

YOUNG SCIENTISTS ALTERNATIVE CAREER PATHS - THEORETICAL CONSIDERATIONS

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Abstract

A career at a university is a special and unique kind of professional activity, and it also involves adopting a specific lifestyle. It is a profession that offers great freedom and is commonly driven by passion. The literature indicates that a doctoral degree builds prestige and recognition according to society, but from the labour market perspective (employers), an employee holding one can expect a high salary. Unlike other employees in the incentive system, he may be perceived as a threat because of his qualifications and career aspirations, but he may also lack practice. They may also be outstanding specialists in a specific field, advisors, and entrepreneurs. The research competencies acquired and shaped in the course of study at doctoral school are not equivalent to the competencies expected by the labour market and, thus, by employers. A break in work experience due to training at doctoral school and dedicating oneself exclusively to research may generate difficulties in finding employment. Young researchers may not find employment at university due to a lack of posts, but they may also not want to continue their careers in science. In both cases, it is very intriguing to see what paths they can choose with a doctoral degree, whether they know about them, and which they prefer.

Keywords: young scientist, career, scientific career, academic advising, university, labour market, alternative career paths

1. INTRODUCTION

The topic of research career design is of considerable importance. In the case of the university, it is part of the implementation of the European Charter for Researchers (ECR) tasks. It is important to note that not all individuals who complete their doctoral studies will secure employment at their home university. They may also seek opportunities at other academic institutions within their country and abroad. Continuing academic work is one of the many possibilities for young researchers. However, to be able to plan specific activities that fit into and build an effective employment policy at universities, it is necessary to recognize the needs and plans of young researchers. It would appear that young researchers, attracted by the prospect of working at a prestigious university, are reluctant to consider alternative career paths outside academia. The lack of job offers is often a surprise and a massive disappointment for young researchers. It is necessary and interesting to find out about the career plans of young researchers (PhD students and postdocs) in case they do not receive (an offer or an opportunity) for employment at their home university. Awareness of alternative career pathways will facilitate the implementation of preventative and counselling strategies.

The article presents a theoretical analysis of the professional situation of young scientists. The author analysed selected literature on the subject, reports, and online sources on possible career paths for scientists, focusing on alternative career paths, which, in this case, are understood as non-academic. The concept of an alternative career vision entails formulating a plan and considering a range of potential career pathways. They may not be typical or traditional in a given career context. It is a contemporary way of thinking about careers, considering various scenarios and possibilities, and is not necessarily limited to one predetermined career path. An alternative career vision may entail retraining, self-employment, or relocation. A so-called 'Plan B' or 'Plan C' can indicate a flexible attitude and an ability to adapt to changing conditions. It can prevent professional burnout and frustration, and thus increase professional and personal satisfaction. An alternative career vision is an important tool in today's world of work, enabling individuals to take a more flexible, creative and sustainable approach

to their professional development. Furthermore, the study addresses several pivotal areas linked to the research subject.

2. THEORETICAL BACKGROUND

2.1 The young scientist and university work

In Poland, in academia, the term young scientist has been used to refer to individuals who obtained their doctoral degree within the last 5–10 years or are under 35 years of age (Szen-Ziemianska, Trzmielewska 2022). A young scientist is a person conducting scientific activity who is a doctoral student or an academic teacher — and does not hold a doctoral degree or holds a doctoral degree less than seven years since obtaining it, and is employed in an entity referred to in Article 7(1) of the Act (Art. 360(2) of the Act of 20 July 2018. Law on Higher Education and Science). This article concerns young doctoral students. However, the author considers the period elapsed since the degree was awarded and successfully defended no longer than one year. The period chosen is related to the need to seek employment after graduation from doctoral school.

The role of an academic is to represent a profession or field of study, to teach and to create knowledge within that field. It involves standards and ethics in scientific work and respect for intellectual property rights. It requires perseverance and the courage to express unpopular or different new views, often challenging the state of the art. It also requires the courage to defend one's position and adhere to values and principles that oppose those promoted by the authorities or various pressure groups. The procedure of professional promotion and the related evaluation of scientific and didactic work, the contribution to the development of the field, involves not only the possession of appropriate qualifications but also competencies, among which the ability to provide constructive criticism, multifaceted and multithreaded review, reliability, fairness, objectivity, and the ability to be above personal animosities deserve special attention. Tact and a sense of the situation in such a sensitive matter is an expression of respect for the dignity of the other person, his views, and his future. Ratings and reviews have a tangible impact on the professional and private lives of the individuals assessed. A hasty judgement that does not consider all factors can be damaging and break a person's life. It is a kind of power that translates into public perception of academics. The doctoral school and the supervisor prepare the young student to fulfil the abovementioned responsibilities.

