Has the pandemic affected the motivation and job satisfaction of university researchers? A case study from France

Journal:	*International Journal of Educational Management*
Manuscript ID	IJEM-06-2022-0217.R4
Manuscript Type:	Original Article
Keywords:	motivation, pandemic, job satisfaction, university researchers

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Abstract

The purpose of this study is to determine whether the pandemic affects the motivation and job satisfaction of university researchers as a whole and by their separate groups by gender, age, academic position (career stage), and degree. For this, two hypotheses were tested, using the one-way ANOVA parametric test and the Kruskal-Wallis nonparametric statistical test, with the data collected during in-depth interviews and surveys with university researchers from two French universities in 2019 and 2021. It was found that during the pandemic, the overall motivation and job satisfaction of all researchers did indeed change, but not significantly. However, as an in-depth analysis showed, the insignificance of general changes during the pandemic is associated with multidirectional changes in individual groups of researchers. Significant differences were found between changes in motivation and job satisfaction of respondent groups by gender, career stage, and academic qualifications. These differences in the changes observed confirm the hypothesis that the pandemic had a significant impact on certain motivators and elements of job satisfaction among various groups of university researchers. The study showed that pandemic restrictions and fears positively affected the motivation and job satisfaction of younger researchers and male researchers, while negatively affecting older researchers and female researchers. During the pandemic, early-stage researchers were mostly unhappy only about their salary and lack of teaching skills. As for experienced and senior researchers, dissatisfaction resulted from the fact they did not have time to fulfil all their duties – because of an overload arising from a combination of new forms of teaching, ~~a large number of~~many teaching hours, administrative duties, and the need to master new communication tools.

Introduction

The COVID-19 pandemic brought about a number of changes into people's lives. On the one hand, it introduced ~~a number of~~several restrictions (Kaushik & Guleria, 2020) that forced representatives of many professions to master online communication and temporarily go without many of life's joys. On the other hand, it ~~opened up~~opened new opportunities (Diab-Bahman & Al-Enzi, 2020) that allowed employees to perform operations without unnecessary logistics and other costs, saving resources and time. Science is a special field of activity, but it also underwent ~~a number~~some of changes when most of the communication moved online. When we talk about science, we are usually interested in research results and findings. However, these all result from the work of people burdened with a lot of worries, e.g., financial difficulties (Yamada, 2019), extreme competition, and a lack of time for family and furthering their hopes of promotion (Nature, 2016), even if they may still have time for research. And ~~in order for~~for the results of their work to be of high quality and useful for society, it is necessary that these people – researchers – are highly motivated.

University researcher is a special profession ~~which~~that, in addition to involving the pursuit of scientific discoveries, requires serious teaching and supervising work ~~in order to~~to convey the new knowledge gained to students and future employees. This work thus requires special skills and takes a lot of time and effort if it is to be performed to a high standard. The profession demands that the researcher work in a complex system, requiring self-discipline and an ability to concentrate on the multiple results of the work carried out, something that in turn requires strong communication skills, effective research methods, and the ability to cope with changing emotions.

Over the last fifty years, the world of higher education and research has been swept by an unprecedented wave of change. Tertiary education initially experienced a phenomenal global expansion (Schofer and Meyer, 2005); today, around the world, 20% of young people participate in tertiary education, up from less than 2% fifty years ago. In 2013, there were no fewer than 14,500 institutions of higher education in the world. In parallel with the massification and diversification of their audiences, universities have been called upon to report to their various stakeholders. After the Second World War and throughout the period of what the French call the "trente glorieuses" (1945-75), many Western countries enjoyed a flourishing economy and an unemployment rate close to zero. This period also saw massive public investment in higher education, perceived as an instrument of social ascension. At the turn

of the 1980s, with rising unemployment, rising higher education costs, and shrinking public budgets, students and their families increasingly contributed to the financing of studies, as governments sought to rationalize public spending in the sector. The combination of ~~the exponential~~the exponential growth of higher education and the resulting requirement of accountability have paved the way for the emergence and development of national and international rankings.

As research shows, there is no unequivocal answer in science to the question of the influence of the motivation of university researchers on their performance. On the one hand, Akhtar and Iqbal (2017) drew on a study of 100 researchers from one university in Pakistan to prove that, statistically, university researchers' motivation has a significant impact on their job performance. This result confirmed previous conclusions by Asim (2013) for another university in the same country regarding the positive relationship between academic staff motivation and performance. Similar conclusions were obtained by Olusadum and Anulika (2018) in their study of 200 employees of a college on another continent (in Nigeria), in which the positive relationship between motivation and staff performance turned out to be significant. This conclusion received earlier support from Mawoli & Babandako (2011), ~~whose study~~whose study of a sample of 219 academic staff in another Nigerian university found that the impressive working conditions and outstanding employee motivation resulted in high academic staff performance and productivity. Similar positive relationships were found for universities in Turkey (Aydın, 2012), Ghana (Kwapong et al., 2015), and Malaysia (Ghaffari et al., 2017). Moreover, the positive relationship between employee motivation and job performance was confirmed for different industries and different countries in Asia, ~~Africa~~Africa, and Europe (Hemakumara, 2020; Diamantidis and Chatzoglou, 2019) with certain national differences in the level of influence of particular motivational factors.

On the other hand, Comighud and Arevalo (2020), using a descriptive-correlational method to study a sample of 89 ~~school teachers~~schoolteachers in the Philippines, found that the relationship between the teachers' motivation and their job performance was insignificant. Besides, Jusmin (2016) drew on a sample of Indonesian private higher schools and found that work motivation had a negative and significant effect on lecture performance, while job satisfaction had a positive and significant effect on lecturer performance. Obviously, ~~school teachers~~schoolteachers differ significantly from university researchers in terms of their roles and responsibilities. However, such results make us think about the individual impact of motivation on the employee performance, as well as the importance of job satisfaction for achieving high performance.

We may conclude that motivation and job satisfaction to some extent affect the performance of university researchers, and hence the research and teaching performance of universities and other higher education institutes. The quality of both the scientific results and the student training would therefore appear to a certain extent to depend on the motivation and job satisfaction of university researchers. However, during the COVID-19 pandemic, the working conditions, the daily routine, and other important elements of the university researchers' working system underwent major changes (Joshi et al., 2020).

So how does the pandemic affect the motivation and job satisfaction of university researchers, which are significant factors of university performance? In this study, we will try to answer this question using the case of two well-known French universities.

