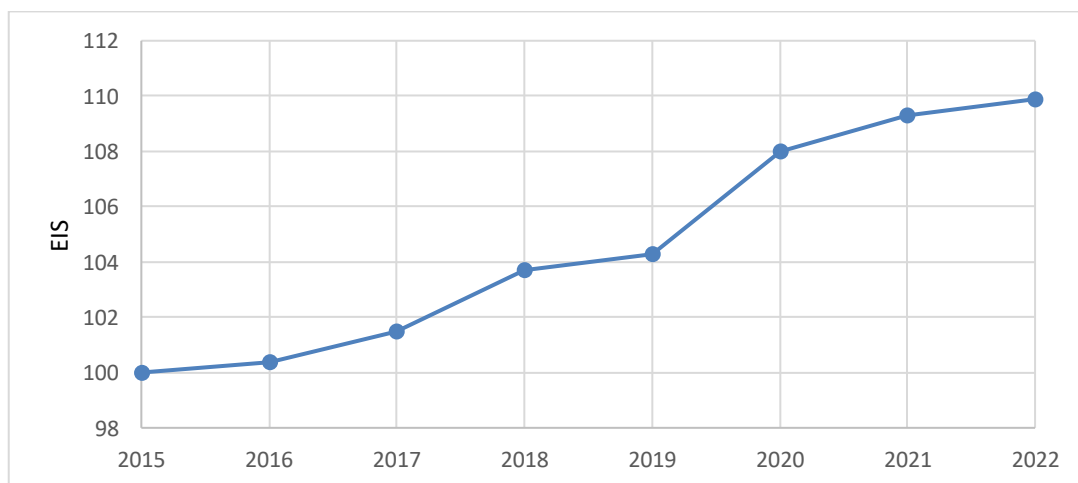
This descriptive analysis is relevant for at least two reasons. On the one hand, it is of intrinsic interest as it provides rich information on the variables of interest, and on the other hand, it allows one to choose the most relevant variables for the subsequent analysis based on Principal Component Analysis (PCA).

4.1 INNOVATION

4.1.1. Evolution of the EIS

As shown in Figure 3, the overall average innovation performance of European Union member states has increased during the whole period. However, the pace of growth has been uneven over the years. Rapid growth is observed in 2015-2020 and a slowdown in the last two years. Growth in the index from 2015 to 2020 was 8% and over the entire period (2015-2022) 9.8%.

Figure 3. Evolution of EU Innovation Index from 2015 to 2022. (2015 baseline)

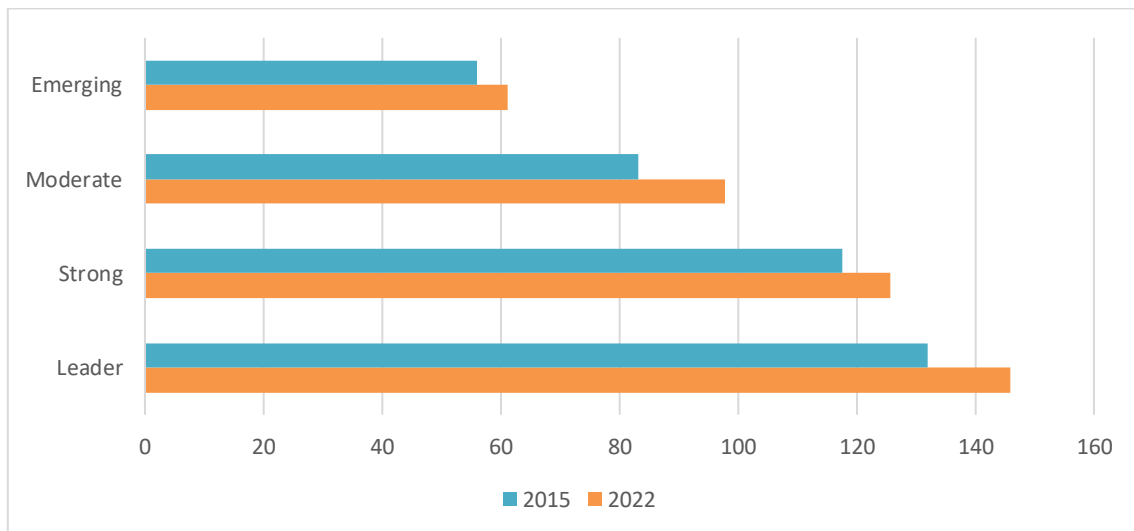


Source: European Innovation Scoreboard 2022 and own elaboration.

The EIS performance for the EU as a whole, however, has not been the same across all the countries. As noted, EU countries are classified into four groups according to their innovation performance: leader, strong, moderate and emerging innovators. During 2015 and 2022, there have been some significant changes in the EIS performance of each group, including a widening of the gap between most groupings and the group of countries that are considered emerging innovators (Figure 4). The performance of the EIS for those countries considered innovation leaders improved by 13.6% during the whole period. All the leaders' countries registered an improvement, especially Finland. Countries in this group are mostly Norden countries. If we look at the strong innovators' group of countries, we can see that they improved by 9,6% during the same period, widening the gap concerning leading countries. Cyprus stands out the most. Next, the moderators are the groups with the best improvement (14.3%), where almost all members improved above the EU average: Estonia (24.4%), Greece (24.2%), Lithuania (19.9%), Czechia (19.8%), and Italy (17.5%). Finally, in the case of emerging innovators, their overall performance improved by 6.4% (Figure 4). However, given that the pace of advancement in this group is slower than in the rest of the groups the difference with the latter has increased. They happen to be southeast countries.

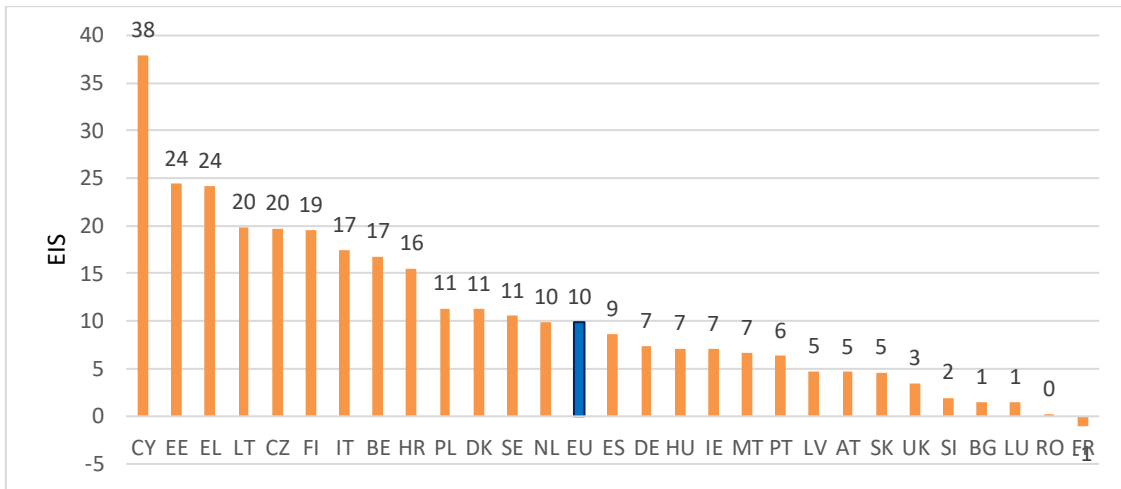
If we look at the state members individually (Figure 5), performance has increased most in Cyprus (38%), Estonia (24%), and Greece (24%). Ten members have improved between 10 and 20 per cent: Lithuania (20%), Czech Rep. (20%), Finland (19%), Italy (17%), Belgium (17%), Croatia (16%), Poland (11%), Denmark (11%), and Sweden (11%) and The Netherlands (10%). Thirteen States members have grown between 10 and 0: Spain (9%), Germany (7%), Hungary (7%), Ireland (7%), Malta 7%, Portugal (6%), Latvia (5%), Austria (5%), Slovakia (5%), United Kingdom (3%), Slovenia (2%), Bulgaria (1%), Luxembourg (1%) and Romania (0%). Meanwhile, France has decreased (-1%).

Figure 4. ESI change of the EU groups of innovation. 2015-2022



Source: European Innovation Scoreboard 2022 and own elaboration.

Figure 5. ESI change of the EU's States Member. 2015-2022 (%)



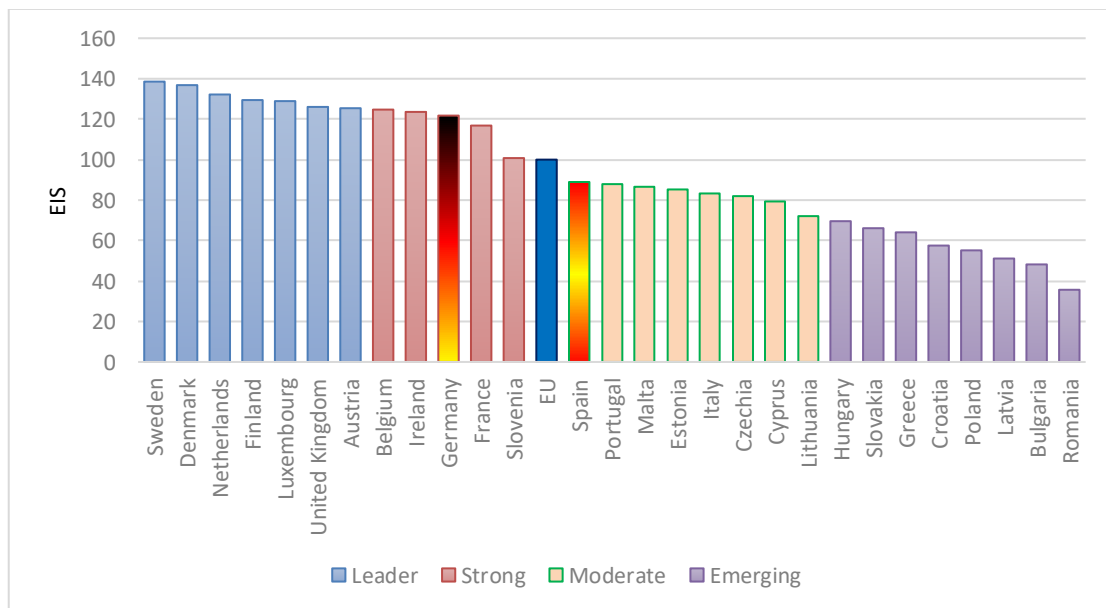
Source: European Innovation Scoreboard 2022 and own elaboration.

4.1.2. The EIS in 2015

Since we are interested in studying the relationship between the innovation and the high-performance work practices in the EU countries and bearing in mind that the reference year is 2015, we believe that it is worth presenting in more detail some specificities of the EIS for 2015.

Figure 6 displays the EIS in 2015 for each country. The top three more innovative countries were Sweden (136.8%), Denmark (132.2%) and The Netherlands (129.4%). On the other side, Romania (35.7%), Bulgaria (48.2%) and Latvia (51.1%) were the top three from the bottom. Spain was below the E average as a moderate country with 87.9% while Germany was above the average with 116.8% within the group of strong countries.

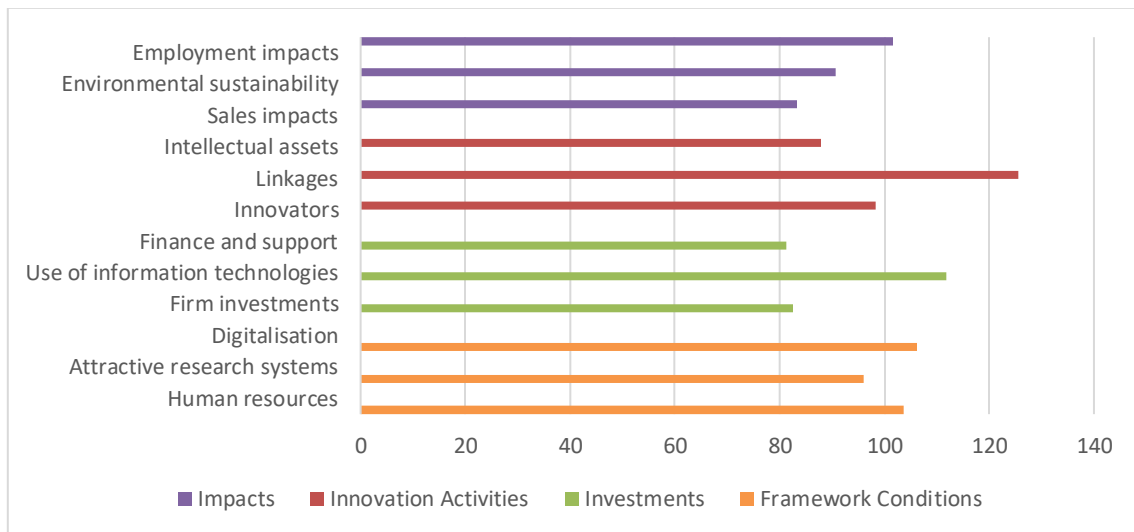
Figure 6. EU Member States' Innovation performance in 2015



Source: European Innovation Scoreboard 2022 and own elaboration.

