

Extrinsic Motivation Index: A New Tool for Managing Labor Productivity

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Abstract

The objective of this paper is to provide a tool of practical significance for HR managers and firm executives. This tool, which is called Extrinsic Motivation Index (EMI), is meant to measure the extrinsic motivation of employees. By measuring employees' extrinsic motivation, managers are able to track job satisfaction and, subsequently, implement measures aiming both to raise job satisfaction and to improve organizational commitment. In order to test the validity of the model, we apply the EMI to Faculty members at Spanish and German universities. We also carry out simulation experiments in order to address all possible situations an organization most probably will have to deal with. The results point out significant differences in the level of motivation and commitment of Faculty members. Additionally, the analysis shows several ways in which an organization may manage job satisfaction issues according to on its level of resources.

Keywords: motivation, job satisfaction, human resources, statistical methods.

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1 INTRODUCTION

The rise of globalization has shaken the conventional paradigm, affecting both the social and economic environments of the organization. Thus, it is not surprising that Human Resource Management (HRM) has been significantly affected. Historically, we have witnessed the managing of human resources since the first organization of people into functioning units, as in the case of tribes. Adam Smith's seminal work "*An Inquiry into the Nature and Causes of the Wealth of Nations*" highlighted the division of labor in which different persons –craftsmen– were allocated into different roles in the production process. Whether managed through the natural functioning of a tribal leader or through the personnel management of an industrial firm, the managing of human resources is something that has always been present in most firms.

Around 1800, Robert Owen somewhat introduced in England the welfare system into private business, improving both social and working for the employees conditions (Dulebohn *et al.*, 1995). Over time, these systems evolved into more elaborated systems where workers were provided with social services for the family unit, such as education, insurance, and pensions (Davis, 1957). These welfare systems were mainly designed to promote proper worker relations and to increase productivity (Dulebohn *et al.*, 1995). Unsurprisingly, these practices were targeted as the starting point of the different techniques used today to attract, motivate, and retain workers. The evolution, however, has been significant: whereas those welfare programs were initially designed to benefit businesses, today's HRM programs are focused on the satisfaction of both employers and employees.

In fact, the study of HRM has a brief history. It was 1901 when the President of National Cash Register Co. decided to set-up a separate department for HRM¹ in the United States (Denisi *et al.*, 2014). Later on, other companies such as Ford, GM or Bethlehem Steel carried out similar operations. When Western Electric² argued that employees' attitudes were related to productivity, major companies began to see potential in keeping their employees satisfied, and so the human relations era was born. During the 1950s, the Human Relations movement challenged the traditional assumption that people do not want to work, stressed the role of the human resources department, and emphasized that human resources are assets to organizations and that the way in which HR are managed does, in fact, matter. The last quarter of the 20th century witnessed the changes that led to the current mode of operations. By the 1980s, managers came to realize that if they hired the right people, trained them and rewarded them properly, these employees could actually be the source of some competitive advantage. As it became clear that human resources are critical for the correct functioning of organizations, HRM assumed a new strategic function (Kochan *et al.*, 1986). It is this rising interest in managing HR and increasing productivity what motivates this paper.

Although there are compelling reasons to believe that research has improved the understanding and quality of HRM procedures, there are academics (Saari and Judge, 2004; Hambrick, 2007; Rousseau, 2007; DeNisi *et al.*, 2014; etc.) who advise researchers to make research more relevant, or at least more useful for organizations. DeNisi *et al.* (2014) complained about the existing gap between HR research and practice, and stressed the relevance of making use of the information that comes out of research. In their view, scholars are too often focused on issues that in practice are insignificant. Accordingly, Hambrick (2007) points out that strong theory has replaced practical significance in the best journals. By the same token, Rousseau (2007) suggests that academicians need to explain how research findings can be translated into practice.

This paper aims to answer the criticism that comes from both executives and scholars. Especially, it tries to provide a method designed to measure employee attitudes, highly demanded by Saari and Judge (2004). Thus, we focus on providing a tool of practical significance, although a strong theoretical framework is still needed. This tool, which we will refer to as Extrinsic Motivation Index (EMI), is meant to measure the extrinsic motivation of employees³. By measuring employees' extrinsic motivation, managers could track job satisfaction and, subsequently, implement measures aiming both to raise job satisfaction and to improve organizational commitment. The benefits from relying on such a tool are

1 To be more precise, this department was named "personnel management" department.

2 As a result of the Hawthorne Studies, performed between 1925 and 1937.

3 Extrinsic motivation is the sort of motivation in which managers can exert some influence on. Intrinsic motivation (IM) is found to depend only on individual preferences. This will be thoroughly discussed in the Literature Review section.

quite substantial, as we will argue in later sections. From tracking employees' motivation to know how to improve organizational commitment⁴, we put a valuable tool at the disposal of managers and CEOs.

In this section we shortly introduced the object of study. The rest of the paper is organized as follows. In section II we present the complete body of previous research, as well as set the links among motivation, job satisfaction and productivity. In Section III we discuss the methodology used and develop the according Extrinsic Motivation Index (EMI). Section III also tries to prove the usefulness of the empirical tool by addressing the motivation of Faculty members in three European universities, to know: Freie Universität and Humboldt Universität zu Berlin (both from Germany), and Spanish Universidad Rey Juan Carlos (URJC). Seeking to test the relevance of the EMI in different scenarios, simulation experiments are also carried out in this section. Finally, Section IV aims to put all pieces together and it also comments the limitations of EMI, emphasizing the conclusions of our research, and by making new questions that need to be further explored in future research.

2 LITERATURE REVIEW

The performance of employees is the most important factor that affects the success of institutions. In fact, some scholars have pointed out that motivation is a prerequisite for an effective social and economic activity (Colesca, 2010). Throughout centuries, thinkers and philosophers have tried to identify and explain what motivates people to perform activities. Seneca (2014, pp. 41-42) affirmed: "All men wish to make things, but in the process of discovering what stimulates them they wander off track". During the 20th century economists also tried –although implicitly– to explain motivation. They focused, however, on goals of a more fiscal or monetary nature, i.e. they assumed that higher employment and lower inflation rates would make us happier, more motivated human beings. In recent years we have experienced a revival in the interest for motivation, benefitting from ideas with broader views in about what motivates people which serves to motivate people. Several studies (Bruni and Porta, 2006; Van Praag and Ferrer-i-Carbonell, 2008; Aziri, 2011; Saager et al., 2012) have deepened our understanding of what is to be meant by "motivation", and what are the most adequate instruments to encourage it. The aforementioned literature agrees when it says that motivation not only increases work productivity, but is also a decisive element for emotional wellbeing. For this reason it is vital to identify the factors that increase work motivation and its measurement, both for the benefit of the employee, who will see satisfaction increased in the development of his activity, and for the employers, who will be able to maximize productivity.