Literature Review

In general, motivation is the process that initiates, guides, and maintains goal-oriented behaviours (Cherry, 2022). In other words, motivation is the study of why individuals behave as they do: what gets their behaviour started, and what directs, energizes, sustains, and eventually terminates action (Graham & Weiner, 2012). At work and especially in the case of management, motivation plays a critical role because, in the form of distributing energy to different actions, motivation is the only aspect of behaviour that people can control. This means that any attempt to change behaviour must do so through a change in motivation (Kanfer et al., 2008). It is therefore very important for management to know what motivates employees and what affects their motivation.

Motivation theory has been around for over a century, during which it has evolved significantly. It began wi~~z~~ith Taylor's (1911) rational-economic model of the maximization of employees' own financial and material rewards. Then there was Mayo's (1922) social model which focussed on the satisfaction ~~of employees~~of employees' social needs. Later, a self-actualizing model, drawing on the theory that human needs are hierarchically organized, was put forward by Maslow (1954). In contrast to previously

developed motivation models, Schein (1980) considered the nature of employees to be complex, with varying needs and motivations depending on their different circumstances, age, experience, expectations, and so on. Introducing the concept of a psychological contract, Schein (1980) argued that people at work can be motivated by the satisfaction of security needs, challenging work, the ability to achieve goals, and so on.

Focussing specifically on academia, Rowley (1996) argued that the motivation of academic staff in higher education is key to the production of high-quality results and described also the cultural and environmental factors that contribute to it, e.g., financial rewards, personal autonomy. And since academics have their own motivating characteristics, Rowley argued that good management must recognize and deal with these individual differences.

Motivation is also closely related to job satisfaction and, according to Maslow's (1954) hierarchy of needs, lower-order needs must be satisfied before higher-level needs emerge and can determine motivation. Starting from Herzberg et al. (1959), who argued that job satisfaction is not a one-dimensional concept and is influenced by various factors, job satisfaction has become the object of intense research attention. Later, studies appeared on the job satisfaction of academic staff, which revealed the influence of such factors as the university atmosphere (Lacy and Sheehan, 1997), work environment (Pearson and Seiler, 1983; Flowers and Hughes, 1973), well-paid employment, prestigious and autonomous work (Moses, 1986), opportunities for professional growth through compatible work activities and colleagues (Finkelstein, 1984), and age and social status (Toker, 2011). Such diverse contributing factors to the satisfaction of academic staff suggest~~s~~ that the pandemic, with its multifaceted effect on various aspects of people's lives, could also significantly affect the job satisfaction and motivation of university researchers.

Applying Hertzberg's theory to academic staff in higher education institutions, Hill (1987) found that job satisfaction of academic staff is related mostly to intrinsic factors, for instance, an interest to work, whereas job dissatisfaction is related rather to extrinsic factors~~-~~, ~~e.g.~~e.g., rewards or praise. These conclusions have been empirically confirmed later by Schroder (2008)~~,~~ and Sharma and Jyoti (2009). Therefore, to study the factors of motivation and job satisfaction, it makes sense to consider both intrinsic and extrinsic motivators.

Besides, Hagedorn (2000) introduced demographic factors as mediators for job satisfaction. Later, Bentley et al. (2012) used demographic categories like gender and age, when studying the factors of job satisfaction of academic staff in Australia, for example by dividing them into three groups (early career, mid-career, and late~~-~~-career). Stankovska et al. (2017) also used gender and age categories to study job satisfaction and motivation of Macedonian academic staff. The most recent application of demographic categories is that of Goncharuk and Cirella (2022), who used demographic (age, gender, experience) and geographic categories (Eastern and Western European universities) to understand the way individual university teachers perceive existing academic institutional models.

Despite the relative novelty of the problem of the impact of the COVID-19 pandemic on the motivation of academic staff, there are already some publications on this topic in the scientific literature. Since the pandemic primarily removes academic workers from the workplace, forcing them to do most of~~r~~ ~~all of~~all their work from home, ~~a number of~~several aspects of remote work during the pandemic have been addressed in publications. So, Purwanto et al. (2020) identified many benefits of working from home during the pandemic: flexibility in completing work; lower transportation and gas costs; saving time previously spent commuting; lower stress; a comfortable and conducive atmosphere; more time for family and hobbies, etc. Remote academic work, which makes this job faster and more effective, would appear to bring greater job satisfaction. However, ~~a number of~~several disadvantages have also been identified that reduce the motivation of academics while working from home, e.g., distracting by social media and other entertainment, higher ~~electricity~~electricity, and internet costs. However, as Purwanto et al. (2020) concluded, work from home is the most effective solution during a pandemic and helps to minimize the risk of coronavirus transmission, which can also be a positive factor in~~for~~ improving the motivation of university teachers and researchers.

Studying the impact of online teaching during the pandemic on Italian teachers' motivation, Toto and Limone (2021) confirmed it~~'~~s ambivalent nature: on the one hand, there is the negative stress-inducing impact of the need for a rapid transformation of pedagogical practices and personal learning styles; on the other hand, there is the positive motivational impact of learning new teaching methods that

will be useful in the future. A study on the impact of remote work during the pandemic on motivation and job satisfaction among 220 teachers at schools, ~~colleges~~colleges, and universities in India by Basu (2021) found that teaching through various digital platforms increased their self-confidence and creativity to a greater extent. Moreover, about three-quarters of them are satisfied with online teaching and believe that the use of digital platforms has improved students' ability to learn to a greater extent, leading to teacher satisfaction.

The most negative assessment of online teaching came from studies of of 202 Polish (Kulikowski et al., 2021) and 87 Russian university teachers (Almazova et al., 2020), who were forced to provide e-learning to students. However, certain positive impacts that motivate teachers to participate in e-learning have also been identified, e.g., the intellectual challenge of mastering online technologies.

Nevertheless, all the ~~a~~forementioned studies dealt with the motivation of teachers, not university researchers. It is possible that in terms of teaching, the pandemic may have little overall impact. However, their other no less important work related to research, joint projects and individual work, administrative duties, advanced training, supervision of the scientific work of young colleagues and students, participation in conferences and other important events, may be impacted quite differently during a pandemic.

Among other things, an important point may be the different impact of the pandemic on motivation and job satisfaction for different groups of university researchers, e.g., by gender, age, career stage, and academic degree. As Ghasemy and Elwood (2022) found, ~~the~~ female teachers ~~are~~ were more satisfied as compared to male teachers during the COVID-19 pandemic in Japan and Malaysia (658 academic respondents), when job satisfaction occurred as a strong predictor of academic motivation. This finding partly confirmed the earlier US sample (560 university teachers) study results by Okpara et al. (2005), which found ~~the~~ higher female faculty satisfaction with their work and co-workers. However, their male colleagues were more satisfied with their pay, promotions, supervision, and overall job satisfaction.