Taking into account the four dimensions covered in the EIS: Framework Conditions, Investments, Activities and Impacts, Figure 7 shows that the European Union’s main factor that drives innovation external to the firm is Digitalization, with human resources nearby. In addition, most of the investment in the EU is in the use of information technologies. In the business sector, the best innovation capabilities appear when there are collaborations between innovative firms, private and public research and Job-to-Job mobility (Linkages). Moreover, the most significant effect of enterprise innovation is in employment.

Figure 7. EU Performance change by dimensions. 2015

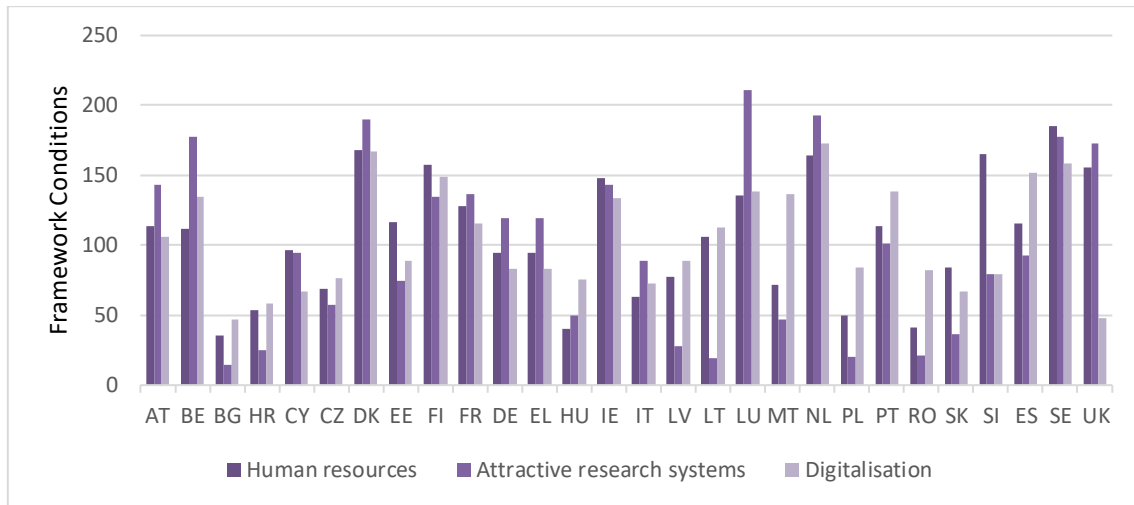


Source: European Innovation Scoreboard 2022 and own elaboration.

– **Framework Conditions**

The best availability of high skilled and educated workforce in the EU is Sweden. On the other hand, the country with the most attractive research system is Luxemburg. Netherlands is the country with the higher level of digital technologies. The country with the lowest level, in all indicators, is Bulgaria. (Figure 8).

Figure 8. EU performance change by Framework Condition



Source: European Innovation Scoreboard 2022 and own elaboration.

If we examine Spain and Germany closely (Table 2), we find that both are close to the EU average. Spain is above average in both digitization and the attractiveness of its research systems, while Germany only excels in the latter.

Table 2. Framework Condition for Spain, Germany and EU average

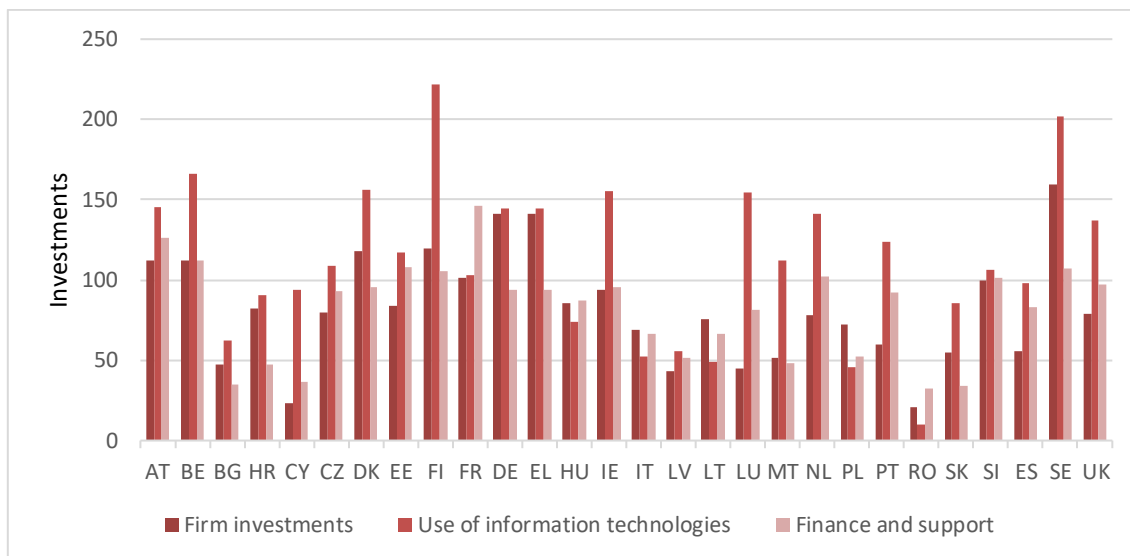
	SPAIN	EU AVERAGE	GERMANY
HUMAN RESOURCES	103.70	151.37	119.54
ATTRACTIVE RESEARCH SYSTEMS	96.11	92.98	94.95
DIGITALIZATION	106.23	115.22	83.26

Source: European Innovation Scoreboard 2021 and own elaboration.

– *Investments in innovation*

If we refer to investment in innovation (in both public and business sector), France is the country with the best finance and support. Again, Sweden is in the top with the firm investments in generating innovation, R&D or Non-R&D. Finally, the country that best uses the information technologies for innovating is Finland. This time, the worst country in terms of investment in innovation is Romania (Figure 9).

Figure 9. EU performance change by Investment



Source: European Innovation Scoreboard 2021 and own elaboration.

As far as Spain and Germany are concerned, they are above the EU average in finance and support and firm investments (Table 3). Nevertheless, Spain is below the average in the use of information technologies into innovation, unlike Germany.

Table 3. Investments for Spain, Germany and EU average

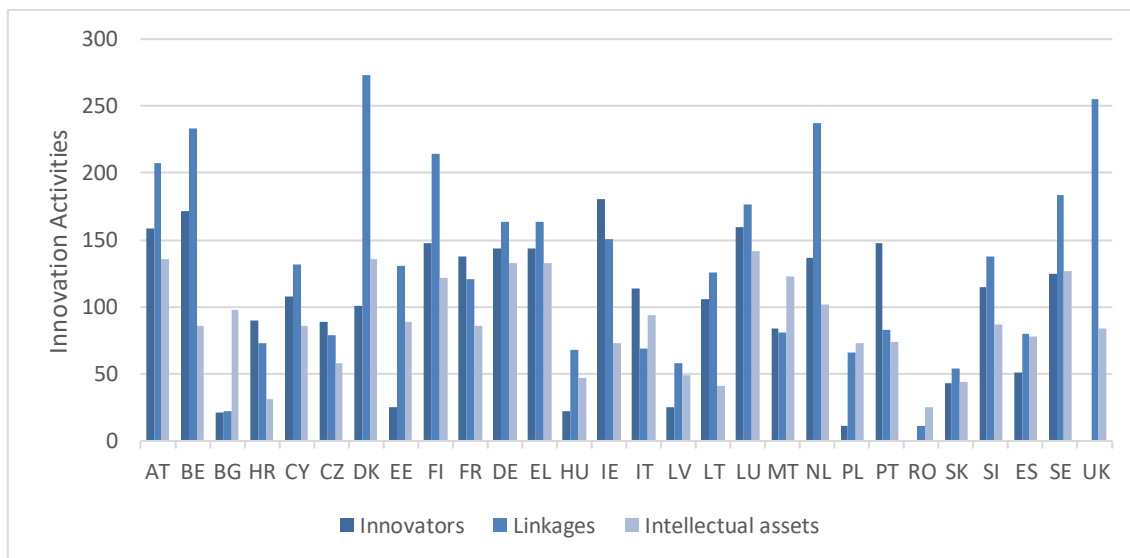
	SPAIN	EU AVERAGE	GERMANY
FINANCE AND SUPPORT	82.84	79.26	93.73
FIRM INVESTMENTS	97.83	79.37	144.57
USE OF INFORMATION TECHNOLOGIES	55.84	107.73	141.57

Source: European Innovation Scoreboard 2022 and own elaboration.

– ***Innovation Activities***

In the business sector of the EU, Ireland is the top in the use of innovators, Denmark in linkages and Luxemburg has the most intellectual property rights. Romania has also the worst ranking in all the dimensions (Figure 10).

Figure 10. EU performance change by Innovation Activities



Source: European Innovation Scoreboard 2021 and own elaboration.

Focusing on Germany and Spain, we can see (Table 4) that Germany is above the EU average in the entire dimension, meaning that in general, the use of innovators, linkages and intellectual assets in innovation is high comparing the rest of the countries. Spain is below Germany and the average in the entire dimension.

Table 4. Innovation Activities for Spain, Germany and EU average

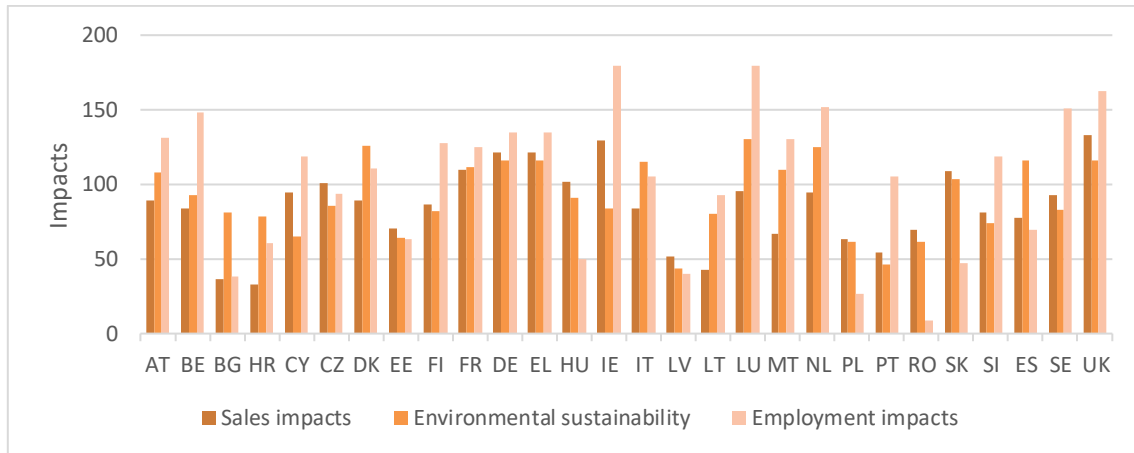
	SPAIN	EU AVERAGE	GERMANY
INNOVATORS	50.69	97.8	143.84
LINKAGES	79.65	123.07	163.33
INTELLECTUAL ASSETS	77.86	84.32	132.57

Source: European Innovation Scoreboard 2022 and own elaboration.

– *Impacts of innovation*

Innovation has a major impact on employment and the environment, specifically in Luxembourg and Ireland. About sales, we can see how Ireland is the country where innovation has the biggest impact on sales. We can also notice that in Romania, Croatia and Latvia the impact in all fields, is low, but that is because innovation performance is quite low in these countries. (Figure 11)

Figure 11. EU performance change by Impacts



Source: European Innovation Scoreboard 2021 and own elaboration.