2.1 Linking Motivation and Productivity

Diverse factors such as the level of investment in capital goods, the development of new technologies, larger innovation processes, or a complex blend of institutional and human factors, determine productivity. Among these, human variables include workers' skills and the effort required to develop their work. Therefore we can affirm that: i) personal effort is directly related to motivation (White, 1959); and ii) personal effort has a direct impact on productivity (Mahoney, 1988). But what does motivation mean?

2.2 Concept of Motivation

Motivation has been analyzed over time and it dates back to Ancient Greece. However, modern academic research was not carried out until 1920s, when the Psychological Review published the work of English (1921), Wolfe (1921), and Perrin (1923). Since the first publications appeared, motivation has never left academic research. In fact, according to the Web of Science search results, there have been more than 210.000 researches related to motivation. Today's most-widely accepted definition of work motivation is the outlined by Pinder (1984), which is consistent with later formulations coming from motivation theorists such as Landy and Becker (1987), Ford (1992), and Latham and Pinder (2005). Work motivation is defined by Pinder (2008, pp. 11) as "a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behavior, and to determine its form, direction, intensity and duration". It is widely accepted that motivation is primarily two-dimensional, referring to intrinsic and extrinsic. Intrinsic motivation involves persons performing an activity because they get satisfaction from their own performance (White, 1959; Berlyne, 1960). Their behaviors are driven by curiosity, pursuit of knowledge and skill acquisition, even in the absence of rewards. On the other hand, extrinsic motivation is the connection between the performance of an activity and its sudden

4 Organizational commitment could be improved through a vast selection of alternatives, such as a better management of personnel costs or by redesigning the different aspects of employees' interaction with the work environment.

reward, such as monetary or verbal prizes, so that satisfaction does not come from the activity itself, but through extrinsic rewards related to the activity. In addition to these sorts of motivation, it is necessary to consider that individuals can also feel demotivated.

2.3 Extrinsic Motivation

Extrinsic motivation has been previously defined as the connection between the performance of an activity and its sudden reward. It seems clear that extrinsic rewards improve the performance of an activity in the absence of intrinsic motivation. And in most activities people are not intrinsically motivated because of the routine. Satisfaction comes from the reward rather than the activity itself. Miller (1944) recognized two goals to focus on: approach and avoidance. In approach motivation, behavior is directed by a positive or desirable event, whereas in avoidance motivation, behavior is directed by a negative or undesirable event (Elliot, 1999). The importance of avoidance motivation must be acknowledged when thinking of motivation as a whole. For Instance, in Herzberg's (1957) Two-Factor model, avoidance of loss is a great motivator.

2.4 Linking Motivation and Job Satisfaction

In order to develop the previously mentioned Extrinsic Motivation Index, the vast literature on job satisfaction (e.g. Theory of Work Adjustment) needs also to be considered. Arguably, there is a close relationship between motivation, job satisfaction and job performance (Kahya, 2008; Yang, 2010). Job satisfaction impacts on the motivation of workers, while the level of motivation impacts productivity and, thus, the performance of organizations (Aziri, 2011). Job satisfaction attempts to identify how content an individual is with his or her job and all that it entails (Spector, 1997). It has been found to significantly influence absenteeism, turnover, the quantity of work performed, the tardiness rate, commitment level, job performance, and psychological distress (Silverthorne, 2004; Chen *et al.*, 2006; Griffin and Moorhead, 2014).

However, the linkages between motivation and job satisfaction are certainly diffuse. In the past few decades, researchers have explained the motivation of HR from different perspectives (Pritchard, 2008; Munir, 2011), in most cases combining characteristics from several theoretical models. To begin with, we must refer to Maslow's (1943) pioneering paper, which introduced the Hierarchy of Needs. Later on, we have witnessed the appearance of a diversified branch of theories, such as Adams' (1965) Equity Theory, Herzberg's (1968) Two-Factor Theory, Porter and Lawler's (1968) improvement of Vroom's (1964) Theory, Locke's (1969) Discrepancy Theory, Alderfer's (1969) ERG Model, Hackman and Oldham's (1976) Job Characteristics Model, Locke's (1976) Range of Affect Theory, Bandura's (1977) Social Learning Theory, Landy's (1978) Opponent Process Theory, Deci and Ryan's (1985) Organismic Integration Theory (OIT), Caplan's (1987) Person-Environment Fit Theory, McClelland's (1988) Human Motivation Theory, Deci and Ryan's (2000) Self-Determination Theory (SDT), to just name the more popular. Table 1 displays a brief summary of those theoretical approaches we consider more relevant when constructing the EMI.

Table 1: Brief Summary of the Theoretical Approaches Relevant to the Construction of the EMI.

Theoretical Tradition	Argument
Cognitive Evaluation Theory (CET)	External factors, such as tangible rewards, monitoring, assessment and delivery deadlines tend to decrease feelings of autonomy and undermine intrinsic motivation. It also specifies that a competitive environment does not increase intrinsic motivation unless a locus of autonomy –understood as the ability of a person to lead their life– is given. Later it was found that tangible rewards significantly undermine intrinsic motivation.
Self-Determination Theory (SDT)	SDT asserts that humans are motivated by three basic psychological needs: for competence, relatedness, and autonomy. When an individual's three needs are fully satisfied, engagement in action is intrinsically motivated and promotes adaptive development and well-being. When one of the needs is unsatisfied, engagement is likely to be extrinsically motivated and development may be hindered. SDT suggests a greater degree of extrinsic motivation has a greater influence on motivation when enjoying some freedom and willingness to perform tasks.
Person-Environment Fit Theory	Person-Environment fit is focused on providing predictions on how personal and environmental factors impact results. Therefore, inferences can be made about the match/mismatch of a person with the environment in which he/she works. Personal variables (P) refer to the value people attach to rewards. In principle it recognizes that rewards are positive. A high degree of adjustment predicts several positive results, while, generally, a mismatch predicts greater stress, tension, and negative results. Csikszentmihalyi (1990) identified that in both cases, when rewards exceed a certain value, it can foster negative effects.