Such results contradict the finding by Feng and Savani (2020), who argue that while there were no gender differences in self-reported job satisfaction before the COVID-19 pandemic, women reported lower job satisfaction than men during lockdown. However, this finding concerned with various professions of 286 US-resident full-time employees. This difference suggests that not only gender~~,~~ but also the profession (job position) may be significant when studying the impact of a pandemic on motivation and job satisfaction.

Moreover, based on the Malaysian sample Ghasemy and Elwood (2022) found that age also plays an important role. Okpara et al. (2005) also confirmed that personal variables such as age, gender, and rank are important variables that influence the job satisfaction levels of professors. Therefore, when studying the impact of the pandemic on the motivation and job satisfaction of university researchers, it makes sense to consider both the overall impact on all respondents in the sample, and to check for differences in their perception by different groups, depending on gender, age, academic positions, and degrees.

Thus, we decided to carry out separate total and group studies for the motivation and job satisfaction of university researchers, to track how they changed during the COVID-19 pandemic. The purpose of this study is to determine whether the pandemic affects the motivation and job satisfaction of university researchers as a whole and by their separate groups by gender, age, academic position (career stage), and degree.

Methodology

The main idea of the study is to compare self-assessments of university researchers concerning their motivation and job satisfaction both before (in 2019), and then again one and a half years after (in 2021), the onset of the COVID-19 pandemic (Figure 1).

insert figure 1 here

This approach provides an opportunity to assess changes in self-assessments under the influence of the pandemic, which has been a key driver of most changes in Europe since March 2020 (De Vet et al., 2021). The first hypothesis of our study is:

H1: The pandemic has significantly affected total motivation and job satisfaction of all university researchers.

To test this hypothesis, the results of surveys of university researchers before and during the pandemic were compared and tested for the statistical significance of their differences. Such a comparison should give an answer about the possible total impact of the pandemic on university researchers. In the absence of a noticeable overall effect, it would be advisable to test possible changes in the context of individual groups of researchers, dividing them up according to various criteria. Hence, a second hypothesis was also put forward:

H2: The pandemic has a significant impact on the motivation and job satisfaction of certain groups of university researchers.

The data for the study was collected at two well-known French universities in two periods: in July 2019 (before the pandemic) and September 2021 (a year and a half after the onset of the pandemic).

To obtain general responses and in-depth opinions, as well as to test the hypotheses, the following quantitative and qualitative methods were used:

(1) A survey using a specific questionnaire (Table 1), which was offered for completion both in hardcopy and electronic form using the SurveyMonkey service. The questionnaire includes both intrinsic and extrinsic motivators, as well as ~~a number of~~several factors that characterize job satisfaction in the main areas of work of university researchers: research, teaching, professional learning, writing, and administrative duties. The 5-point Likert scale (Joshi et al., 2015) was used to transform answers into quantitative form for further statistical analysis. This questionnaire is similar to the one used by Goncharuk and Cirella (2022) in the study of motivation and job satisfaction in Bosnia and Herzegovina and France, as well as in Ukraine (Goncharuk, 2018), Poland (Goncharuk et al., 2020), and Croatia (Goncharuk et al., 2023). It contains 20 items on possible motivators and 5 items on specific areas of academic work of university researchers.

insert table 1 here

(2) In-depth interviews with representatives of different career levels by age, namely young researchers (postdoc), experienced researchers (associate professor), and senior researchers (full professor), which made it possible to study the perception of existing working conditions on the part of individual university researchers, but also to consider how various different challenges and opportunities affected the perception of researchers at different stages of their career during the pandemic.

(3) Statistical tests, which helped identify differences in responses on various grounds: period, gender, age, career stage, and degree. In particular, the Kruskal-Wallis nonparametric statistical test (McKight and Najab, 2010) was used to assess differences between three or more independently sampled groups on a single, non-normally distributed continuous variable. This test is suitable for non-normally distributed data. Besides, the one-way ANOVA parametric test (Wooditch et al., 2021) was applied for normally distributed continuous variables. In particular, the Bonferroni method with ANOVA (Cardinal & Aitken, 2013) was used to compare the results of the surveys and to find clear differences between the groups of university researchers depending on their motivation and job satisfaction. In addition, the Pearson correlation coefficient (Bobko, 2001) was used to establish the degree to which researchers' responses were consistent with their attributes.

Statistical testing of the responses then made it possible to test both H1 and ~~H2, and~~H2 and find how significant are differences between the responses of different groups of university researchers, depending on their distinguishing features (gender, age, etc.).

The Data

Using electronic and hardcopy questionnaires, 60 university researchers from two French ~~universities'~~universities' research groups and laboratories working in management and linguistics were surveyed in July 2019 and September 2021. Descriptive statistics of a random balanced sample are presented in Table 2 in the context of the main distinguishing features.

insert table 2 here

In addition, to understand how the perceptions of academics changed during the pandemic, in-depth interviews with 3 groups of researchers covering two periods were also conducted: young, experienced, and senior university researchers.

The Case Background

In 2017, the number of students at French public universities was 1.6 million (Insee, 2017). The state budget for this sector was €13.4 billion (Ministry of Economy and Finance, 2017). Despite continued growth in the number of students since 1980, France suffers from underfunding of the public higher education sector. In 2013, the share of GDP (1.5%) spent on higher education remained below the OECD average (1.6%). It ranks only 24th among these countries in terms of the share (20.3%) of total education funding devoted to higher education (OECD, 2014). In this context of underfunding, French universities have had to undertake complex and varied missions and meet ~~a number of~~several challenges over the past decade: managing the increase in the number of students; achieving the digital transformation of teaching; supporting innovation; and maintaining or even recovering a sound financial position. In addition, like many countries, France is seeking to build an international reputation and improve the position of its public universities in the global rankings (Dixon and Hood, 2016).

Although French universities are mainly composed of civil servants recruited through a national competition, for several years it has also been recruiting employees on indefinite and fixed-term contracts, in line with the practices advocated by the NPM (New Public Management) (Hood, 1995). It is now possible to recruit non-permanent staff on fixed-term contracts for an indefinite period. Universities have made extensive use of this right: a report published by the Ministry of Higher Education (2019) indicates that staff on fixed-term contracts account for 27% of all staff. In addition, between 2007 and 2014, the number of non-permanent academics increased by 19.5%. They represented 35% of the total number of research teachers in 2014. The Research Programming Act passed at the end of 2020 also introduced the possibility of recruiting 'tenure track' researchers for fixed-term contracts of 3 to 6 years.