On the one hand, in Spain, sales and employment have a lower impact comparing the EU average. On the other hand, Germany is above the average in those two impacts. In addition, both countries are above the average in environmental sustainability. (Table 5)

Table 5. Innovation Activities for Spain, Germany and EU average

	SPAIN	EU AVERAGE	GERMANY
SALES IMPACT	78.02	81.1	121.29
ENVIRONMENTAL SUSTAINABILITY	115.64	89.4	116.13
EMPLOYEMENT IMPACT	69.42	100.19	135.07

Source: European Innovation Scoreboard 2021 and own elaboration.

To sum up, innovation is not only measured by how much one invested but also by how and in what way is invested, and what output is obtained. Sweden has the highest investment in generating innovation and focuses on improving employees' skills as external innovation. Denmark, for example, relies on linkages to get a strong position in innovation rankings. The Netherlands is committed to digitalisation, and Luxemburg to research systems supported by a high use of the intellectual property. On the contrary, Finland has preferred to invest in information technologies. Countries with a low innovation index invested less and focused less on improving external and business innovation. In addition, it seems that northern countries tend to be more innovative (Sweden, Denmark, Finland, and The Netherlands).

Delving into the countries of Spain and Germany, the former is below the average while the latter is above. To be more specific, although in terms of investments and external innovation (framework conditions), the numbers are quite similar, the business sector in Germany is far from the Spanish one. The use of innovators, linkages and intellectual assets is better in all senses. This performance may explain why Germany is better in the innovation rankings. In terms of impact, Spain is also below Germany, but it is logical that the more you innovate, the more impact you generate.

4.2. HIGH WORK PERFORMANCE SYSTEMS

In this section, we analyse the HPWPs using the information from the ECWC. To do so, we follow the classification of the questions into the three categories previously indicated: organisational structure, AMO model and emotional intelligence.

4.2.1. Organizational Structure

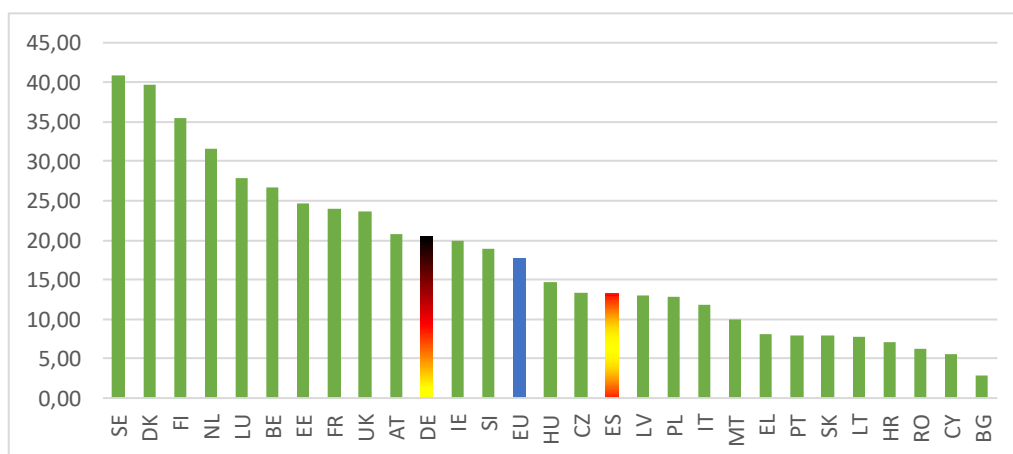
○ “How are your working time arrangements set?”

How working arrangements are set tells us about the flexibility of a company. If the company sets everything, it would suggest a centralized hierarchy. However, if workers have full control of their activity and the decision process is more decentralized, this flexibility could drive innovation though it could be a bit chaotic. The flextime (working hours within certain limits), however, could represent an adequate balance to foster innovation.

Results reveal that for most EU workers (56%), the company or organization arranges working time with no possibility for changing, while 16% of workers state that they determine their working time. The remaining 28% of employees can choose between several fixed working hours or have a degree of flexibility with some limits. The employees from this group were asked whether they were informed in advance if there was a change in their schedule, and only 31% (out of 28%) answered affirmatively. Moreover, it seems that the earlier they are notified, the better their work-life balance reports (Eurofound, 2017).

We have opted to focus on flextime to capture the degree of flexibility in different countries (Figure 12). One can notice how Nordic countries are at the top of the ranking: Sweden with 40.9%, Denmark with 39.6% and Finland with 35.4%. On the other hand, southeast countries are in the tale, such as Bulgaria (2.8%), Cyprus (5.5%) and Romania (6.3%). If we pay attention to Germany and Spain, we can see that German workers have more flextime that Spanish ones.

Figure 12. Employees can adapt their working hours within certain limits, by countries in 2015



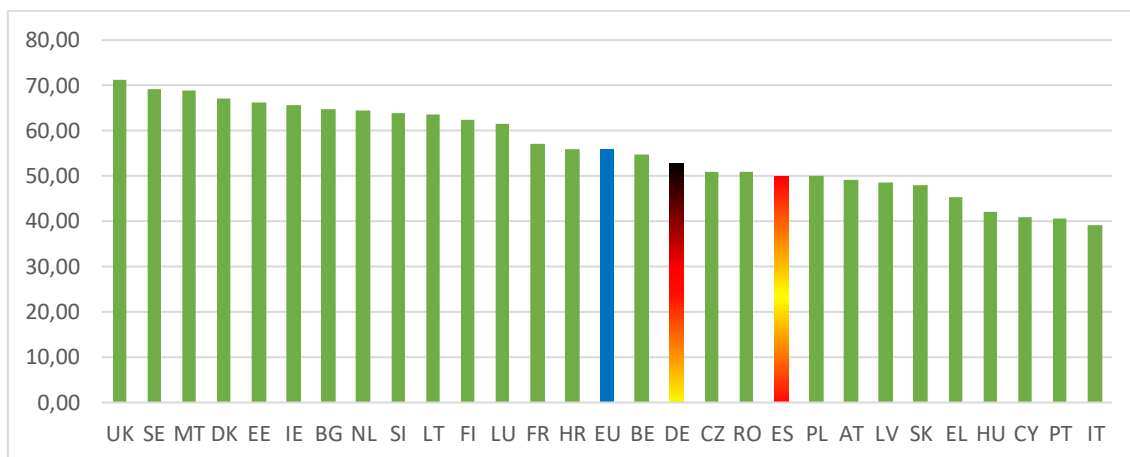
Source: Sixth EWCS and own elaboration

○ “Level of team autonomy”

The analysis of how widespread teamwork is can give us an insight into the degree of involvement of workers in the decisions that affect their work as well as give us some idea of the type of structure that is most prevalent in each country. More than half of the workers in EU work in teams (55.8%). United Kingdom (71.3%), Norway (69.3%) and Malta (68.8%) exhibit the highest

values while Italy (39%), Portugal (40.6%), and Cyprus (40.9%) have the lowest ones. We can note that in this variance, Germany (52.8%) and Spain (50%) are also below the average. (Figure 13).

Figure 13. Working in teams, by countries in 2015



Source: Sixth EWCS and own elaboration

It is worth looking at the autonomy of teamwork as an autonomous team can decide on its division of tasks, who will lead the team and their schedule. “Such autonomous types of teams have been recognised for their potential in improving organisational performance, using better the tacit knowledge of employees, and improving employees’ communication with actors outside their group” (Eurofound, 2017). Teamwork can be seen as “a double-edged sword by Eurofound, 2017, with positive and negative aspects: is more likely to learn new things, apply own ideas in work and have more help and support than working alone, but teamwork could also lead to work intensity, emotional disturbing situations and adverse social behaviour.

Sweden (27%), Finland (22.7%) and Slovenia (21.1%) are at the top in the ranking of team autonomy dimension. At the top, we find the northern countries, except for Slovenia, though it is considered a strong country related to innovation. Portugal (4.6%), Cyprus (5%) and Greece (6.10%) are in the tail, countries from the moderate and emerging groups.

Spain (13.4%) is much higher in the ranking than Germany (8.2%), contrary to our assumptions (Figure 14).

Figure 14. Working in full autonomy teams by countries in 2015



Source: Sixth EWCS and own elaboration

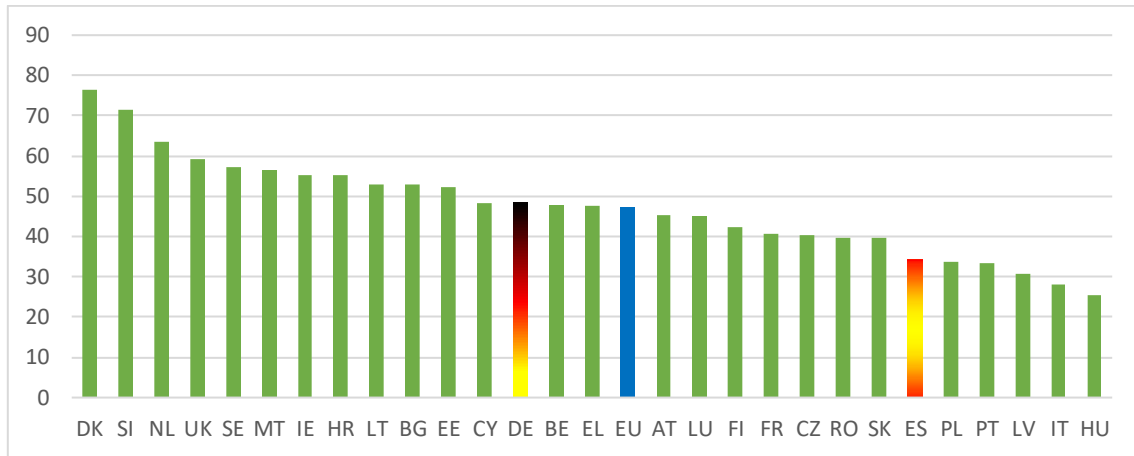
4.2.2. Ability

- *“Does your job involve rotation of tasks?”*

Rotation tasks reduce the work monotony and thereby increase the productivity and flexibility of workers (Figure 15). This measure has been put into practice in half of Europe (47.3%), especially in Denmark (76.5%), followed by Slovenia (71.4%) and The Netherlands (63.5%). Innovative countries are also at the top of this factor.

In contrast, the lowest in the ranking are Hungary (25.5%), Italy (28.1%) and Latvia (30.6%), which also are the less innovative. In turn, Germany is above the EU (28) average with 48.4%, while Spain is below the European average (34.4%) (Figure 15).

Figure 15. Rotation of tasks by countries in 2015



Source: Sixth EWCS and own elaboration

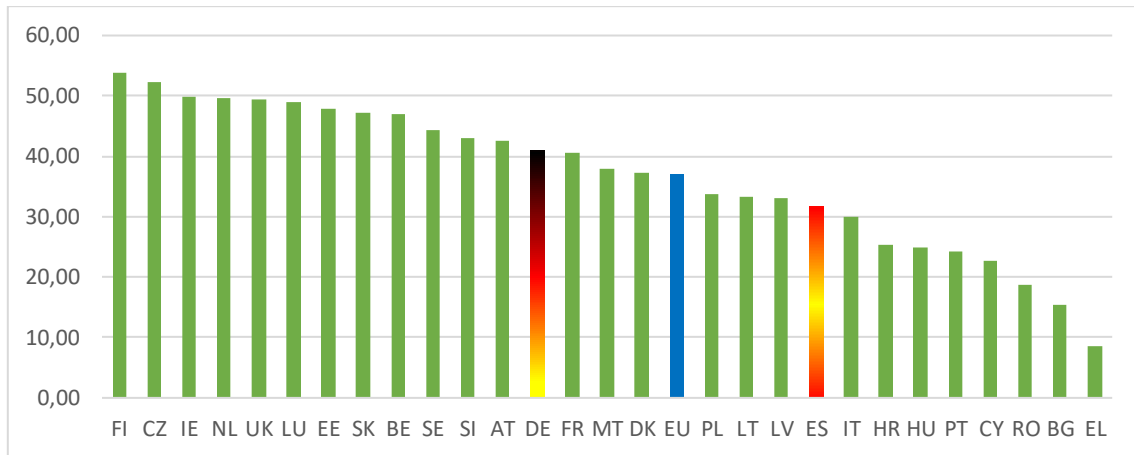
○ *“Have you had training paid by your employer?”*

As noted previously, training can be an incentive and it is considered an investment for the firm. Training benefits the employees as they can improve their working process by gaining knowledge. Learning has always been an objective of European policy, and the ECWC confirms this extent. The number of employees, who have access to training paid for either by the company or themselves, has increased.