Crowding-out Theory	This approach is based on the crowding-out effect, to the extent that external rewards are introduced, it highlights the capability of moving and minimizes the intrinsic motivation levels.
Social/Justice Comparison Theories	Social/Justice comparison theory is centered on the belief that there is a need within individuals to compare with each other. The theory explains how individuals evaluate their own opinions and abilities by comparing themselves to others. Following the initial theory, research began to focus on social comparison as a way of self-enhancement, introducing the concepts of downward and upward comparisons. Downward social comparisons are likely to make us feel better, while upward social comparisons are likely to motivate us to achieve our goals. We find several models of Social comparison: Self-Evaluation Maintenance Model, the Proxy Model, the Triadic Model, and the Three-Sleeves Model.
Cognitive-Interactional Theories	Within this large branch of theories we can identify: i) Social Cognitive Theory, which is focused on social interactions and experiences. According to this theory, depending on whether people are rewarded or punished for their behavior, their behavior may be modeled; ii) Vroom's Expectancy Theory (1964), which provides a process of cognitive variables that reflects individual differences in work motivation. It allows to identify what factors affect employees' motivation (such as economic rewards) and what can be done to alter it; and iii) Attribution Theory, which is primarily focused on explaining behaviors.

3 THE EXTRINSIC MOTIVATION INDEX (EMI)

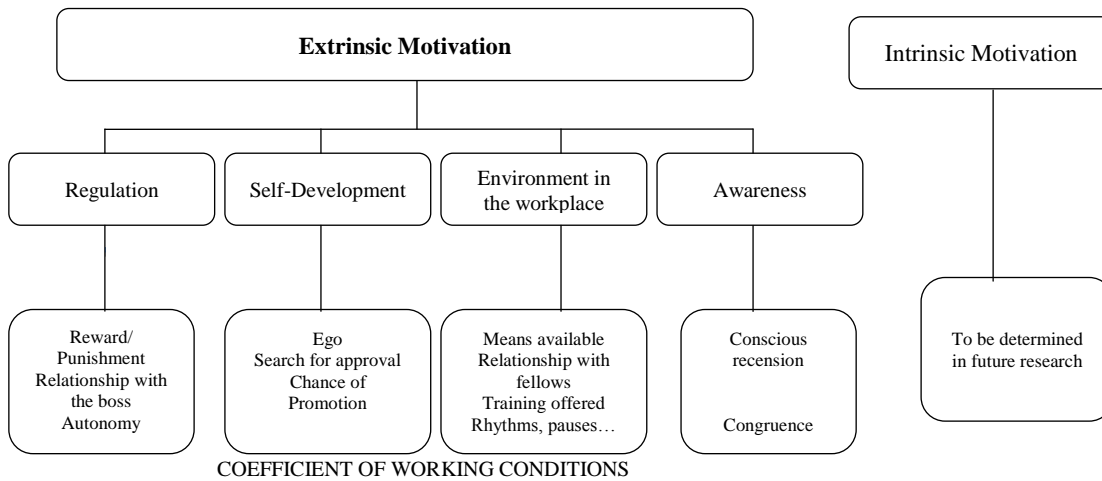
Research has suggested that it is possible to increase productivity and employees' quality of work life through the manipulation of job-related variables (Korunka and Vitouch, 1999; Barling et al., 2003; Thomas et al., 2004; Sageer et al., 2012). Additionally, research has also indicated that by altering various aspects of the work environment, an organization may provide its employees with higher levels of motivation and satisfaction, which ultimately will lead to increased worker productivity (Thomas et al., 2004). Notwithstanding, to correctly manipulate these job-related variables, an organization first needs to identify and quantify its employees' motivation and satisfaction levels. Quantifying the factors regarding work motivation is, arguably, not an easy task because motivation stems from both objective and subjective elements.

Therefore, hereby we propose a new methodology to measure extrinsic motivation in which the influence of job satisfaction is remarkable. It is so because motivation is operationalized, among other factors, in terms of questions about satisfaction⁵. The questionnaires should cover the four aspects regarding extrinsic motivation and shown in Figure 1. In the analysis further developed here, surveys are designed for Faculty members and accordingly so are the questions. The questions are no explicitly arranged in four blocks: regulation, self-development, environment, and awareness⁶. This is the recommended procedure for researchers or HR managers who try to apply the use of EMI. However, we kindly request that you note that the enclosed survey is far from being an example, as it is designed specifically for Faculty members. And questionnaires should always fit to the special circumstances and characteristics of the job analyzed occupation.

⁵ Find all the questions in the survey, which is detailed in the Appendix.

⁶ Questions are intended to gather information from a large number of factors, including working conditions, salary, promotions, autonomy, and role conflict.

Figure 1: Key Factors for Developing a Motivation Questionnaire.



The EMI is built upon the following assumptions: i) organizations are complex, dynamic environments in which the workforce can be managed and it is used to meet goals; ii) changes in the productivity of an organization can occur by increases/decreases in total motivation; iii) a greater extrinsic motivation, *ceteris paribus*, involves a greater degree of total motivation and, therefore, a higher productivity level; and iv) the occupational risk involved in each occupation is implicit in the wage: higher risk leads to higher wages because a risk premium must be paid.

In the literature review, extrinsic motivation (EM) is regarded to be affected by several kinds of rewards. We simplify the analysis by classifying all extrinsic rewards into three groups: gross income, working hours, and the coefficient of working conditions. The gross income variable entails all monetary rewards. The working hours inform of the number of hours spent at the workplace. Finally, the coefficient of working conditions reports the satisfaction level with the environment and the personal fulfillment. While gross income and working hours can be quantified objectively because of their quantitative nature, the coefficient of working conditions is more of a qualitative nature and, hence, presents more difficulties.

The coefficient of working conditions is constructed through a Likert scale and later standardized to 1. Respondents were asked to respond to items by indicating their level of agreement using a five-point Likert scale, in which 1 is identified with the lowest level of satisfaction and 5 with the highest degree of satisfaction. A five-point Likert scale is used for several reasons. First, the odd number of choices includes an indifference point; that is, without strong preference in either direction. Second, too many points do not necessarily add any value or increase the validity of the findings. In fact, Miller's law (1956) indicates that the number of objects an average human can hold in working memory is 7 ± 2 . In addition, Dawes' (2008) analysis observes no significant differences in variances when comparing the 5-point to the 7-point Likert scale.