The remuneration, bonuses, and additional hours of all permanent staff remain fixed by the State. They are related to the activity performed and not to the performance. Some universities have, however, introduced publication bonuses for researchers along with the freedom to set the pay of non-permanent staff. This situation is in line with the French administration system in general, in which the use of reward/sanction tools was still not widespread in 2017 (Bezes and Jeannot, 2019). The university may decide the working hours of teaching only staff and has limited freedom to change the working hours of ~~of~~ lecturers (with their agreement). It has the right to set the business reference system which defines the work hours allocated to teaching, administrative responsibilities, and research. There have been no major developments in the setting of individual objectives, evaluation of results, or career support. Career evaluation occurs at the national level, especially for academics, and career progression depends on a combination of local evaluation by the institution and evaluation by the National Council of Universities.

The two French universities surveyed in the study are quite successful public higher education institutions with ~~the~~ high national and international (QS World University Rankings, 2021) ranking positions and the total number of students about 100,000.

~~First of studied French university ranks 8th in the national rankings and 275th in the world rankings (QS World University Rankings, 2021), with more than 62,000 students and almost 3700 faculty members;~~

~~Second one ranks in the middle of the national rankings and 1201-1400 in the world ranking (QS World University Rankings, 2021), with more than 26,000 students and almost 700 faculty members.~~

Results

Job satisfaction

Comparing the data obtained for the lower part of the questionnaire (see Table 1), ~~it is clear that there~~there have been some changes to the average of individual elements of job satisfaction among university researchers. These can be seen in Figure 2.

insert figure 2 here

In the whole sample~~, as a whole,~~ satisfactions with teaching, writing, and professional learning have slightly decreased. Conversely, the average satisfaction with research and administrative work has increased. However, despite all the changes in the averages, they were not enough to establish a significant difference (<0.05), as shown by the Kruskal-Wallis test. Among the individual elements, the highest probability of significant change was administrative work (chi-squared = 2.366, prob.=0.1240), though the change is not enough to count as high significance.

Thus, H1 for job satisfaction was not confirmed.

To test H2, we divided the sample into groups and compared how satisfaction changed for individual elements of each group. The most significant results can be seen in Table 3.

insert table 3 here

Gender differences in the perception of working conditions turned out to be insignificant. Only males were slightly more satisfied with administrative work (prob. = 0.1143). Career differences appeared to be larger, especially among senior researchers, who became less satisfied with teaching (prob. = 0.0674) and writing (prob. = 0.0742) during the pandemic. These differences were the most significant among all the groups examined. The reduction in satisfaction in professional learning occurred mainly for experienced researchers and habilitated doctors, but the significance of such changes is not high enough to count as significant. The ~~S~~satisfaction of researchers with a ~~master~~master's degree did not change much, especially in research where the null hypothesis was completely confirmed (pr. = 1.0000).

The greatest changes that affected ~~the~~ satisfaction with administrative work occurred at the expense of groups of males with PhD and habilitation degrees. The latter turned out to be the most changeable and disaffected towards teaching, writing, and professional learning during the pandemic.

Thus, we were able to confirm the H2 hypothesis about the impact of the pandemic on job satisfaction, mainly on the part of senior researchers, who, with a probability higher than 0.925, became less satisfied with the teaching and writing conditions.

Motivation

Comparing the data obtained for the upper part of the questionnaire (see Table 1), ~~it is clear that some~~some change occurred in the average for individual motivators of university researchers. These can be seen in Figure 3.

insert figure 3 here

In the ~~sample as a whole, satisfaction~~sample, satisfactions with teaching, writing, and professional learning decreased slightly from 3.63 to 3.61 points on average. And only 3 out of 20 motivators showed a noticeable increase in ratings: altruistic motives, exciting work, and flexible working hours. However, even the most noticeable change among the motivators, namely community respect for your occupation, had a probability of less than 0.8, which is not enough to make the changes count as significant. This indicates that in general ~~the~~ hypothesis H1 has not been confirmed.

To test H2, we divided the sample into groups and compared how motivators changed for every group of university researchers. The most significant results can be seen in Table 4.

insert table 4 here

As can be seen, the greatest changes in motivation occurred among senior researchers. It seems that senior researchers and researchers with a habilitation degree were seriously disappointed with their work during the pandemic, especially as regards the following factors: interesting work, community

respect for your occupation, awards and recognition, pleasant working conditions, and professional prestige. Moreover, senior researchers (full professors) lost interest in their salary/future earnings potential, indicating a major shift in financial motivation among the older generation of university researchers. Experienced researchers also experienced a major drop in motivation, especially as ~~regards:~~ regards: the ability to make a strong contribution to society, community respect for ~~your~~ their occupation, potential to combine work and family, and professional prestige, all with a probability higher than 0.9. Thus, one can notice a general trend towards a decrease in both intrinsic and extrinsic motivation among the middle and older generation of university researchers during the pandemic.

In contrast, young researchers (with master's degree and early-stage) had consistent motivation or even positive shifts in motivation, ~~in particular as~~as ~~regards:~~ regards: awards and recognition, flexible working hours, professional prestige, and salary/future earnings potential. Thus, we can note the positive impact of the pandemic on the motivation of early-stage researchers, who seem to have become more interested in both intrinsic and extrinsic motivators.

Gender comparisons revealed a more positive attitude of males during the pandemic, e.g., in exciting work (pr.=0.0386) and altruistic motives (pr. = 0.0775). On the other hand, females became less motivated, especially concerning~~with respect to:~~~~to~~: social benefits (pr. = 0.0065) and working closely with students (pr. = 0.0432). The high probability of such shifts indicates a significant impact of the pandemic on ~~a number of~~several motivators for both genders~~,~~ but in different directions.

Thus, the H2 hypothesis was confirmed by ~~the majority of~~most motivators and groups of university researchers. Only 5 of them did not reveal significant changes in the surveyed groups, 2 of which had confirmation of null hypotheses: job security for senior researchers and challenging work for those with master's degrees.

In-depth interviews

~~In order to~~To understand the reasons for the change in motivation and job satisfaction, the interviews were conducted with university researchers at various career levels: young, experienced, and senior. These interviews included 32 main questions, both open-ended and ~~closed,~~closed on the following aspects of the researcher's work:

(1) professional purposes
(2) how ~~–~~current working conditions (research, teaching, writing, professional learning, and administrative work) support their professional ~~purposes~~purposes.
(3) the barriers, motivations, impressions, and factors of research, teaching, writing, professional learning, and administrative work.
(4) personal traits and dispositions influencing their success at ~~university~~university.
(5) opportunities and challenges of doing research, teaching, writing, professional learning, and their ~~synergy~~synergy.