We examine the companies’ involvement in training by looking at the percentage of companies that offer to pay for training courses for their employees. In Europe Union (28), 36.9% of the workers have been paid for training by the company. The countries with the highest score are Finland (53.9%), Czech Republic (52.3%) and Ireland (49.9%), while the lowest are Romania (18.8%), Bulgaria (15.4%) and Greece (8.6%). (Figure 16) Although we cannot see much relation between the countries with the higher score, we could say that the lowest ones are emerging countries.

Focusing on Spain and Germany, we can see that, similar to the previous ranking, Germany is above the EU (28) average with 42.6%, while Spain is below the average with 31.7%. (Figure 16).

Figure 16. Training paid by the employer by countries in 2015



Source: Sixth EWCS and own elaboration

4.2.3. Motivation

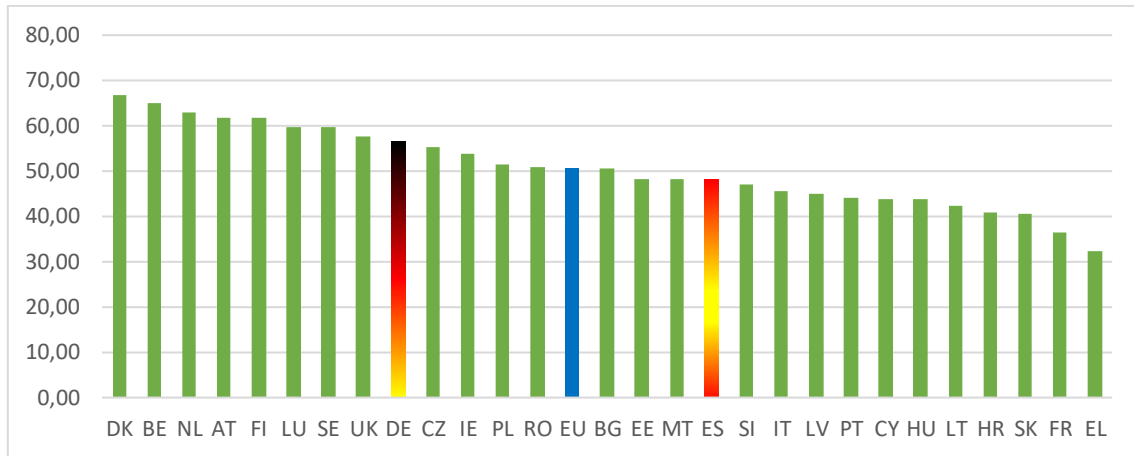
- *“Considering all my efforts and achievements, I feel I get paid appropriately”*

Employee motivation is one of the most relevant points for better performance and, therefore, a more innovative spirit. As already mentioned, we can distinguish two types of rewards for motivating workers: material and non-material, and both are important.

Material rewards are a crucial element of work life. Not only does the salary level matter, but also the fairness of the reward, that is, the answer to the question: Am I being paid fairly? Half of the European workers would answer yes (50.7%) to this question, mainly in Denmark (66.9%), Belgium (65%) and The Netherlands (62.9%). Contrarily, in Slovakia (40.6%), France (36.3%) and Greece (32.2%), workers state that they are not being paid fairly (Figure 17). Denmark, Belgium and The Netherlands are top-tier innovative countries, and so are France and Slovenia (46.9%). In these countries, the workers' perceptions of fairness could relate to work-life philosophy. Northern and southern countries have different working styles, cultures and priorities.

Clear examples are Germany and Spain. In Germany, more than half of the workers (56.5%) feel that their salary is fair, whereas, in Spain, less than half of the employees think so (48.1%).

Figure 17. Perception of Fair Pay of workers by countries in 2015



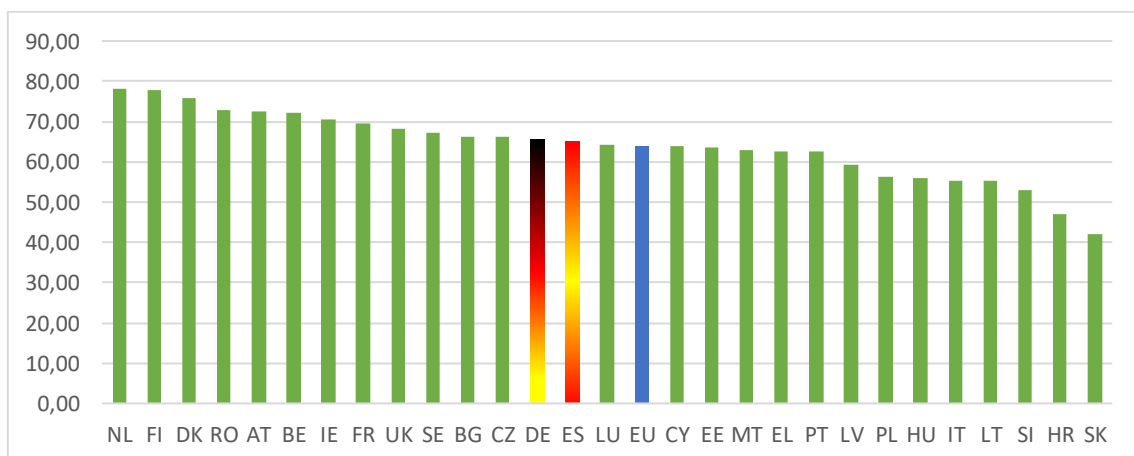
Source: Sixth EWCS and own elaboration

o *“I receive the recognition I deserve for my work”*

Non-material rewards are as relevant as money. These types of rewards refer, for instance, to guaranteeing a proper and good social climate, organizational justice, mutual trust, and recognition. They are crucial aspects of organizational management as they produce positive results for the company and the employees.

At least 64% of the European Union’s workers reveal that they receive the recognition they deserve for their work. The following countries stand out: the Netherlands (78.1%), Finland (77.7%), and Denmark (75.7%). The ones with the lowest score are Slovakia (42.1%), Croatia (47.1%) and Slovenia. (53%). Both Spain and Germany are above de average. The former has 65%, and the latter has 65.6% (Figure 18). We can see the abovementioned phenomenon of the philosophy of the North and South countries.

Figure 18. “I receive the recognition I deserve for my work” by countries in 2015



Source: Sixth EWCS and own elaboration

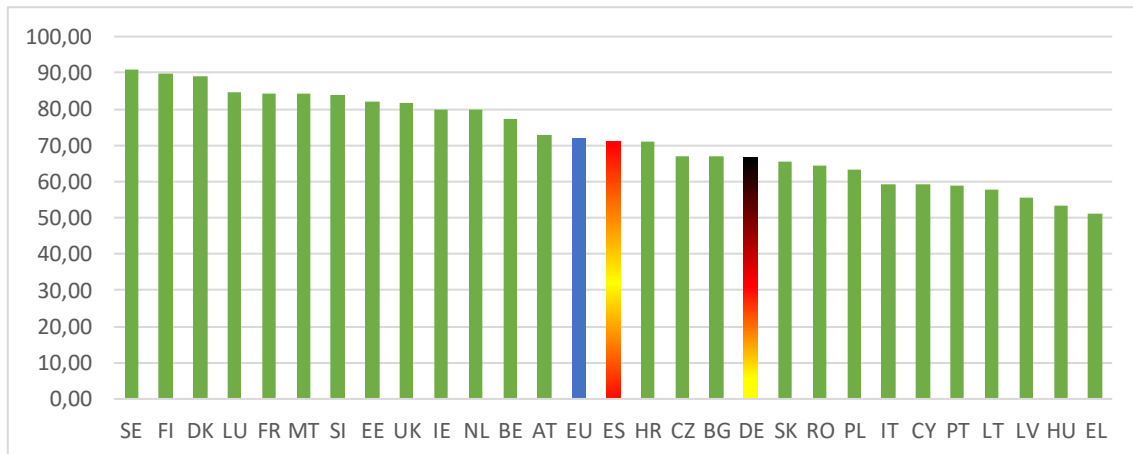
4.2.4. Opportunity

○ *“Does your work involve learning new things?”*

Shifting tasks and creative work contribute to self-development at work and, thus, boost motivation. Some indicators are used for capturing self-development, such as complex tasks, applying their own ideas or learning new things. We have focused on “learning new things” because both the workers and the organization may gain competitiveness through learning.

The EWCS reveal that, in the European Union (28), 71.8% of workers say that their work involves learning new things. For the selected countries, at least half of the workers answered positively to the referred question. At the top of the ranking, Sweden (90.9%), Finland (89.8%) and Denmark (89.2%) stand out as northern countries, while at the bottom, Greece (51.1%), Hungary (53.5%) and Latvia (55.5%) are found, as southern countries. Although Germany and Spain are below the European Union average, their values are relatively high: Spain (71.1%) and Germany (66.5%) (Figure 19).

Figure 19. Work involving learning new things by countries in 2015



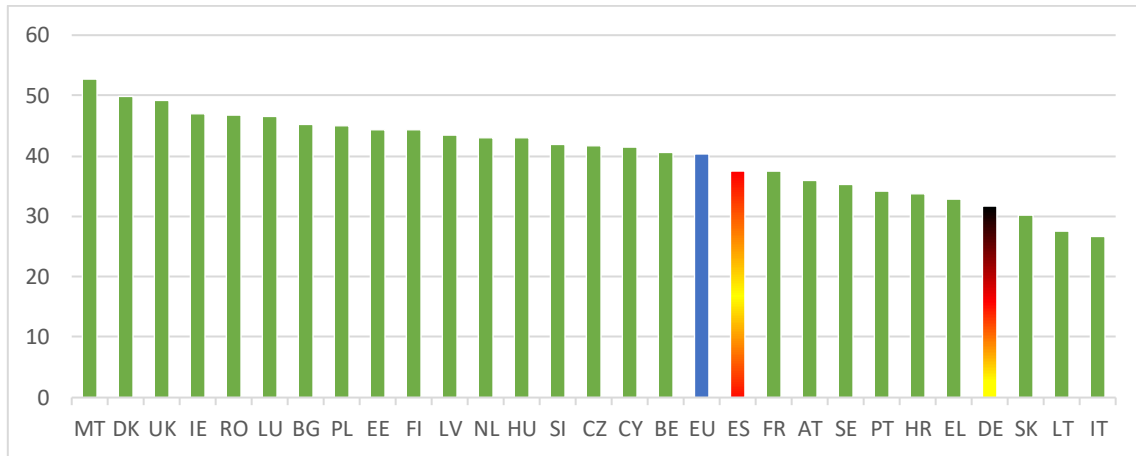
Source: Sixth EWCS and own elaboration

○ *“My job offers good prospects for career advancement”*

The career prospect is an aspect of the job that contributes to a person’s need for employment. This concept includes job security and the prospect of career advancement. Both are closely connected with people’s self-esteem.

If we focus on the prospects for career advancement, we can see that 40.3% of workers agree with the statement. The share of workers who feel their job offers good prospects for career advancement is the highest in Malta (52.8%), Denmark (49.8%), and the United Kingdom (49.1%). In contrast, less than one-third of workers feel this way in Serbia (30.2%), Lithuania (27.6%) and Italy (26.7%). Spain is close to the EU average (37.5%) and Germany is almost at the bottom of the ranking with 31.7%. This suggests that, in general, Spanish workers have better career prospects than German workers. No clear pattern can be identified in this dimension. Countries at the top of the ranking have a high innovative ratio and those countries at the bottom are emerging or moderate innovative countries. However, for example, Romania (46.8%) has the lowest innovative ratio and is at the top, and the other way around Austria (Figure 20).