Under the theoretical assumptions already discussed, it seems clear that the extrinsic motivation of a worker will be greater as a result of: i) a higher income; ii) less working hours; and iii) a higher coefficient of working conditions. Therefore, the equation to assess the extrinsic motivation of a worker "i" is given by

$$EM_i = \frac{w_{ai} \cdot \rho_i^*}{h_a} \quad (1)$$

Where w_{ai} is the real income of a worker i in annual terms, h_a stands for the number of working hours per year, and ρ_i^* is the standardized coefficient of working conditions or satisfaction level of employee i , calculated as the mean of the scores given by the worker for each survey question. The standardization of this coefficient leads to $0 \leq \rho_i^* \leq 1$. Further simplifying, the EMI can be expressed as

$$EM_i = w_i \cdot \rho_i^* \quad (2)$$

Where w_i is the real income per hour worked, and ρ_i^* the already familiar, standardized coefficient of the working conditions. Therefore, the extrinsic motivation of a worker at a given time t –we thought about time as being indexed by t where t is valued by whole members ($t = 0, 1, 2, \dots, n$)– depends on the hourly-earned wage and the level of satisfaction with the working conditions. In this framework, EMI will peak when the worker is completely satisfied (5 to answer any and all of the raised issues) given a

fixed income, and it is worth zero when the worker is completely dissatisfied (1 to answer any and all of the issues raised).

The EMI can also be estimated for a group S , in this case S representing a company, a region, or a particular profession. Re-writing equation (2) in terms of group S

$$EM_S = w_S \cdot \rho_S^* \quad (3)$$

Where w_S is a weighted-average of the real income per hour worked in S , and ρ_S^* is the standardized level of satisfaction in S , so that $0 \leq \rho_S^* \leq 1$.

We expect the EMI to fluctuate over time between and within groups. This could be either the result from changes in job-related variables or simply because no changes occur at all, i.e. the real wage will decrease with inflation. We may calculate the corresponding variations between periods by comparing the respective EMIs over time with a simple index number. Thus, the relative change in the EMI of a group S between period t , and period $t-1$ is

$$I_{St-1}^t = \frac{EM_t}{EM_{t-1}} \quad (4)$$

Thus, a score of 1 would indicate that the EM of the group has remained constant over time, while an index greater than 1 means that the EM of the group has increased. By the same token, a ratio below 1 would report a bad performance. It is also possible to calculate the differences in EM between groups, Z and S , in period t . The procedure is the same than in (4) but comparing groups instead of periods of time. Hence, we proceed as follows:

$$I_S^Z = \frac{EM_Z}{EM_S} \quad (5)$$

In both cases, the change in the EMI is simply calculated by subtracting 1 from the index, and obtaining the rate of change, which is generally expressed in percentage.

Additionally, by using a complex index of aggregative type, the EMI of organizations, where different groups (e.g. departments, sections...) may coexist, and it could be calculated as a whole. By doing so, it is also possible to provide comparisons of the EMI, for instance, by occupations, companies, organizational departments, or even countries:

$$EMI_S^Z = \frac{\sum_{Z=1}^k EM_{iZ,t} \cdot x_i}{\sum_{S=1}^k EM_{iS,t} \cdot x_i} \quad (6)$$

Where Z and S are two different groups, $EM_{iS,t}$ and $EM_{iZ,t}$ are the extrinsic motivation indexes for each group, and x_i is the weight of each subgroup i within the relative group Z or S depending on its belongingness.

The EMI will report on changes that occur in the EM of workers from the selected group unit. We could also suggest complementary formulations, based on the methodology of the consumer price index (CPI), using Laspeyres or Paasche indexes (Turvey, 2004). Then extrinsic motivation could be measured by a wage index (per hours worked), weighted by the standardized coefficient of working conditions:

$$Iw_0^t = \frac{\sum_{S=1}^k w_{st} \cdot \rho_S^*}{\sum_{S=1}^k w_{s0} \cdot \rho_S^*} \quad (7)$$

The Paasche index is obtained when this ratio is assessed in the current period t . Thus, by setting 0 as base period, a Laspeyres index is obtained. It is reasonable to adopt Paasche instead of Laspeyres index since the working conditions change over short periods of time. A wage index based on Laspeyres index would be obsolete in periods greater than one-year time.

An additional complication comes when there is the intention to compare workers whose wages are expressed in different currencies or simply when workers live in regions/countries where prices are different. In such cases, the EMI needs to be homogenized. By computing purchasing power parity (PPP) in the index, we do not only mitigate the effect of receiving wages in different currencies but also adjust for different price levels⁷. Therefore, the optimal EMI index for comparison between two groups, when observing monetary differences, can be written as

⁷ Now, it is possible to make comparisons between organizational units from all over the world.

$$I_S^Z = \frac{EM_Z^I}{EM_S^I} = \frac{\frac{w_Z}{PPP_Z} \rho_Z^*}{\frac{w_S}{PPP_S} \rho_S^*} \quad (8)$$

Where PPP_S and PPP_Z indicate the purchasing power parity for group S and Z respectively.

3.1 Application of the EMI to Faculty Members

In order to prove the utility of the index, we do apply the EMI to university Faculty members⁸. We collected representative samples, according to the size of the universities at hand, and also their location: Germany (Freie Universität and Humboldt Universität zu Berlin) and Spain (Universidad Rey Juan Carlos). Surveys were solely handed out to Faculty members from humanities and social sciences' faculties and, more specifically, to those teaching in the fields of Business Administration and Economics. The analysis was conducted in 2013, the number of respondents was, in total, 196 (118 for Spanish Universidad Rey Juan Carlos, 52 for Humboldt Universität, and 26 for Freie Universität), and respondents were approached either in their offices (Spain) or in the department's meetings (Germany). Table 2 shows the mean values obtained in the surveys.

Table 2: Mean Value of each Question of the Survey

Question	URJC (Vicálvaro)	Humboldt Universität	Freie Universität
1	3,7000	4,4651	4,6471
2	3,5500	4,0000	4,7059
3	3,3700	4,2326	4,6471
4	2,6300	4,0930	4,0588
5	2,8800	3,7674	4,0588
6	2,1000	3,7907	4,4706
7	1,9800	4,3023	4,1765
8	2,0000	2,8140	3,0000
9	3,0200	4,4186	4,7059
10	2,5800	4,2326	4,8824
11	3,6800	4,5581	4,7647
12	2,6200	1,6279	1,6471
13	3,4500	1,6512	1,4118
14	3,0200	4,4884	4,8235
15	2,1500	4,3721	4,1176
n	100	43	17
N	118	52	26

Notes: Mean values are expressed in scale 1-5, as indicated in the questionnaire. Please see Annex I, where the polls for universities are specified.