In-depth interviews helped to identify certain changes in the perception of the existing working conditions on the part of university researchers and to help understand how opportunities and challenges at different career stages influenced this perception during the pandemic (Table 5).

insert table 5 here

In-depth interviews confirmed the positive impact of the pandemic on early-stage researchers' satisfaction with working conditions. It seems on-line teaching and certain research activities bring them more opportunities than challenges. However, increased motivation ~~with respect to~~concerning salary and future earnings confirmed the growing challenge for young university researchers in France, who need more financial incentives during a pandemic.

Experienced and senior researchers experience more challenges during the pandemic, which brought them ~~a number o~~some~~f~~ frustrations. The first one is teaching overload (online and in-person), which takes up a lot of their time and does not allow them to fully engage in research and writing. And good online platforms require even more preparation and administrative time. Hence, the second challenge is administrative duties, which became somewhat greater with a mixed mode of work consisting of both online and in-person duties.

Besides, the lack of live events and awards results in a lack of recognition, which senior researchers

who have dedicated their lives to university work are especially in need of. In conditions of dissatisfaction with the lack of encouragement, they begin to lose interest in their work and ~~with~~ in ~~a number of~~several other intrinsic and extrinsic motivators, as the results of the surveys confirm (see Table 4). Despite a higher drop in the job satisfaction of experienced researchers (-2 points), senior researchers had the lowest job satisfaction overall during the pandemic, which, against the background of a decrease in ~~a~~ the number of motivators, indicates a decrease in their interest in work. Apparently, the lack of face-to-face communication and fears caused by the pandemic played a role in this negative outcome.

In combination with the gender motivation described above, it can be concluded that female researchers began to value social benefits and communication with students less, and male researchers experienced a dramatic increase in the need for altruism and exciting work. Obviously, all this is due to the changes that the pandemic brought to the lives of university researchers, who have become more appreciative of the intangible values and emotions that in-person work gives them. However, this does not apply to young researchers, who during the pandemic became much more interested in material values, e.g., awards, salary, and future earnings.

Discussion

The results of the study demonstrate to varying degrees the presence of certain shifts in job satisfaction and motivation of university researchers in France. Moreover, these shifts are heterogeneous and, with different sections of the sample, demonstrate different directions for individual factors. Fluctuating, heterogeneous motivation was also found by Dinu et al. (2021) among UK university academics during the pandemic, but without the gender or career division of respondents.

Definite positive changes occurred during the pandemic as regards the motivation of males and early-stage researchers. They became more motivated by several factors. The males become more altruistic and eager for exciting work. And early-stage researchers became more in need of external motivators (salary and awards) and flexible working conditions. Obviously, these respondent groups, while retaining other motivators, began to need more return on their work. Apparently, the pandemic, by introducing certain restrictions and fears into the lives of researchers, has led to a generally positive increase in their needs, which they expect to be satisfied by working at university. Therefore, to a certain extent, this can be considered a positive impact of the pandemic on the motivation of university researchers, one that induces them to ask more from their jobs. However, this finding contrasts with the results of Kulikowski et al. (2021) who found a decrease in the work motivation of Polish university teachers during the COVID-19 pandemic. Moreover, the negative effects like work-related stress, digital fatigue, and a negative impact on work-life balance due to the COVID-19 pandemic on Australian academics have been identified by McGaughey et al. (2021). Ghasemy & Frömbling (2022) also confirmed decreased motivation of academic staff in Malaysia during this pandemic.

At the same time, the remaining groups showed negative shifts in motivation and job satisfaction during the pandemic. Female researchers began to significantly lose interest in working closely with students and in social benefits. For young women to work at home often implies an additional constraint linked to childcare and the burden of organizing family activities. In France, COVID-19 generated several weeks of working from home in a consolidated family environment during lockdowns. In a certain extent, ~~this results~~these results confirm the challenges and less motivation due to the pandemic, especially for career progression among female academics that have been found in Australia by Watson et al. (2022).

Experienced researchers, lacking the time to research and write and not having sufficient support for their publications, suffered from a reduced ability to make a strong contribution to society, as well as a lack of community respect and professional prestige. Besides, during the pandemic, their need to achieve a balance between work and family life ~~were~~ was also negatively impacted. Their perception of working conditions fell by 22%, more than other groups. This raises questions about appropriate support for this group of researchers, who seem to bear the greatest burden, doing a lot of teaching, research, and administrative work both online and in person.

However, perhaps the biggest shifts during the pandemic were in the motivation of senior researchers. It seems that they were not ready for the introduction of online teaching and a mixed system of academic life. With an unbearable teaching load that takes away their time for research, writing, and administrative work, they began to lose motivation for their university work. In addition, the lack of live communication, recognition, and awards, against a background of feeling overloaded by new

requirements and a high volume of teaching led to a loss of interest in work, ~~to~~ a significantly reduced sense of respect from society, and ~~to~~ reduced extrinsic motivators (salary and awards). Amid the fears and constraints of the pandemic and the corresponding new working conditions, the senior researchers became less motivated by ~~a number of~~several important intrinsic and extrinsic factors; the only thing that has remained unchanged is their need for job security.

Indeed, the pandemic could not significantly affect such motivators as opportunities for creativity and originality, demand for the profession, interesting work, and job security for all observed groups. Apparently, these motivators are stable for researchers in any working conditions, especially ~~in~~ critical ones.

French academics remain very attached to public service and to their freedom to conduct their research and teaching.

The various tools to strengthen the attractiveness of universities have not yet been fully successful. The European HR4R (Human R~~r~~esources for Research) label was implemented in 2018 in the L3 university, and extensive studies on the Quality of life of employees have also been carried out at the level of the institution, along with ~~as~~ an extensive survey entitled "Good Place to Work, which confirmed the shortcomings shown in our research, without, however, effective levers of action having been demonstrated to date.

The autonomy of French universities is still very limited, and the control of centralised public bodies under the authority of the Ministry of Higher Education and Research makes it difficult to consider each university individually.

Conclusions

Studying French universities for changes in motivation and job satisfaction among researchers under the impact of the COVID-19 pandemic, two hypotheses were tested, the results of which led to the following conclusions.