Figure 20. Good Prospects for Career Advancement by countries in 2015



Source: Sixth EWCS and own elaboration

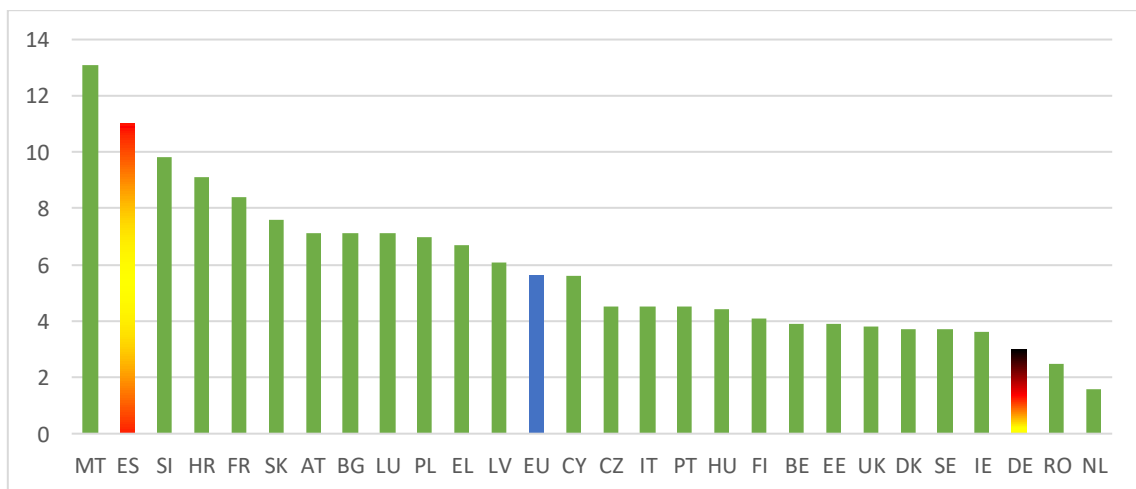
4.2.5. Emotional intelligence

- *“Does your job involve being in situations that are emotionally disturbing for you?”*

Sometimes workers are expected to manage their emotions while working. A job like this is called an “emotionally demanding” job. For example, hiding emotions, and dealing with angry clients requires working with emotionally disturbing situations. This is related to mental health issues, fatigue and burnout syndrome.

With regard to levels of reported emotional demands in the European Union (28), on average, one out of 20 workers states that hides their feeling ‘always’ (5%). A few countries exhibit a percentage lower than 3%: the Netherlands (1.6%), Romania (2.5%) and Germany (3%). However, in Malta (13.1%), Spain (11%) and Slovenia (9.8%) workers seem to deal with more stressful situations. We can see that Germany and Spain are far away in this area. (Figure 21). Could be possible that the more innovative the country is, the less stressful situation you experience.

Figure 21. Emotionally disturbing jobs by countries in 2015



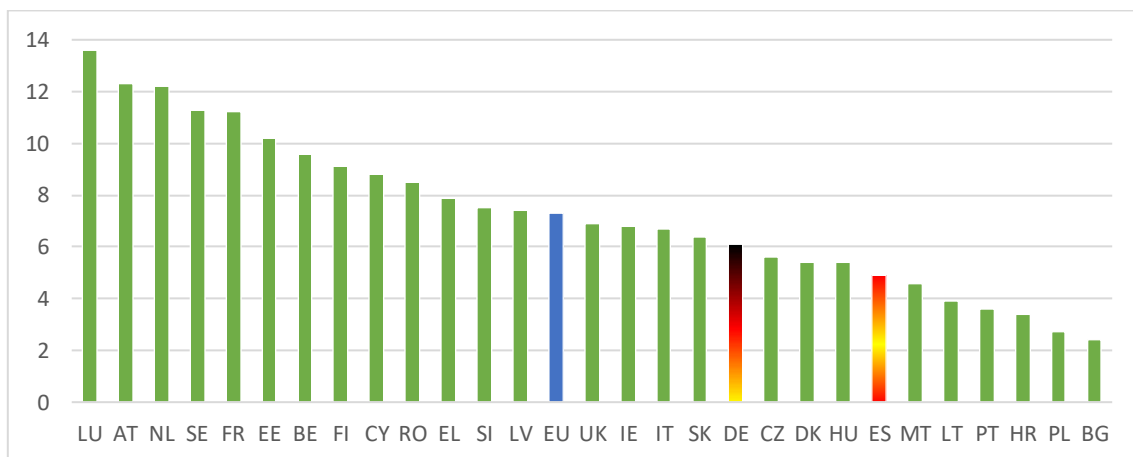
Source: Sixth EWCS and own elaboration

○ “Have you been subjected to discrimination at work in the last 12 months?”

Adverse social behaviour is a reality that many people, unfortunately, have to deal with daily, such as verbal abuse, unwanted sexual attention, humiliation, threats, and discrimination, among others. Paying attention to discrimination, we find that many workers seem to feel discriminated against even though there is European legislation that protects workers against this fact. Discrimination may affect negatively workers' mental health and career paths. Discrimination based on age, sex, nationality and race is the most prevalent.

In the European Union (28), at least 7% of the workers have felt discriminated against at some point. This proportion is particularly high in Luxemburg (13.6%), Austria (12.3%) and The Netherlands (12.2%). Bulgaria (2.4%), Poland (2.7%) and Croatia (3.4%) are in the opposite position. Spain (4.9%) and Germany (6.1%) are under the EU average. Although these results are relatively small, we must bear in mind that any type of discrimination is a serious offence (Figure 22). Leader counties in innovation are the ones who feel more discriminated against. There may be a problem related to awareness of discrimination. It is possible that in more advanced countries there is greater sensitivity to these issues.

Figure 22. Discrimination at work by countries in 2015



Source: Sixth EWCS and own elaboration

4.2.6. Synthetic index of HPWS

To measure the intensity of HPWS, we constructed a synthetic index, summing up the mean values of the indicators, with equal weights for all sub-factors (and for their variables within each sub-factor). This method has the advantage of simplicity and is less susceptible to variations in the sample (Kline, 2005, p. 204).

$$HPWS = ORGANIZATIONAL\ STRUCTURE + ABILITY + MOTIVATION + OPORTUNITY + EMOTIONAL\ INTELIGENCE$$

$$HPWS = \frac{F1.1 + F1.2}{2} + \frac{F2.1 + F2.2}{2} + \frac{F3.1 + F3.2}{2} + \frac{F4.1 + F4.2}{2} + \frac{F5.1 + F5.2}{2}$$

Table 6 presents the results of the global HPWP index and the HPWP indexes by categories. We have coloured the cells of the table to ease the interpretation of the data. The first column groups the European countries according to the regional area to which they belong. We have coloured in green those cells that exhibit values higher than the average in each category and white those with values below the average.

We try to identify whether a pattern regarding the HPWS exists. According to the global average, we observe a first north-south pattern among European countries. Northern and western countries have higher values in the global index than southern and eastern countries. The same is true in the rest of the sub-categories. More specifically, both in the structural organization and in the AMO classification, the Nordic or northern European countries exhibit higher scores. They are the ones that use most of the flextime arranging method and pay the most attention to team autonomy. However, this pattern is no longer meaningful concerning the training dimension. Rotation, in turn, is divided by northern and eastern countries.

Regarding motivation and opportunity, instead of North-East, we could say that the tendency is more accurate North-Southeast. Since these two variables measure perceptions (subjective facts) and not objective facts, it is reasonable to believe that they could be reflecting the country's culture. As noted in the previous section, Northern and Southern Europe consists of different philosophies of life. Just as the north is known to be more "Germanic", strict, with earlier working hours and nature. In the south of the continent, the culture seems to be more relaxed, the hours are later, and the weather is warmer. Perceptions change depending on how you have seen, learned, and grown up.

On the contrary, in the emotional intelligence category, i.e., having disturbing situations or being discriminated against gives us opposite results. In Northern countries, workers say that they have felt this negative emotion more frequently than in eastern or southern countries. As mentioned, Nordic countries may be more aware of discrimination and disturbing situations.

If we pay attention, to our selected countries, Spain and Germany, we can see that the gap between them is not relevant. The global index for Germany is 54.5 while in Spain 50.7. By sub-categories, except for "Opportunity", in the rest of categories, Germany is above Spain. First, German workers are more used to working in a team and enjoy the advantage of "flextime". However, in Spain, teams have more autonomy than in Germany, but the influence is not big enough to turn the balance on Spain's side. Secondly, task rotation, training being paid by the company, feeling fairly paid and work recognition are more usual in Germany than in Spain. In addition, despite Spanish workers feeling more disturbing situations in their jobs than Germans', the overall average is bigger for Germany (81.2 and Spain 78.1). As we said at the beginning of the paragraph, "opportunity" is a peculiar variable. Both countries are below the average but in Spain, workers feel that they are constantly learning new things and have good prospects for career advancement than they do in Germany.

Table 6. HPWS Index by EU (28) Countries 2015. Total average and by sub-categories

Area	Country	Average	Average by sub-categories				
			Struct_org.	Ability	Motivation	Opportunity	Emoc. Intell.
Northern Europe	DK	67,3	53,4	56,9	71,3	69,5	85,7
	EE	58,6	45,4	50,0	55,9	63,2	78,7
	FI	62,2	48,9	48,1	69,8	67,1	77,3
	IE	61,5	42,8	52,7	62,1	63,4	86,5
	LT	50,6	35,7	43,2	48,9	42,8	82,5
	LV	49,0	30,8	31,8	52,2	49,5	80,8
	SE	62,6	55,1	50,8	63,4	63,1	80,5
	UK	63,1	47,5	54,4	62,9	65,5	85,3
	Group Average	59,4	45,0	48,5	60,8	60,5	82,2
Western Europe	AT	55,5	35,0	44,0	67,3	54,5	76,9
	BE	59,3	40,8	47,4	68,6	58,9	80,8
	DE	54,5	36,6	44,7	61,1	49,1	81,2
	FR	54,4	40,6	40,7	52,9	60,8	76,9
	LU	59,5	44,7	47,0	62,0	65,6	78,3
	NL	64,0	48,1	56,6	70,5	61,5	83,3
		Group Average	57,9	41,0	46,7	63,7	58,4
South Europe	CY	48,1	23,2	35,5	53,9	50,4	77,7
	EL	44,4	26,7	28,2	47,5	42,0	78,0
	ES	50,7	31,6	33,1	56,6	54,3	78,1
	HR	49,5	31,5	40,3	44,0	52,4	79,6
	IT	46,8	25,4	29,0	50,5	43,1	86,3
	MT	57,7	39,4	47,2	55,6	68,5	77,8
	PT	48,2	24,3	28,8	53,3	46,6	88,2
	SI	57,6	41,4	57,2	50,0	62,8	76,7
	Group Average	50,4	30,4	37,4	51,4	52,5	80,3
Eastern Europe	BG	53,1	33,8	34,1	58,4	56,1	83,4
	CZ	55,0	32,1	46,3	60,8	54,3	81,4
	HU	47,0	28,3	25,2	49,8	48,2	83,8
	PL	50,5	31,5	33,7	53,8	54,2	79,6
	RO	51,0	28,6	29,3	61,9	55,7	79,7
	SK	47,7	27,9	43,4	41,4	47,8	77,8
	Group Average	50,7	30,4	35,3	54,4	52,7	81,0
	Total average	54,6	36,8	42,1	57,4	56,1	80,8

Source: Sixth EWCS and own elaboration

For a better and sharper picture, we have displayed the data on a Map, to identify a geographical pattern (Figure 23). Northern countries plus The Netherlands have the highest average. Then, it continues with the Western and Eastern countries and, finally, the southern ones.

Figure 23. HPWS Index for EU (28) Countries 2015



Source: Sixth EWCS and own elaboration

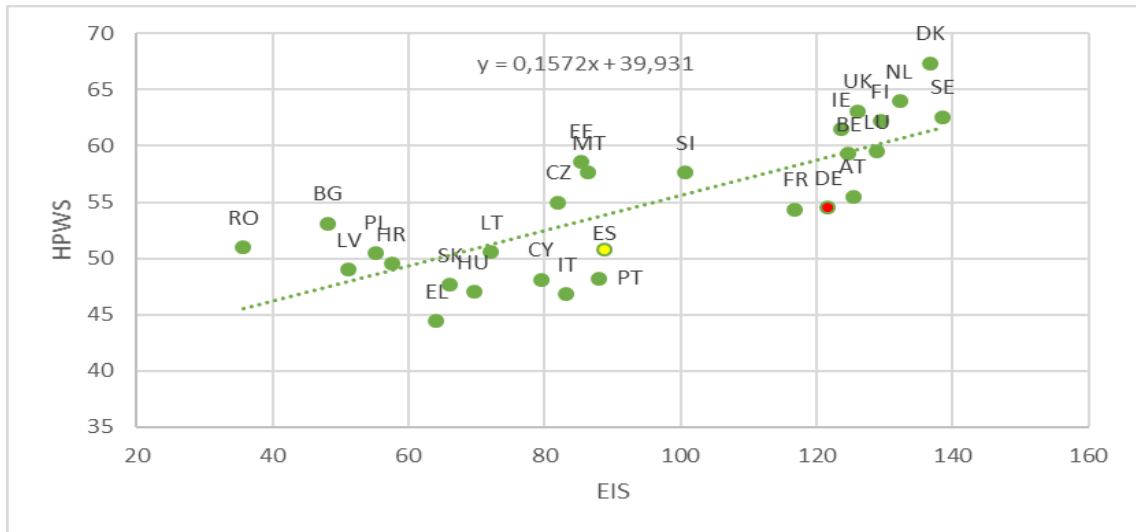
5. HPWP AND INNOVATION PERFORMANCE: HOW DO THEY RELATE?