Table 3 refers to the fundamental variables for estimating the EMI. Professorship categories are expressed in terms of government recognition, according to their home country. Therefore, the groups are not entirely homogeneous but still show many similarities. In relation to job security, the Spanish teachers overwhelmingly belong to the category of civil servants while the same cannot be affirmed for their German counterparts. In the case of Germany, the teacher's gross income (W level) appears in the Bundesbesolgunordnung (BBesO) or federal wage scale. On this scale we find W1 Privatdozent (Lecturer) –those who have a PhD but still cannot supervise PhD students–, W2 Extraordinarius (Associate) –they have some influence but their careers are still in process of consolidation–, and finally W3 Ordinarius (Professor) –those in charge of research groups, with established careers and permanent Faculty positions⁹. In Spain, professorship and lecturer groups are divided into more than three categories. In order to establish comparisons, we selected those with the most similarities to the German system: Contratado Doctor (Lecturer) –has a PhD and is accredited by ANECA or ACAP–, Profesor Titular (Associate Professor) –has a PhD and is accredited by ANECA; he has also won, through

⁸ Faculty members are one of the professions most shaken by 2007's financial crises in the case of Spain. Right after the crises, wages were greatly lowered, and most of the monetary bonuses suppressed.

⁹ For more information about academic career structure in Germany, see *Research and Academic Jobs in Germany*. Link: <http://www.careeredu.eu/index.php?doc=1>

competition, a civil servant position–, and finally Catedrático (Full Professor) –have a PhD and is accredited by ANECA¹⁰.

Table 3: Variables needed for EM_i calculus, 2013

University	Teacher Categories	Deflated gross income (annual)	Working hours per year	Coefficient of working conditions, ρ_s^*
URJC (Vicálvaro)	Catedrático	39.590,46€	2016	0,4656
	Profesor titular	31.469,45€		
	Contratado Doctor	26.976,54€		
Freie Universität	W3 Ordinarius	91.323,16€	2024	0,8778
	W2 Extraordinarius	64.184,61€		
	W1 Privatdozent	49.744,80€		
Humboldt Universität zu Berlin	W3 Ordinarius	91.323,16€	2024	0,8090
	W2 Extraordinarius	64.184,61€		
	W1 Privatdozent	49.744,80€		

Notes: To calculate deflated gross income we assess the following information for Spain: base salary, extra and special allowance, adjusted to an annual inflation rate of 0.2%. On old, teaching, and research supplements are excluded. In 2013, we found 14 payments, including summer and Christmas payments, whose amounts differ from the ordinary wage. For Germany: the annual inflation rate is 1.3%. Supplements were excluded from marital union, child and the amount linked to the performance of W1 and W2, which varies depending on the quantity and quality of publications and teaching. The number of pays is 14, including summer and Christmas payments. Business days are calculated by country, depending on holidays and weekends. Hours worked are taken daily as listed in the full-time contract, 8 hours. Working conditions ρ_s^* were calculated as the mean of all questions, excluding the eighth and twelfth. For calculation purposes the question number thirteen had to be reversed, taking the opposite mean.

Source: *Tabla de Retribuciones PDI 2013 (Spain) and forschung.w-besoldung.net (Germany) for nominal wages, Statistisches Bundesamt (Germany, November 2013) and Instituto Nacional de Estadística (Spain, November 2013) for inflation, and www.dias-laborales.es (Spain) and www.arbeitstage.de (Germany) for working hours.*

We consider gross income for analysis because tax provisions differ among countries, both for VAT and for income tax. The latter varies depending on marital status, number of household members and personal aspects. It is also usual to find different individual income tax rates among countries. On the other hand, only common monetary rewards among groups are considered, i.e. supplements such as seniority, research and teaching were excluded.

3.2 Main Findings

The results are shown in Table 4. Whilst EM_i is valid for comparison between groups of the same country (Germany), it needs to be homogenized through PPP when intending to compare all faculty members.

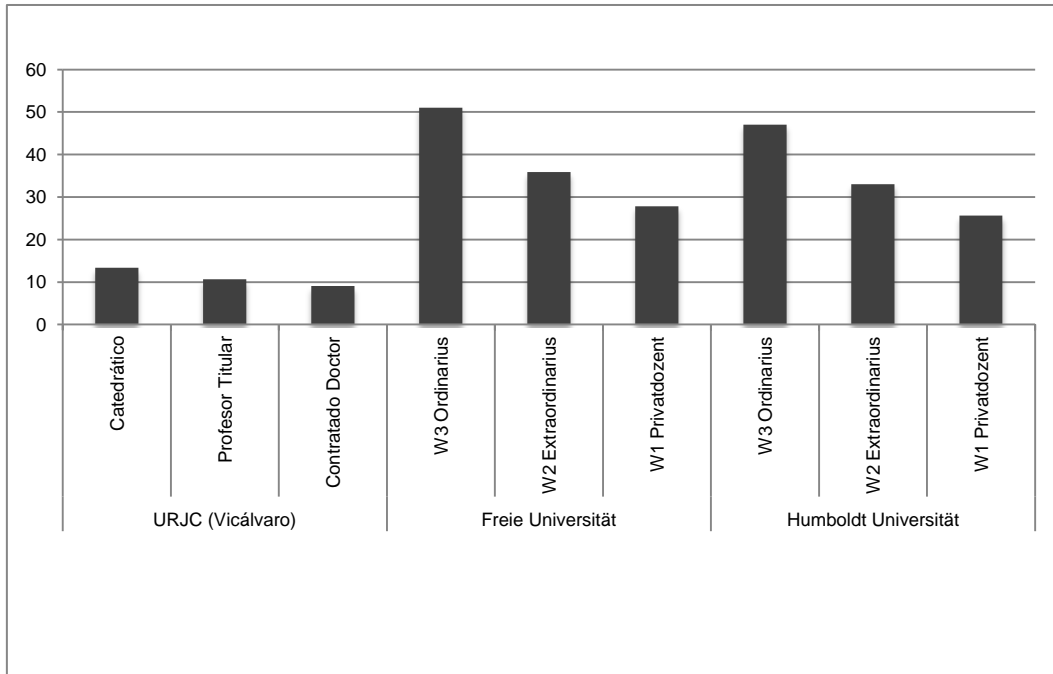
Table 4: EM_i and homogenized EM_i by university, 2013

University	Teacher categories	EM_i	PPP (2013)	EM_i PPP
URJC (Vicálvaro)	Catedrático	9,1435	0,680	13,4463
	Profesor Titular	7,2679		10,6880
	Contratado Doctor	6,2303		9,1622
Freie Universität	W3 Ordinarius	39,6065	0,781	51,7126
	W2 Extraordinarius	27,8366		35,6423
	W1 Privatdozent	21,5741		27,6237
Humboldt Universität zu Berlin	W3 Ordinarius	36,5022	0,781	46,7378
	W2 Extraordinarius	25,6548		32,8487
	W1 Privatdozent	19,8832		25,4586

Figure 2 shows the results by category of teacher and university. It is clear the existing disparity between German and Spanish university teachers.