It was found that during the pandemic the overall motivation and job satisfaction of researchers changed, but not significantly. These results did not allow us to confirm hypothesis H1, which was that the pandemic has significantly affected the total motivation and job satisfaction of all university researchers However, as an in-depth analysis showed, the overall insignificance of changes to motivation and job satisfaction during a pandemic is associated with multidirectional changes in individual groups of researchers. The following differences between changes in motivation and job satisfaction of respondent groups were identified as the most significant:

(1) *Gender differences*. Males perceived the pandemic more positively, which is reflected in their increased motivation ~~in~~ for altruism and exciting work. In contrast, females lost interest in close work with students and in the social benefits of their work.

(2) *Career stage differences*. Surveys and in-depth interviews have confirmed the positive impact of the pandemic on early career researchers, who have become more motivated by external incentives (salary and rewards) and flexible working hours. On the contrary, ~~experienced~~experienced, and senior researchers lost interest during the pandemic in ~~a number of~~several important motivators. Moreover, if experienced researchers lost interest in intrinsic incentives (ability to make a strong contribution to society, community respect for occupation, potential to combine work and family, and professional prestige), then senior researchers began to lose interest in ~~a number of~~several intrinsic (interesting work, community respect for occupation, pleasant working conditions, and professional prestige) and extrinsic (salary, awards and recognition) incentives. In general, ~~the~~ job satisfaction improved among young researchers and worsened among experienced and senior researchers.

(3) *Differences in academic qualifications*. Researchers with a master's degree in some positions became more motivated, especially in terms of professional prestige and awards and recognition. There were changes in those with PhDs, but statistically, they were only weakly significant. However, among those possessing 'habilitations', there was a marked decline in motivation across a range of intrinsic and extrinsic motivators, largely ~~similar to~~like the changes observed in the group of senior researchers.

All these differences in changes confirm hypothesis H2 about the significant impact of the pandemic on certain motivators and elements of satisfaction in the work of certain groups of university researchers.

Therefore, the study showed that pandemic restrictions and fears positively affect the motivation and job satisfaction of both the younger generation of researchers and males~~,~~ and negatively on both the

older generation and female researchers. During the pandemic, early-stage researchers are mostly unhappy only with the salary and the lack of teaching skills. By contrast, experienced and senior researchers do not have time to fulfil all their duties because of an overload resulting from a combination of different forms of teaching, ~~a large number of~~many teaching hours, administrative ~~duties~~duties, and the need to master new communication tools.

Implications

The results obtained have the following research, policy, and practical implications.

First, they capture the selective impact of pandemic restrictions~~,~~ and ~~its~~ their physical and mental effects on academic staff. Although only two universities in a single country were considered, the findings show the heterogeneity of the perception of new (pandemic) working conditions by different groups of university workers. If such heterogeneity is revealed in the example of two universities, then it is very likely to be observable also in broader studies.

As for the significant differences identified in intergroup motivational trends, for example, between female and male perceptions, these confirm that despite all the talk and policies about equality, all people are different and in critical periods like a pandemic this is even more noticeable. Perhaps it makes sense to reconsider certain paradigms of equality and selectively hire the most resilient members of the profession to work in critical conditions, giving more time to rest and more appropriate incentives to less resilient workers.

An important implication of the research Is the need for further research to test similar hypotheses in other universities and countries, since French researchers may have their own national characteristics, such as a specific mentality.

Regarding the universities studied, the results of this study can help university administrations, higher education regulators, and national research agencies address the needs of all groups of researchers, alleviating the most acute restrictions and fears caused by pandemics, and providing the necessary incentives for relevant groups, e.g., higher salary, teaching school and awards for young researchers and a lower teaching loading for experienced and senior researchers.

More generally, French universities are now subject to greater international competitive pressure, and the attractiveness of the teaching/research profession for young researchers is clearly problematic. The French government has proceeded since 2021 to an upgrading of the beginning of the career, which will extend until 2027. Similarly, a large-scale « repyramidage » (a form of upgrading) plan offers lecturers the opportunity to become university professors ~~on the basis of~~based on seniority, which is profoundly new for the French university, which has traditionally been very attached to competitive examinations. But the choice made concerns individual upgrading, not creating additional posts. A recent ruling by the Conseil d'Etat (the highest French court for public law) confirmed the possibility for tenured research professors to carry out private activities in addition to their jobs, even on a full-time basis.

However, our study also found that academics suffer from a significant administrative burden, apparently caused by a lack of administrative staff and a complex bureaucratic system. Therefore, ~~in order to~~to relieve university researchers, especially during pandemics, it is necessary to improve the management system of higher education institutions, easing administrative pressure and making their work more interesting and employees more satisfied.

Given the results of a certain impact of the pandemic on the motivation and job satisfaction of university researchers, it is appropriate to continue the research in a later period to check how persistent these studies are, whether they have led to permanent changes or returned to the previous state with the complete removal of pandemic restrictions. Testing the persistence of changes caused by the pandemic will allow us to get both a scientific understanding of the nature of such changes and a managerial understanding of whether temporary or permanent measures are needed to improve motivation, job satisfaction, and the appropriate stimulation of effective work through the right incentive system.

Acknowledgments

This paper contains the results of two case studies conducted during short-term scientific missions, which were financed by the COST Action CA15221 “Advancing effective institutional models towards cohesive teaching, learning, research and writing development” (in 2019) and the COST Action CA19117

"Researcher mental health" (in 2021).

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Table 1. Questionnaire for surveying the university researchers' motivation and job satisfaction

What motivates you in your work?

No	Motivators		Levels of evaluation				
			1 – no matter	2 – weak	3 – medium	4 – important	5 – very important
1	Altruistic motives / Working to help others	AM					
2	Interesting work	IW					
3	Working closely with youth	WC					
4	Job security	JS					
5	Challenging work	CW					
6	Social benefits	SB					
7	Ability to make a strong contribution to society	AS					
8	Opportunities for travel (mobility)	OT					
9	Exciting work	EW					
10	Community respect for your occupation	CR					
11	Potential to combine work & family	PC					
12	Flexible hours of work	FH					
13	Awards and recognition	AR					
14	Opportunities for promotion / advancement	OP					
15	Responsibility in job	RJ					
16	Pleasant working conditions	PW					
17	Professional prestige / high status	PP					
18	Salary / Future earnings potential	S					
19	Opportunities for creativity and originality	OC					
20	Demand for the profession / Job opportunities	JO					

How do you evaluate your working conditions[1] by type?

No	Type of work	Levels of evaluation				
		1 – very bad	2 – bad	3 – modest	4 – good	5 – excellent
1	Teaching					
2	Research					
3	Writing					
4	Professional learning					
5	Administrative work (optional)					

here refers to whether enough time, resources, technical conditions, institutional support, etc.