5.1. THE LINK BETWEEN HPWPS AND INNOVATION: A BIVARIATE ANALYSIS

In this section, we analyse the relationship between HPWP and countries' innovative performance by studying the correlations between the two variables. To do so, we initially project the countries in a scatter plot taking into account the synthetic HPWP index and the innovative performance measured by the EIS (Figure 24).

It shows a fairly strong and positive linear correlation between the two variables. Almost all countries in the North and West are in the upper right, while countries in the South and East are in the lower left. Based on these data, there seems to be a positive relationship between HWPS and innovation performance. We observed a significant distance in innovation as well as in HPWPs between Spain and Germany

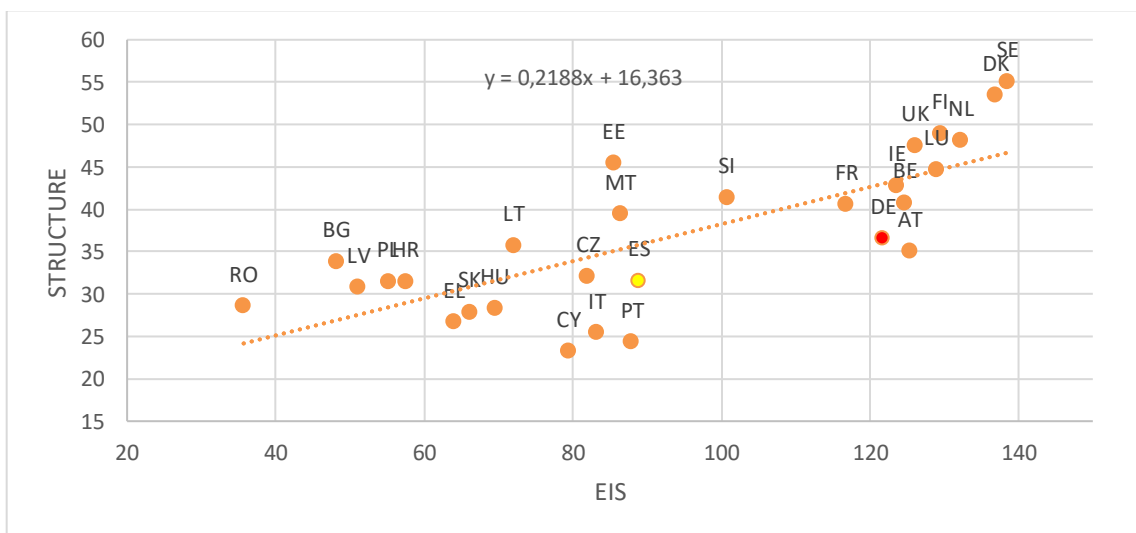
Figure 24. Scatter Plot of Innovation and HPWS in 2015



Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

Although the overall HPWP index provides relevant summary information, it may also hide some issues of interest. For this reason, we will proceed to analyse the relationship between each HPWS dimension that make up the global index and the innovative performance of EU countries. Figure 25 presents the relationship between the structural dimension and innovative performance. There is also a positive linear relationship with a steeper slope (0.2188). The coordinates of the countries look similar to the previous Figure.

Figure 25. Correlation between Innovation performance and Structure. 2015

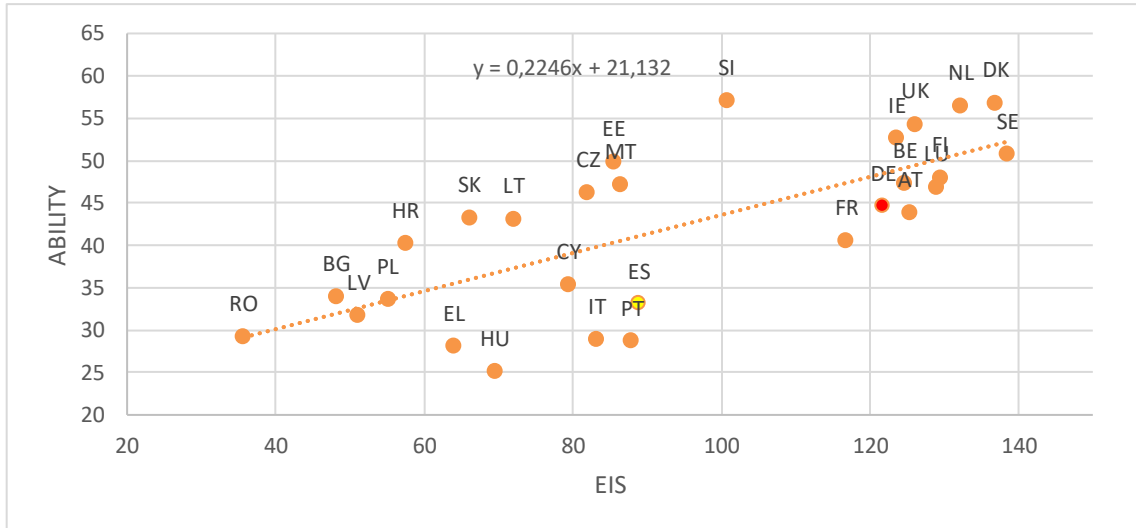


Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

Similarly, Figure 26 displays the correlation between the ability dimension and innovation, showing a positive relationship with an even steeper slope (0.2246). The coordinates of the countries look similar except for Slovenia, which behaves as an outlier. Both Figures 25 and 26

show a similar conclusion: Northwestern countries on the upper right and Southeastern countries on the bottom left. This result suggests that working in groups, team autonomy, task rotation and training are compatible with innovation.

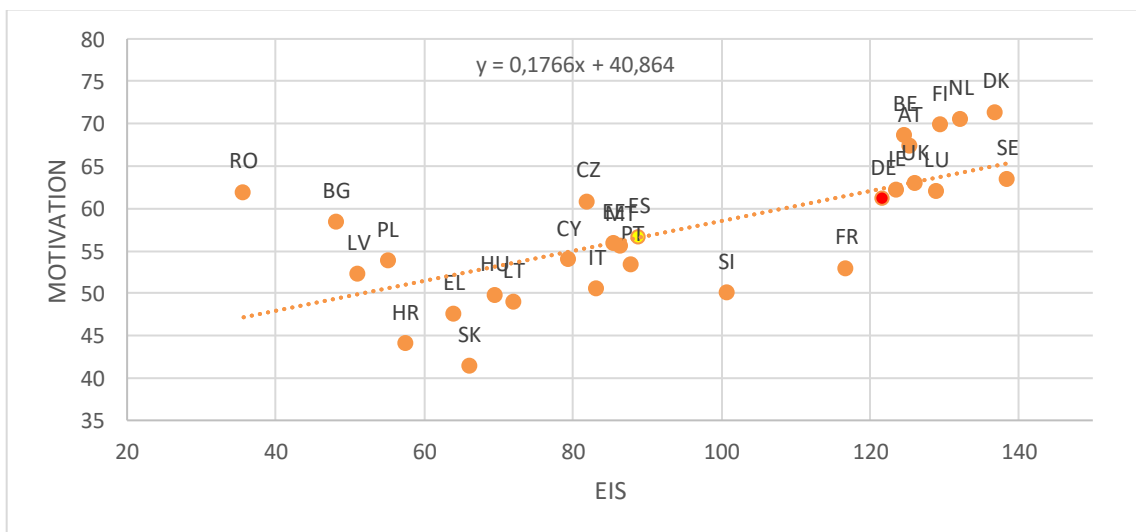
Figure 26. Correlation between Innovation performance and Ability. 2015



Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

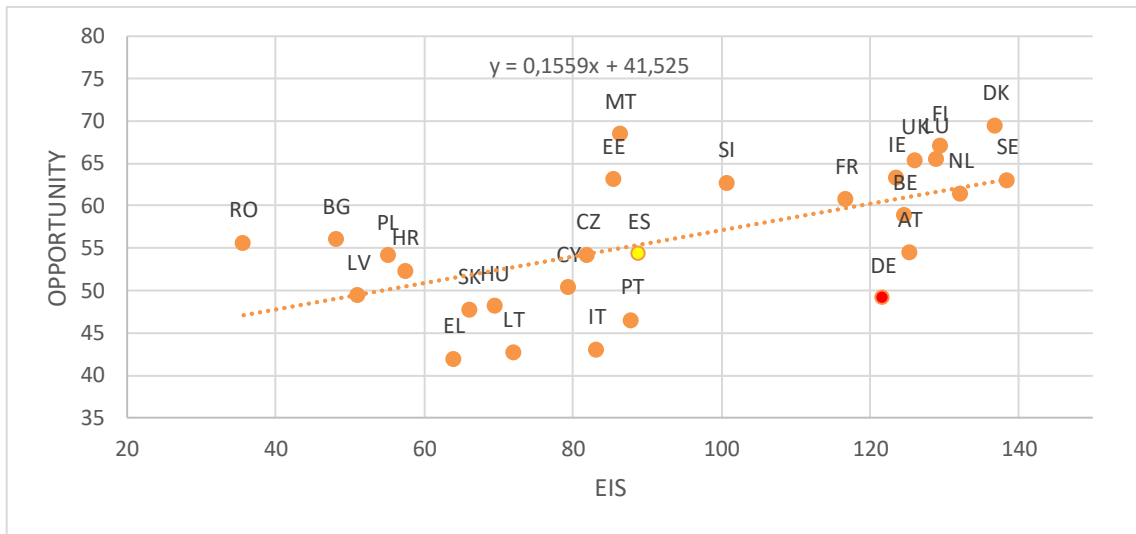
Figure 27 shows the relationship between innovation and Motivation. There are some differences with regard to the previous Figures. It is observed that the slope is smoother (0.1766), but not low. Similar conclusions are drawn from Figure 28, which presents the relationship between Opportunity and Innovation but with a lower slope (0.1559). Finally, the relationship between Emotional Intelligence and Innovation (Figure 29) reveals that the correlation is very low. There is hardly any slope, and the countries are very dispersed.