¹⁰ The accreditation process by ANECA is newly implemented. Previously, a system named “habilitación” was used. So, most jobs are governed by the old system.

Figure 2: Homogenized EM_i by university, 2013



We apply the proposed index, I_s^z , to compare extrinsic motivation between two groups at a time t , obtaining the following results for German universities¹¹ (Table 5). The results presented for I_s^z and I_z^s would be exactly the same if the three variables of the index concur. In this case, working hours and gross income for each category are the same because both groups belong to the same region and, thus, are affected by the same regulations. The coefficient of working conditions ρ_s^* is the only variable which differs. As ρ_s^* has the same value for the three subgroups, the result is symmetrical.

Table 5: Comparison between Freie and Humboldt, 2013

University	Teacher Categories	EM_i	I_s^z	I_z^s
Freie Universität (z)	W3 Ordinarius	39,6065	1,0850	-
	W2 Extraordinarius	27,8366	1,0850	-
	W1 Privatdozent	21,5741	1,0850	-
Humboldt Universität zu Berlin (s)	W3 Ordinarius	36,5022	-	0,9216
	W2 Extraordinarius	25,6548	-	0,9216
	W1 Privatdozent	19,8832	-	0,9216

Notes: Purchasing Power Parities for GDP: National currency units per US dollars, OECD Database (2014)

Table 6 compares Universidad Rey Juan Carlos (Vicálvaro Campus, Madrid) with Freie Universität (Berlin). To the extent that both belong to different countries, it is necessary to use homogenized EMI.

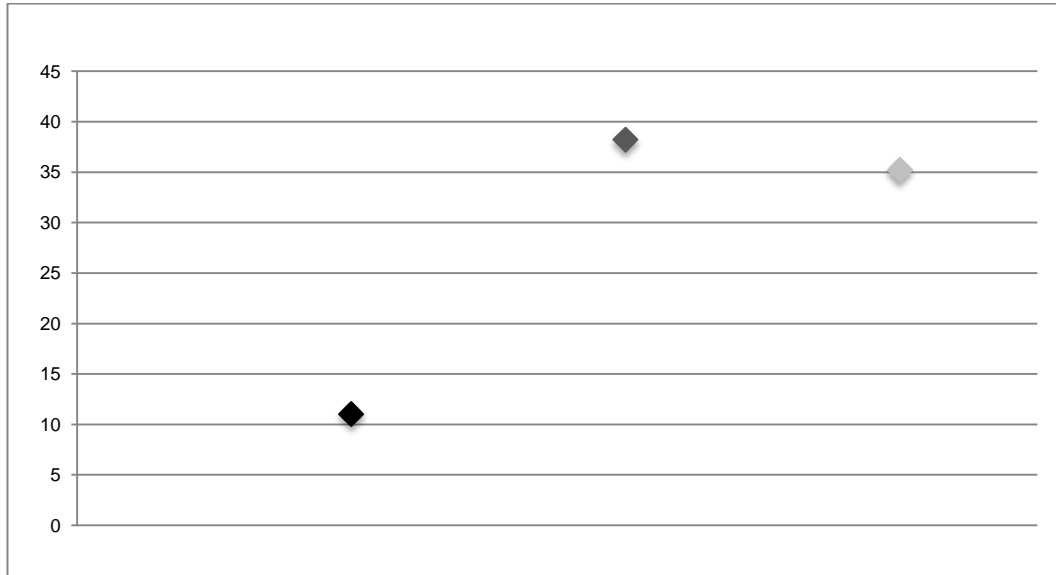
Table 6: Comparison between URJC and Freie, 2013

University	Teacher Categories	Homogenized EM_i	I_s^z	I_z^s
Universidad Rey Juan Carlos (z)	Catedrático	13,4463	0,2600	-
	Profesor Titular	10,6880	0,2999	-
	Contratado Doctor	9,1622	0,3318	-
Freie Universität (s)	W3 Ordinarius	51,7126	-	3,8459
	W2 Extraordinarius	35,6423	-	3,3348
	W1 Privatdozent	27,6237	-	3,0150

¹¹ Recall that there is no need to use PPPs when comparing similar groups: same country, same region.

The great disparity observed between Spanish and German universities is mainly explained by significant differences in the standardized coefficient of working conditions, ρ_s^* , and real annual wages. Calculations of homogenized EMI place URJC faculty members well below those from Freie Universität, as it may be seen when looking at I_s^z . Figure 3 shows the mean of homogenized EMI by university, reflecting the disparity between German and Spanish Faculty members. There is also divergence between German groups, which is entirely explained by the inferior working conditions at Humboldt Universität.

Figure 2: Homogenized EMi (mean) across universities, 2013



Notes: URJC (Black), Freie Universität (Dark Gray) and Humboldt Universität zu Berlin (Light Gray)

3.3 Simulation Experiments

In the previous analysis the EMI was applied with research objectives, i.e. to have a better understanding of the job satisfaction among European scholars. However, the possibilities that the EMI brings along are much relevant than that, especially for decision-making. In fact, the EMI turns out to be a tool of the utmost importance for the private sector. As it is shown when running different simulations, the HR departments are provided with a valuable tool. HR managers are able now to improve their understanding about the reasons behind turnover and, most importantly, they get to know what strategies would allow the organization to attract and retain valuable employees. In addition, the most relevant feature of the EMI is that it allows the organization to measure the consequences of its actions and, hence, to be able to reduce existing gaps in job satisfaction.