Table 2. Descriptive statistics of survey sample

Respondents	Mean	Median	St. Dev.
Female (N=26)			
Age	42.8	44.5	9.5
Experience	13.6	10.5	10.2
Male (N=34)			
Age	44.7	43.5	12.5
Experience	16.3	14.0	10.8
Early Stage (N=23)			
Age	34.4	33.0	6.8
Experience	5.0	5.0	2.8
Experienced (N=14)			
Age	43.3	42.5	8.2
Experience	12.2	12.0	1.8
Senior (N=23)			
Age	54.5	55.0	7.5
Experience	26.8	25.0	5.7
Master's degree (N=8)			
Age	33.3	29.0	9.4
Experience	6.1	2.5	8.0
PhD degree (N=33)			
Age	42.7	41.0	10.5
Experience	12.9	10.0	9.3
Dr. habil. degree (N=19)			
Age	51.4	50.0	9.6
Experience	22.5	25.0	9.1

Table 3. The most significant differences in groups of respondents between 2019 and 2021

Group of university researchers	Teaching	Research	Writing	Professional learning	Administrative work
Female					
Male					↗ pr.=0.1143
Early-stage					
Experienced				↘ pr.=0.1355	
Senior	↘ pr.=0.0674		↘ pr.=0.0742		
Master degree		pr.=1.0000			
PhD degree					↗ pr.=0.2734
Dr. habil. degree	↘ pr.=0.2626		↘ pr.=0.1776	↘ pr.=0.2954	↗ pr.=0.1194

Table 4. The most significant differences in groups of respondents between 2019 and 2021

Motivators	Female	Male	Early-stage	Experienced	Senior	Master's degree	PhD degree	Dr. habil. degree
AM		↗ pr.=0.0775						
IW					↘ pr.=0.0942			↘ pr.=0.0471
WC	↘ pr.=0.0432							
JS					pr.=1.0000			
CW						pr.=1.0000		
SB	↘ pr.=0.0065						↘ pr.=0.1525	
AS				↘ pr.=0.0816				
OT								
EW		↗ pr.=0.0386						
CR				↘ pr.=0.0441	↘ pr.=0.0334			↘ pr.=0.0061
PC				↘ pr.=0.0934				
FH			↗ pr.=0.0510					pr.=1.0000
AR			↗ pr.=0.0297		↘ pr.=0.0160	↗ pr.=0.1024		↘ pr.=0.0211
OP								
RJ					↘ pr.=0.0822			
PW					↘ pr.=0.0407			↘ pr.=0.0113
PP				↘ pr.=0.0774	↘ pr.=0.0933	↗ pr.=0.1024		↘ pr.=0.0931
S			↗ pr.=0.0514		↘ pr.=0.0724			
OC								
JO								

Table 5. Perception of working conditions at different career stages in 2019 and 2021

Career stage	2019		2021		2021/2019 Change
	Perception	Aver. Score	Perception	Aver. Score	
Early-stage researcher	Positives/Opportunities 1.IT support for on-line teaching 2. Grants for research mobility 3. Good supporting from experienced colleagues Negatives/Challenges 1. No funding for research projects 2. No teaching school 3. No special support for English writing	7	Positives/Opportunities 1.Opportunities for on-line teaching 2. Conference fees are covered by university 3. Good supervision and supporting from senior colleagues Negatives/Challenges 1. Low scholarship (salary) 2. No teaching school	8	+1
Experienced researcher	Positives/Opportunities 1.Enough basic funding from university including research grants 2. APC for publications are covered by university and NRA 3. Many visiting speakers with special training (IT & research skills, etc.) Negatives/Challenges 1. Low academic loading 2. A lot of administrative duties	9	Positives/Opportunities 1.Flexible organizing of lessons (on-line platform like Moodle) 2. Good information support of research opportunities and training for writing skills 3. Funding of research projects from university (up to 10000 euros) Negatives/Challenges 1. Lack of time for research and writing 2. No trainings for teaching skills 3. No APC supports for publications	7	-2
Senior researcher	Positives/Opportunities 1. Enough funding from three sources: university, NRA, EU 2. Many trainings and workshops (academic writing, IT & research skills, etc.) Negatives/Challenges 1. Too much bureaucracy 2. No trainings for management and administrative skills 2. No special support for English teaching and writing 3. No funding for textbooks	7	Positives/Opportunities 1.Conference fees, professional learning cost and APC are covered by university 2. English editorial support of publications 3. Closing to youth with opportunity of transfer knowledge Negatives/Challenges 1. Overloading by teaching (400 hours/year) 2. No time for writing due to administrative duties 3. No recognition and encourages for researchers	6	-1
Total		7.7		7.0	-0.7