Figure 27. Correlation between Innovation and Motivation. 2015



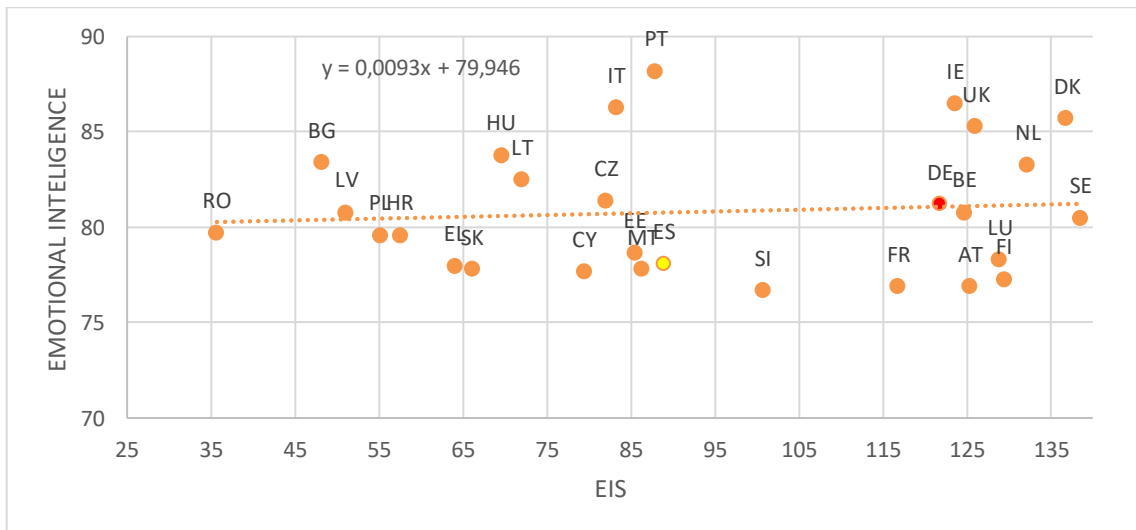
Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

Figure 28. Correlation between Innovation performance and Opportunity. 2015



Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

Figure 29. Correlation between Innovation performance and Emotional Intelligence. 2015



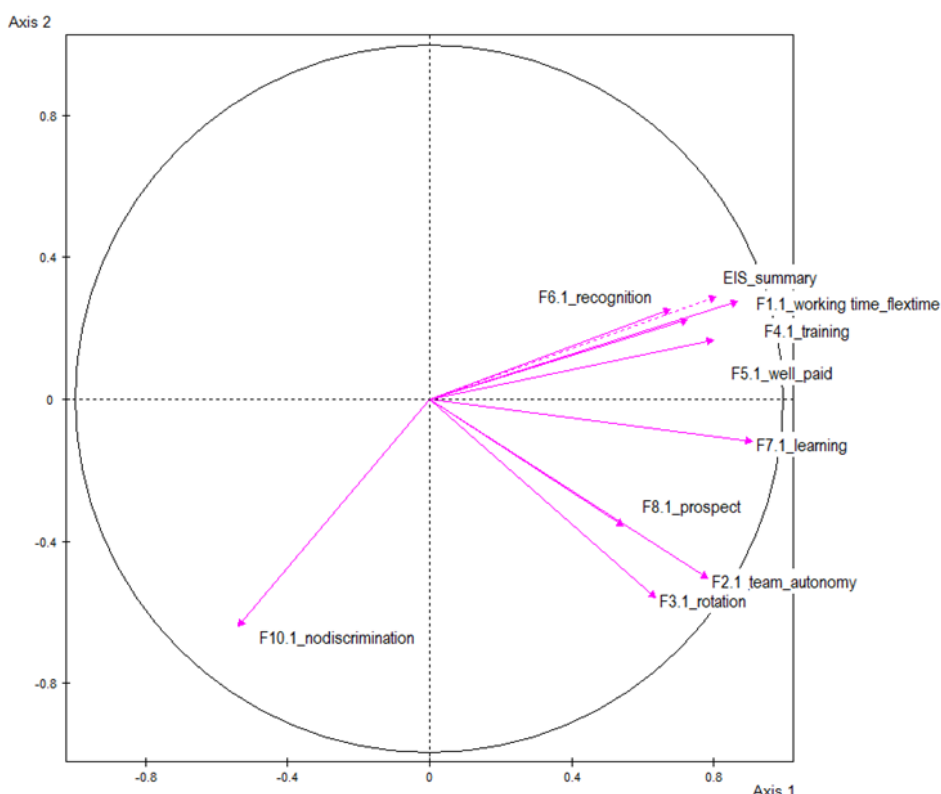
Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

5.2. THE LINK BETWEEN HPWPs AND INNOVATION: A MULTIVARIATE ANALYSIS

In this section, we present the results of the Principal Component Analysis and the Cluster Analysis. For the PCA, we have selected all the dimensions of HPWP that we have previously presented and the EIS, which captures the innovative performance of the countries. Table A1 in the Appendix displays the variables and some basic statistics. Table A2 in the Appendix, in turn, shows the first three eigenvalues, which jointly explain almost 80% of the variability of the data, a very acceptable percentage.

The PCA results can be presented graphically. Figure 30 projects the variables on the first factorial. We can observe that almost all the variables are standing in the right semi-plane, which means they are positively correlated, and connected to axis 1. On the other hand, the variable “no discrimination” is more connected to axis 2. In addition, we could say that this variable correlate negatively to the rest of the variables (see Table A3 in the Appendix).

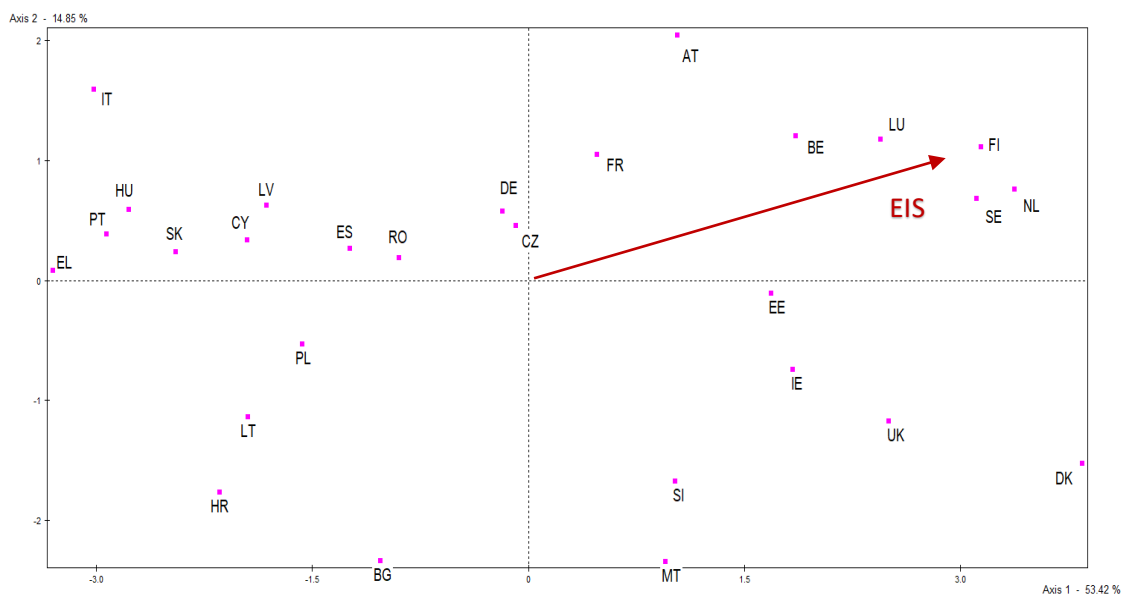
Figure 30. Projection of variables in the first factorial planes (1-2)



Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

Considering the distribution of variables, the EU countries are projected onto the first factorial plane (Figure 31). This projection shows the relative position of the countries. We can see that countries are separated by the two half-planes. Countries in the right semi-plane (Denmark, England, the Netherlands, Finland, among others) are characterised by the highest values for most of the selected variables and for our innovation variable (EIS). In the left half-plane, we find countries (Cyprus, Portugal and Greece, among others) characterised by lower values of those variables and of the EIS variable. Countries close to the origin are characterised by average values of the variables (mainly, the Czech Republic and Germany), which means that, with all the countries, they do not stand out from the rest of the countries in any particular way. We observe a difference in the relative position of Spain and Germany. The former country belongs to the left half-plane while Germany is located near the origin. This suggests that Germany has higher level of implementation of HPWP.

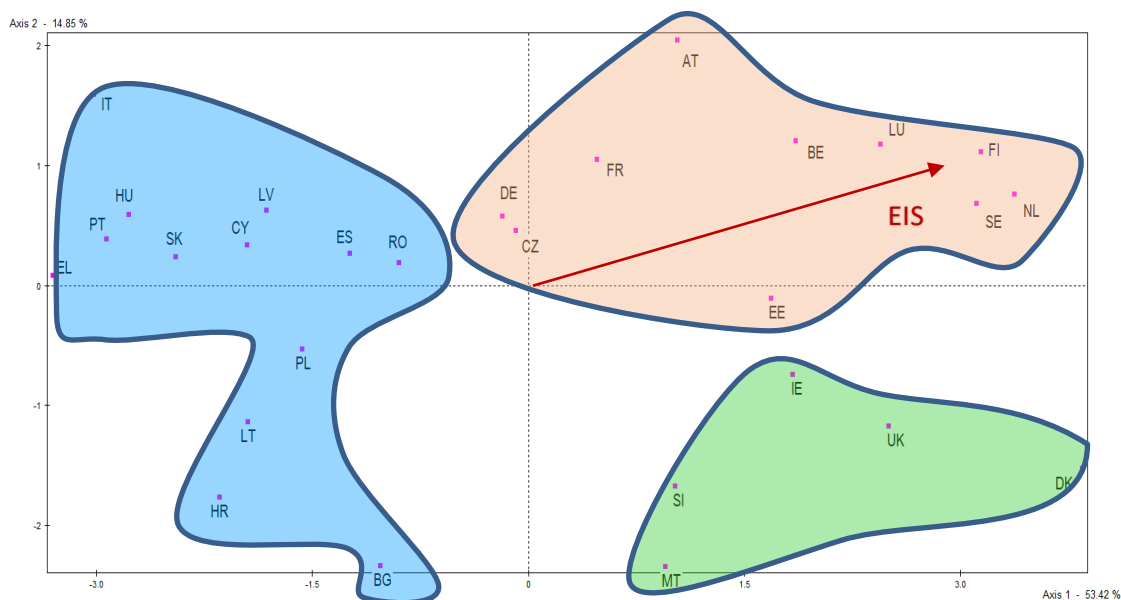
Figure 31. Projection of countries on the first factorial plane



Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

Based on this information, we have performed a cluster analysis to identify patterns in our data and create groups of countries that share statistically similar features. We have obtained three groups of countries (Figure 32).

Figure 32. Cluster analysis: group of countries



Source: Sixth EWCS, European Innovation Scoreboard and own elaboration

The first group comprises ten countries: the Netherlands, Finland, Sweden, Luxembourg, Belgium, Estonia, France, Austria, Germany, and the Czech Republic. Countries in this cluster are characterized by high values in the variables flexible working hours, learning new things, paid training, recognition, and being well paid. These variables are negatively related to discrimination. The second group is made up of five countries: Denmark, the United Kingdom, Ireland, Malta, and Slovenia. Countries within this group are characterized by high values of our variables (rotation, team autonomy, career prospects, and learning). These two groups include most of the northern Western countries, as expected. The third group is on the left half-plane. It consists of 11 countries: Belgium, Romania, Cyprus, Greece, Spain, Poland, Latvia, Hungary, Portugal, Italy, and Slovakia. These countries have below-average values for almost all our variables, and some show high values for the discrimination variable (countries at the bottom of this half-plane). This half-plane contains all of Europe's eastern countries and most of its southern countries. As shown, Germany and Spain belong to different clusters. Table 4A in the Appendix presents all the features of the three groups of countries.

This multivariate analysis using PCA and Cluster Analysis has allowed us to establish a positive relationship between HPWPs and innovative performance. It has shown that those countries characterised by more advanced HPWP are more innovative, suggesting that HPWP-based organisational forms are more compatible with innovation. In addition, this analysis has allowed us to identify three different patterns of behaviour concerning the link between HPWPs and innovation. Considering that most innovative countries have a high weight of high-tech industries in their productive structure, it would be interesting to study to what extent differences in the productive system explain the differences in the application of HPWPs.

6. CONCLUSIONS

It is widely held that being proactive, anticipatory, and entrepreneurial is the only way to survive in this globally integrated world. Being proactive and inventive is crucial. Being proactive, however, is not just a trait that comes naturally to people, but how can one become innovative

Various theories exist on what innovation is. Most agree on the variables that can influence it: flexibility, decentralisation, communication, technical knowledge, and feedback. An organic organizational structure, to put it another way. This style of organizational structure places a strong emphasis on giving employees room to express their creativity (a relevant factor for innovation) while maintaining a certain hierarchy and structure. Employees are the ones that drive innovation. Focusing on enhancing human resources is essential, particularly with reference to High-Performance Work Systems. According to some experts, these management strategies foster innovation by improving the organization's overall efficacy and performance. However, there is still a long way to go until a theory becomes practice. Thus, the aim of this Final Degree Project is to examine whether there is a relationship between innovation and HPWS, using the countries from the European Union (28). We used data on innovation from the European Innovation Scoreboard and on forms of work organization from the European Working Conditions Survey (EWCS) in 2015. In this latter case, we distinguished four categories of HPWP: Organizational Structure, AMO and Emotional Intelligence and Motivation. We performed a univariate, bivariate and multivariate analysis.