To illustrate this, two different firms from the same sector (business consultancy) are analyzed. To ease things up, it is assumed that both companies are located in the same country (United States). Thus, there is no need to adjust the EMI through PPP. Four different scenarios are proposed, trying to cover some of the most-likely situations that can be found in the private sector. All variables are set as it is more convenient for analysis purposes. In all fictitious scenarios, however, variable values are meant to match real-life situations.

1st SCENARIO: The Importance of the Salary

As shown in Table 7, when the coefficient of working conditions and working hours are practically the same, the element that becomes a real difference is the annual income. In the first scenario, Firm Y pays around 10,000 USD more than Firm X, and that places employees of Firm Y with a higher EMI. Accordingly, we expect employees of Firm Y to be more committed to the firm than employees of Firm X, basically because: i) employees of Firm Y tend to value positively their firm when compared with their competitors (Firm X); and ii) the extrinsic rewards provided by Firm Y are significantly higher, which make employees to be more involved and motivated. Finally, we can expect employees of Firm X to move to Firm Y when job offers are available, which would raise turnover costs for Firm X.

Table 7 (1st Scenario): Consulting services' firms, variables for 2014

Firm	Categories	Deflated gross income (annual)	Working hours per year	Coefficient of working conditions, ρ_s^*	EMI
X	Senior Manager	100,000 USD	2024	0,63	31.13
	Senior Consultant	80,000 USD			24.90
	Junior Consultant	60,000 USD			18.68
Y	Senior Manager	110,000 USD	2024	0,66	35.86
	Senior Consultant	90,000 USD			29.35
	Junior Consultant	70,000 USD			22.83

2nd SCENARIO: When Working Conditions Is All that Matters

In the second scenario we propose one of the more realistic examples that can be found in the private sector: there are no huge difference in the salary nor in the working hours, although the working conditions differ greatly. In this case, the variations in the EMI are even greater than in the first scenario, given that the working conditions are significantly inferior in Firm Y. Hence, Firm X employees are more motivated and committed than Firm Y employees. We do expect here employees of Firm Y to move to Firm X when job offers are made. Thus, turnover costs are expected to rise for Firm Y.

Table 8 (2nd Scenario): Consulting services' firms, variables for 2014

Firm	Categories	Deflated gross income (annual)	Working hours per year	Coefficient of working conditions, ρ_s^*	EMI
X	Senior Manager	100,000 USD	2024	0,85	42.00
	Senior Consultant	80,000 USD			33.60
	Junior Consultant	60,000 USD			25.20
Y	Senior Manager	103,000 USD	2024	0,65	33.08
	Senior Consultant	82,000 USD			26.33
	Junior Consultant	61,000 USD			19.60

3rd SCENARIO: Working Hours Do Differ Among Firms

The only difference here lies in the working hours: whereas Firm X employees work 2024 hours/year, employees in Firm Y do work 2277 hours/year. In simple words, employees of Firm Y work one extra hour per day, or 257 hours more per year. When working hours are higher in one firm, *ceteris paribus*, we find higher EMI values for the firm with less working hours, because it provides better conditions to its employees. Thus, we can expect employees of Firm Y to move to Firm X when job offers are made. And thus, turnover costs will tend to increase for Firm Y.

Table 9 (3rd Scenario): Consulting services' firms, variables for 2014

Firm	Categories	Deflated gross income (annual)	Working hours per year	Coefficient of working conditions, ρ_s^*	EMI
X	Senior Manager	100,000 USD	2024	0,70	34.60
	Senior Consultant	80,000 USD			27.67
	Junior Consultant	60,000 USD			20.75
Y	Senior Manager	100,000 USD	2277	0,70	30.75
	Senior Consultant	80,000 USD			24.60
	Junior Consultant	60,000 USD			18.45

4th SCENARIO: The Most Plausible Scenario

The 4th scenario is, without any doubt, the most likely to find in all markets and sectors. Whilst one firm may pay higher wages than the other, the coefficient of working conditions is greater in the firm with lower wages. Unsurprisingly, these effects could even cancel out. In the present scenario, both firms work the same number of hours per year. However, the coefficient of working conditions is higher for firm Y, and wages are higher in Firm X. Additionally, there are no significant differences between firms neither in working conditions for their employees nor in their wages. The result is that the EMI is about the same in the two firms. Therefore, job changes are not expected when job offers are made, except in very special cases where the employees might feel isolated or unsatisfied. In the 4th scenario, turnover costs are expected to increase for now firm.

Table 10 (4th Scenario): Consulting services' firms, variables for 2014

Firm	Categories	Deflated gross income (annual)	Working hours per year	Coefficient of working conditions, ρ_s^*	EMI
X	Senior Manager	110,000 USD	2024	0,65	35.33
	Senior Consultant	87,000 USD			27.94
	Junior Consultant	65,000 USD			20.87
Y	Senior Manager	100,000 USD	2024	0,70	34.58
	Senior Consultant	80,000 USD			27.67
	Junior Consultant	60,000 USD			20.75

3. 4 Utility of the EMI

We conceive the EMI as a valuable managerial tool for researchers, public institutions, and private businesses. The EMI is an attempt to reconcile research in HR with practice, i.e. too often research studies are irrelevant for HR managers or chief executives. In this sense, the EMI aims to fill the lacunae by providing relevant information to both researchers and employers. On one hand, researchers are now able to dig in deeper in the state of affairs of any occupation, i.e. they can collect and process the data in order to obtain useful information about the rationale of a job. On the other hand, HR departments are able to: i) track the satisfaction level among employees; ii) perceive the effects of their labor policies on job satisfaction and commitment; iii) reduce turnover costs by retaining quality employees; and iv) to attract new talent by spotting and erasing the weaknesses of the organization with respect to the competitors.

In both cases, the information that the EMI can provide is highly valuable. For instance, in the case of academic research, one might be interested in knowing why some people work under really unfavorable conditions, or why some employers offer disproportionately negative working conditions. On the other hand, and where the EMI is more likely to be applied, HR departments may use this tool to attract and retain talent and to reduce turnover costs. All in all, the EMI has the ability to measure how a particular policy or strategy affects upon an employee's motivation and satisfaction level, and what the overall effect of such alteration is. In other words, it provides remarkable information for an organization decision-making process.