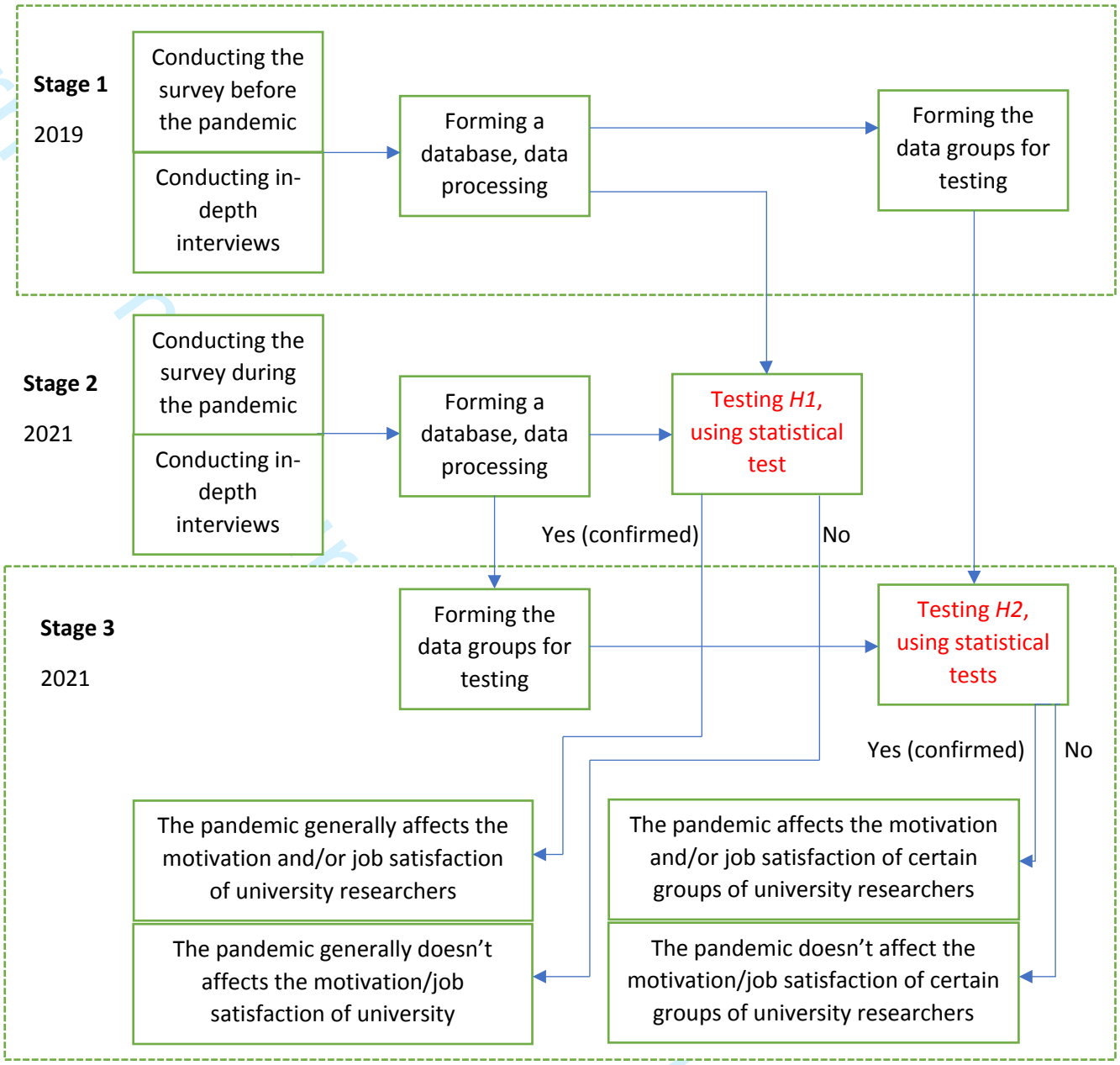

Figure 1. Research model framework

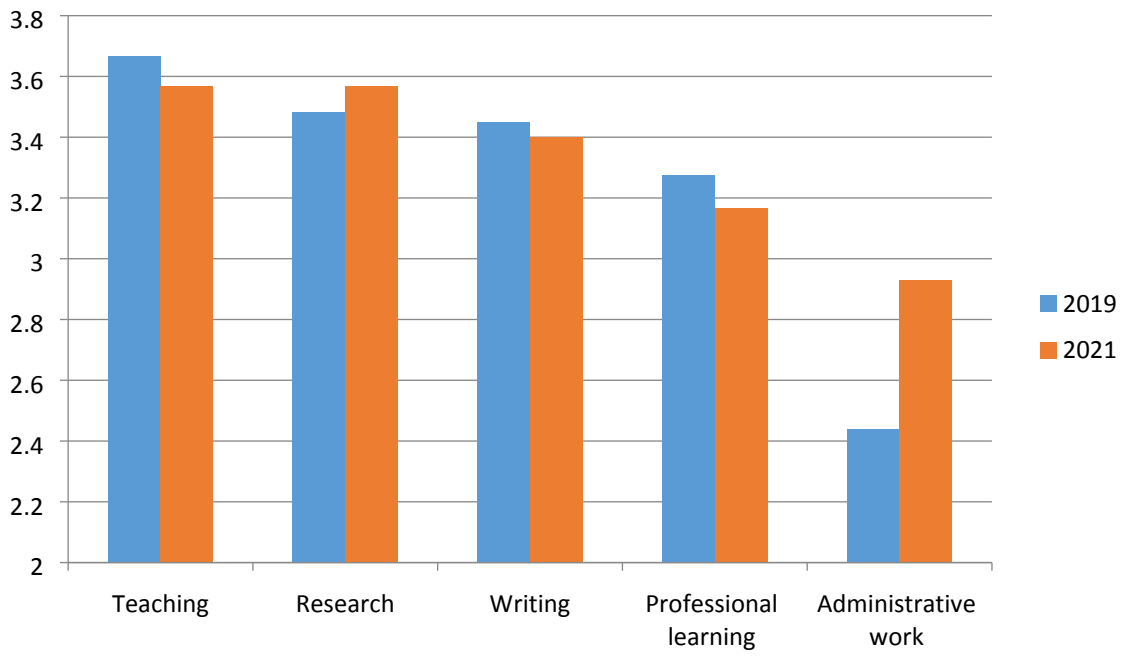

Figure 2. University researchers' job satisfaction elements in 2019 and 2021

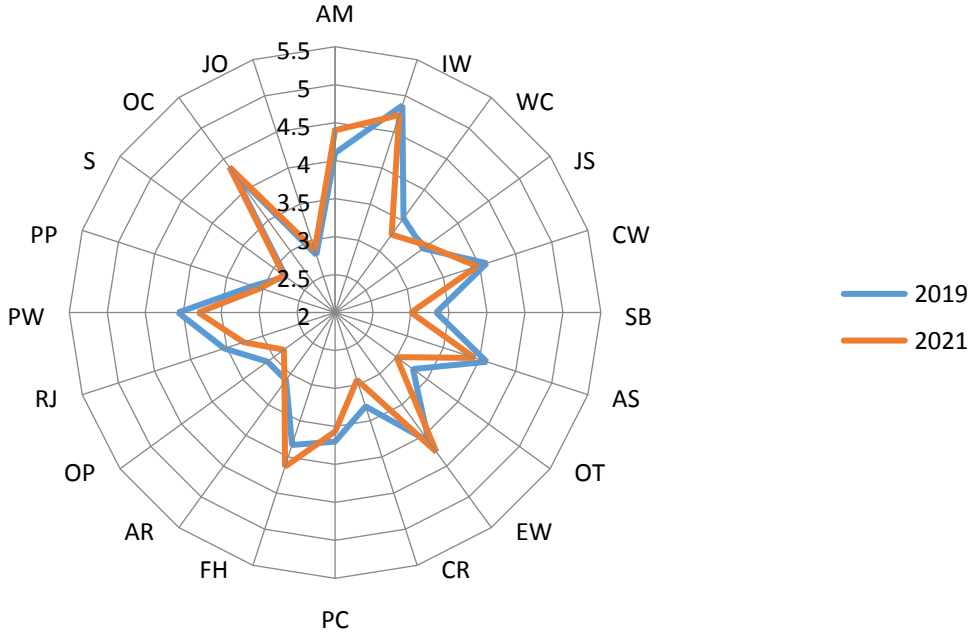

Figure 3. University researchers' motivators in 2019 and 2021