Results from the univariate analysis, using individually the European Innovation Scoreboard (EIS) and the HPWP index, revealed a significant change in EU innovation over the previous few years. Furthermore, it appears that northern and western countries are the most innovative. In addition, due to a higher concentration on the business sector, Germany beats Spain in terms of innovation. Regarding HPWS, we created a synthetic index using the EWCS responses. It appeared that the most innovative countries were also at the top of the HPWS index (Northern and Western countries). The bivariate analysis between the EIS and HPWP index confirmed these results.

Results from the multivariate analysis using PCA and cluster Analysis allowed us to identify three patterns of behaviour concerning the link between HPWPs and innovation. The Netherlands, Finland, Sweden, Luxembourg, Belgium, Estonia, France, Austria, Germany, and the Czech Republic compose the first group, with a premium on the variables of flexible working hours, learning new things, paid training, recognition, and being well compensated. Denmark, the United Kingdom, Ireland, Malta, and Slovenia comprise the second group, which has high values of the variables rotation, team autonomy, career prospects, and learning. As predicted, the majority of northern Western nations are represented in these two groupings. Belgium, Romania, Cyprus, Greece, Spain, Poland, Latvia, Hungary, Portugal, Italy, and Slovakia are among the 11 members of the third group.

In short, countries with strong HPWP are more innovative, implying that HPWP-based organizational models are more compatible with innovation. Furthermore, as predicted, Germany and Spain are in distinct groups.

Our research findings are relevant because they add to our understanding of the disparity across European Union nations in 2015 and suggest that there may be a way to stimulate innovation. This study lays the groundwork for future research. First, building on this research, we might go deeper into the causes of country differences, such as why northern and western European countries have such promising potential, or why southeastern countries are not making as much progress. Second, it would be relevant to analyse the relationship between HPWP and innovation using data that are more recent when they are available. Third, it would be worthwhile to see whether the industry structure of the countries might explain, at least in part, the disparities between them.

Some limitations of this study include using aggregate data. It would be interesting to replicate the research using microdata. This procedure would allow one to perform a more in-depth examination, for example, by considering the effects of industry differences, firm types based on their legal structures (cooperative enterprise, limited society, etc.), and company size. Furthermore, it would be interesting to compare several years. Last but not least, an examination of life after COVID-19 would be relevant.

7. REFERENCES

- Abernathy, W. J., and Utterback, J. M. (1978). Patterns of industrial innovation. *Technology review*, 80(7), 40-47.
- Brandstätter, H. (2011). Personality aspects of entrepreneurship: A look at five meta-analyses. *Personality and individual differences*, 51(3), 222-230.
- Campos, F., Frese, M., Goldstein, M., Iacovonne, L., Johnson, H. C., McKenzie, D., and Mensmann, M. (2017). Teaching personal initiative beats traditional training in boosting small business in West Africa. *Science*, 357(6357), 1287-1290.
- Castrillón, M. I. D., Canto, A. I. G., and Cantorna, A. I. S. (2004). Innovación tecnológica y high performance work system: sus efectos sobre el rendimiento empresarial. *Revista de economía y empresa*, 22(52), 119-138.

- Chen, Y. T. (2017). On the Essential Characteristics of the Innovation Oriented Management Mode: Holacracy. In 3rd International Conference on Social, Education and Management Engineering, 194-198.
- Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of management journal*, 34(3), 555-590.
- Donaldson, L. (2001). *The contingency theory of organizations*. Sage.
- Frese, M., and Gielnik, M. M. (2014). The psychology of entrepreneurship. *Annu. Rev. Organ. Psychol. Organ. Behav*, 1(1), 413-438.
- Gurianova, E., and Mechtcheriakova, S. (2015). Design of organizational structures of management according to strategy of development of the enterprises. *Procedia Economics and Finance*, 24, 395-401.
- Habersang, S. (2021). *Management. 3th semester. International Business Administration. Leuphana University*
- Heery, E., and Noon, M. (2008). *A dictionary of human resource management*. OUP Oxford.
- Jones, G. R., and Jones, G. R. (2013). *Organizational theory, design, and change*, 31-33, Boston: Pearson.
- Kline, S. and Rosenberg N. (1986). An overview of innovation. In *the Positive Sum Strategy*, ed. by R. Landau and N. Rosenberg. Washington, DC: National Academy Press.
- Kono, T. (1988). Factors Affecting the Creativity of Organizations—An Approach From the Analysis of New Product Development. Urabe, Child and Kagano (eds.), 105-144.
- McFadzean, E., O'Loughlin, A., and Shaw, E. (2005). Corporate entrepreneurship and innovation part 1: the missing link. *European journal of innovation management*.
- Mehmood, S., Ramzan, M., and Akbar, M. T. (2013). Managing performance through reward system. *Journal of Humanities and Social Science*, 15(2), 64-67.
- Mintzberg, H. (1993). *Structure in fives: Designing effective organizations*. Prentice-Hall, Inc.
- Obeidat, S. M., Mitchell, R., and Bray, M. (2016). The link between high performance work practices and organizational performance: Empirically validating the conceptualization of HPWP according to the AMO model. *Employee Relations*.
- OECD/Eurostat (2018), *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, 4th Edition, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris/Eurostat, Luxembourg.

- O'Reilly, C., and Binns, A.J. (2019). The three stages of disruptive innovation: Idea generation, incubation, and scaling. *California Management Review*, 61(3), 49-71.
- Özçelik, G., Aybas, M., and Uyargil, C. (2016). High performance work systems and organizational values: Resource-based view considerations. *Procedia-Social and Behavioural Sciences*, 235, 332-341.
- Rabl, T., Jayasinghe, M. M., Gerhart, B., and Kuehlmann, T. M. (2011, January). How much does country matter? A meta-analysis of the HPWP systems-business performance relationship. In *Academy of Management Proceedings*, 2011 (1), 1-6. Briarcliff Manor, NY 10510: Academy of Management.
- Ravasi, D., and Turati, C. (2005). Exploring entrepreneurial learning: A comparative study of technology development projects. *Journal of Business Venturing*, 20(1), 137-164.
- Robertson, B. J. (2007). Organization at the leading edge: Introducing Holacracy™. *Integral Leadership Review*, 7(3), 1-13.
- Saunila, M., Mäkimattila, M., and Salminen, J. (2014). Matrix structure for supporting organisational innovation capability. *International Journal of Business Innovation and Research*, 8(1), 20-35.
- Schumpeter, J. A. (2000). Entrepreneurship as innovation. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship.
- Schunk, D. H., and Pajares, F. (2009). Self-efficacy theory. *Handbook of motivation at school*, 35, 54.
- Shamsuddin, S., Othman, J., Shahadan, M. A., and Zakaria, Z. (2012). The dimensions of corporate entrepreneurship and the performance of established organization. *ACRN Journal of entrepreneurship perspectives*, 1(2), 111-131.
- Urabe, K., Child, J., and Kagono, T. (Eds.). (1988). *Innovation and management: International comparisons*. Berlin: de Gruyter.
- Velasco, E., Zamanillo, I., and Gurutze, M. (2007). Evolución de los modelos sobre el proceso de innovación. In *Comunicación en el XX congreso anual AEDEM: "Decisiones basadas en el conocimiento y en el papel social de la empresa"*, España: Palma de Mallorca.
- Yousaf, S., Latif, M., Aslam, S., and Saddiqui, A. (2014). Impact of financial and non-financial rewards on employee motivation. *Middle-East journal of scientific research*, 21(10), 1776-1786.

Zeitlin, M. (1974). Corporate ownership and control: The large corporation and the capitalist class. *American journal of Sociology*, 79(5), 1073-1119.

Zreen, A., Farrukh, M., and Kanwal, N. (2021). Do HR practices facilitate innovative work behaviour? Empirical evidence from higher education institutes. *Human Systems Management*, 40(5), 701-710

APPENDIX

Table A1. Variables used in the Principal Component Analysis (PCA)

Label variable	Mean	Standard Deviation	Minimum	Maximum
F1.1_working time_flexitime	0.177	0.104	0.028	0.409
F2.1_team_autonomy	0.559	0.096	0.390	0.713
F3.1_rotation	0.473	0.122	0.255	0.765
F4.1_training	0.369	0.119	0.086	0.539
F5.1_well_paid	0.507	0.088	0.322	0.669
F6.1_recognition	0.640	0.085	0.421	0.781
F7.1_learning	0.718	0.118	0.511	0.909
F8.1_prospect	0.403	0.068	0.267	0.528
F10.1_nodiscrimination	0.927	0.030	0.864	0.976
F9.1_disturbing_almostnever	0.942	0.027	0.869	0.984
EIS_summary	93.502	30.769	35.676	138.557

Note. Represents the variables and provides a basic statistical descriptive. Variables F9_1 and EIS_summary are considered illustrative variables. This means that they do not enter in the PCA, but complement the results.

Table A2. Three first eigenvalues

Number	Eigenvalue	Percentage	Cumulated Percentage
1	4.8075	53.42	53.42
2	1.3370	14.85	68.27
3	1.0045	11.16	79.43

Note. Eigenvalues: statistical value that tells us what each of the axes explains. By convention, we stick with axes that have eigenvalues greater than unity.

Tale A3. Coordinates of active variables

	F1.1	F2.1	F3.1	F4.1	F5.1	F6.1	F7.1	F8.1	F9.1	F10.1
F1.1	1.00									
F2.1	0.54	1.00								
F3.1	0.42	0.76	1.00							
F4.1	0.67	0.50	0.26	1.00						
F5.1	0.71	0.45	0.37	0.59	1.00					
F6.1	0.58	0.34	0.26	0.26	0.67	1.00				
F7.1	0.78	0.79	0.62	0.69	0.59	0.47	1.00			
F8.1	0.26	0.49	0.31	0.21	0.43	0.46	0.46	1.00		
F9.1										
F10.1	-0.59	-0.15	-0.12	-0.44	-0.34	-0.46	-0.44	-0.07		1.00

Note: F1.1_working time_flexitime; F2.1_team_autonomy; F3.1_rotation; F4.1_training; F5.1_well_paid; F6.1_recognition; F7.1_learning; F8.1_prospect; F10.1_nodiscrimination

Table A4. Characterisation by continuous variables of clusters

Cluster 1/3

Characteristic variables	Cluster mean	Overall mean	Cluster Std. deviation	Overall Std. deviation	Test-value	Probability
F1.1_working time_flexitime	0,266	0,177	0,075	0,104	3,28	0,001
F4.1_training	0,468	0,369	0,044	0,119	3,20	0,001
EIS_summary	118,527	93,502	18,290	30,769	3,15	0,001
F5.1_well_paid	0,567	0,507	0,082	0,088	2,63	0,004
F6.1_recognition	0,697	0,640	0,050	0,085	2,59	0,005
F7.1_learning	0,795	0,718	0,082	0,118	2,51	0,006
F10.1_nodiscrimination	0,899	0,927	0,025	0,030	-3,64	0,000

Cluster 2/3

Characteristic variables	Cluster mean	Overall mean	Cluster Std. deviation	Overall Std. deviation	Test-value	Probability
F3.1_rotation	0,638	0,473	0,085	0,122	3,29	0,001
F2.1_team_autonomy	0,673	0,559	0,026	0,096	2,88	0,002
F8.1_prospect	0,481	0,403	0,037	0,068	2,78	0,003
F7.1_learning	0,838	0,718	0,031	0,118	2,44	0,007

Cluster 3/3

Characteristic variables	Cluster mean	Overall mean	Cluster Std. deviation	Overall Std. deviation	Test-value	Probability
F10.1_nodiscrimination	0,945	0,927	0,021	0,030	2,84	0,002
F8.1_prospect	0,375	0,403	0,068	0,068	-2,01	0,022
F3.1_rotation	0,401	0,473	0,098	0,122	-2,83	0,002
F6.1_recognition	0,588	0,640	0,079	0,085	-2,93	0,002
F2.1_team_autonomy	0,492	0,559	0,079	0,096	-3,37	0,000
F5.1_well_paid	0,446	0,507	0,050	0,088	-3,37	0,000
F1.1_working time_flexitime	0,091	0,177	0,034	0,104	-3,99	0,000
F4.1_training	0,268	0,369	0,093	0,119	-4,10	0,000
F7.1_learning	0,614	0,718	0,060	0,118	-4,29	0,000
EIS_summary	66,091	93,502	15,662	30,769	-4,31	0,000