Regarding the utility of the EMI in the examples above, we can conclude that in the case of a researcher, the EMI facilitates the way in which information is interpreted. This is obvious when analyzing divergences for Faculty members with respect to their university membership. In such case, as researchers we seek to understand why job satisfaction is markedly different from those scholars teaching in Germany than for those in Spain, but we do not try to change the course of events. However, the EMI becomes much more valuable for the Human Resources Department in its strategic function when the simulation experiments are run. Here, the EMI does not only provide a deeper understanding of the facts, but it also identifies potential consequences of policy decision-making. In the First Scenario, higher wages, other things being equal, mean that a firm can retain quality employees and attract bright employees from other firms if job offers are made. Accordingly, turnover costs will increase for the other firms, whilst productivity is expected to be higher in this firm paying higher wages. In the Second Scenario, there are only significant differences in the working conditions. An organization with better working conditions has more committed and motivated employees than other firms. Thus, turnover costs are lower for this firm, and productivity probably higher. In this hypothetical case, this firm also has the ability to attract talented employees. Lastly, in the Fourth and most plausible scenario, some firms may pay higher wages than others, although firms with lower wages offer superior working conditions. In this case, it is likely that these differences cancel out overall, i.e. some employees emphasize the monetary rewards while others care more about self-enhancement, integration, group dynamics, close relationship to the bosses, etc. Has the EMI any utility in such a case? It certainly does. An organization can, taking into account its capacity and level of resources, address monetary differences or specific differences in working conditions in order to enlarge the gap with existing firms. Thus, it is in these scenarios that HR departments should use the EMI to promote job satisfaction, increase commitment and productivity levels, and also to attract talent and reduce turnover costs. Combining both survey data and the EMI, an organization easily gets to know what needs to be enhanced and to which extent.

4 CONCLUSION AND DISCUSSION

Although the initial objective of the research, which was to provide a tool of practical significance for both researchers and HR managers, has been fulfilled, we must recognize some limitations of the index presented here. First, the need for cooperation with employers when the investigation is carried out by external sources and the gross annual income is not known. Second, the EMI does not consider net annual income, which implies that the positive or negative impact of fiscal pressure exerted in the country is not measured. This methodological difficulty is due to tax provisions, which differ by individual. If the fiscal pressure is to be measured, the anonymity of the survey will be lost and, thus, questionnaire answers would be, most likely, biased for fear of job loss and reprimands. Third, the EMI fluctuates freely without bound. In other words, it cannot reach a peak. This is the most severe difficulty of the index, given it increases asymptotically if so does income. Accordingly, when annual income attains a considerable amount of money, the relevance of the EMI is certainly distorted. Finally, all variables of the EMI vary over short periods of time and, therefore, annual monitoring is highly recommended for those aiming to follow the evolution of a group over time. All in all, we expect to have satisfactorily answered the criticism coming from Hambrick (2007), Rousseau (2007), DeNisi *et al.* (2014), and especially the call for empirical tools made by Saari and Judge (2004).

In a world where globalization has highly altered the way of doing things, competition has increased vastly and, as a consequence, most business practices need to be optimized. The struggle for one of the most critical resources, human resources, can provide organizations with competitive advantages that might lead to dominate the market. The importance of human capital was already seen in the past when most firms established HR departments in the 1960s, and the role of HRM within the firm has been growing ever since. Today's agreement upon HR departments is clear: it bears a strategic function that looks for the best performance and coordination of all resources. The last decades have led to an evident conclusion that makes room for empirical tools such as the EMI: motivations are changing radically, and it is necessary to consider them as one of the main instruments for stimulating the human resources to get the best results. Although it is true that HR departments have its own tools to promote job satisfaction as well as to attract and retain talent, it is less clear whether they have a tool such as the EMI. The strength of the EMI is that it does not only provide a deep and insightful overview of the market, but also allows comparisons with the competitors. The EMI has proven indeed to be very useful: i) to quantify any worker's EM level; ii) to analyze, through historical series, the evolution of a group in the period $t_0 - t_n$; iii) to compare the motivation of a group (e.g. university faculty member) between countries in period t ; iv) to identify the focus of dissatisfaction; and v) to decision-making procedures, e.g. by a better managing of turnover costs.

In fact, the EMI allows economic agents to assess the impact of remuneration as well as the effect of strategies regarding working-time and working-conditions. We hereby present a powerful tool for HRM that is closely related to productivity levels and turnover costs. The EMI is ultimately designed to serve as a tool for attracting and retaining talent. The inner workings of the EMI must be understood in the context of a social responsible organization with a win-win tool at its disposal. By assuring job satisfaction not only is the organization better off because its productivity tends to increase, but also the employees enjoy greater harmony and happiness. This is because the greater the satisfaction, the higher the motivation levels and the willingness of workers to produce.

The methodological limitations of our own research point the way for future research, where opportunities are abundant, especially in the field of developing empirical tools of higher quality. Yet there are still several questions that need to be answered in regard extrinsic motivation, and intrinsic motivation: Is it possible to measure somehow intrinsic motivation? If so, could an index of total motivation be constructed? How should such an index weight the relative importance of extrinsic and intrinsic motivation?

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APPENDIX

The purpose of this survey is to determine the degree of work motivation of the professors who work in URJC, Freie and Humboldt Universities. All questions must be answered with grades 1 to 5, from completely dissatisfied/strongly disagree (1) to completely satisfied/ completely agree (5)

1. What is the degree of satisfaction in your work as teacher?
1 2 3 4 5
2. Are you satisfied with the relationship with your closest boss?
1 2 3 4 5
3. Do you think that the work environment is proper to perform your tasks?
1 2 3 4 5
4. Do you think the University takes into account the professors' suggestions?
1 2 3 4 5
5. Are you agree with the criteria established by the State (national or local) for the professors promotions?
1 2 3 4 5
6. Do you think there is a correlation between the work performed and the wage perceived?
1 2 3 4 5
7. Are you satisfied with the latest reforms undertaken by the government in education issues?
1 2 3 4 5
8. Do you think the new education plan (Bologna plan) improves the quality of education?
1 2 3 4 5
9. Do you think the attitude of students motivates you to get involved in the preparation of the classes?
1 2 3 4 5
10. Do you think the University has the means (technology) needed to develop your tasks efficiently and effectively?
1 2 3 4 5
11. Do you think that the vacation period for professors is enough?
1 2 3 4 5
12. Do you think that teaching the same subject for an extended period of time causes procrastination as preparing classes?
1 2 3 4 5
13. Do you think that some professors are teaching more subjects than usual due to lack of staff?
1 2 3 4 5
14. Do you think it is appropriate the allocation courses system?
1 2 3 4 5
15. Are you satisfied with the time you have to devote to research activities?
1 2 3 4 5