Young researchers' responsibilities and career paths (research, research-teaching or teaching staff) vary depending on their position. During their studies, doctoral students acquire the knowledge and skills they need to work in an academic environment. In its conception, the doctorate is a process, the training of an independent, mature scientist. A scientist who can carry out the research process from the idea through obtaining funding and carrying out the project to describing and publishing the research results.

However, research competencies differ from those sought in the labour market, as will be presented in the article's next section.

2.2 Researcher vs. Market Competence

The contemporary labour market is undergoing significant transformation, which is, in turn, influencing the very concept of career. Rapid technological change makes it necessary to adapt and be flexible. This also applies to universities. However, science does not like haste. A feature that is quite characteristic but not always noticeable is the approach to time. Business and the labour market move fast; hours and minutes count. Semesters and academic years are the foundation of learning and education — some things cannot be rushed. A meticulously planned and time-embedded research process is an essential tool for scientists. Its results can later be found in scientific papers. One of the essential elements of scientific work is solving research problems; to do this well, one needs to have specific knowledge and competence. According to Guy Le Boterf (2000), competence is the ability of an individual to perform tasks by mobilizing appropriate resources from those previously acquired during education or previous experiences. According to the author, competence is 'know-how' applied to a specific situation. A research situation and problem are not the same as a business situation. A lack of knowledge defines the research problem, and the research work aims to address this issue. Formulating a research problem

requires the researcher to be grounded in the subject and acquire knowledge, and the source of this knowledge is the literature. While science and business share numerous characteristics, they also exhibit several differentiating traits that shape the skills and competencies expected of employees in each field. As an example, at least their objectives can be mentioned. Science aims to arrive at the truth and develop knowledge; business goals are profit and meeting customer needs. Science is a long-term activity, and business is oriented towards quick results.

As already mentioned, research competencies are different from market competencies, so it is worth having a closer look at them. According to various sources, the competencies necessary for scientific work will be presented below. In the study *Kompetencje badawcze pracowników naukowych w Polsce* (Kozusznik, Filipowicz et al. 2023), among the competencies that will allow for effective implementation of research processes and scientific projects, the authors list (in alphabetical order): administration, assertiveness, relationship building, striving for results, digital, project activity, sharing knowledge and experience, flexibility, innovation/creativity, identification with the university, communicativeness, shaping one's image, analytical thinking, handling a research project, organizing the work of others, market orientation (commercialization of research), strategic orientation — long-term thinking, scientific writing (publishing reviewing), obtaining funding, scientific and professional professionalism, dealing with stress, professional development, conscientiousness and punctuality, exerting influence (negotiation), financial management, managing the commercialization above process. The study also includes a range of social competencies necessary for research work. These include working with others (collegiality, teamwork, managing people, supervising, mentoring, influence and leadership, collaboration, equality, and diversity), communication and dissemination (methods and ways of communicating, means of communication and publishing) and engagement and impact (teaching, public engagement, organizational activities, politics, socio-cultural engagement and global citizenship).

Another document analysed was an annexe to the Rector of Nicolaus Copernicus University Ordinance in Toruń. The University of Nicolaus Copernicus *University Key Competence Model for Researchers* (2017) describes nine key competencies for developing employees' scientific careers. The model has three levels (the so-called development scale): first (1) — good, second (2) — very good, third level (3) — outstanding. Each competency characterized in the model has a definition, behavioural indicators and a detailed description at each indicated level. Among the competencies described are creativity, striving for development, ethics and professionalism, teaching, communication, organizing own work, commitment, teamwork, and team and project management. This one is far more general than the previously presented set of competencies.

Another paper was a research report conducted within the framework of the Erasmus + programme (Nicol, Lietzmann 2019), whose research group consisted of doctoral students. The value of the collected information stems from the fact that the young researchers know best what transferable skills and competencies they need to increase their employability in academia and outside of it, which is all the more attractive about the topic addressed. This study is essential and valuable cognitively and strategically, as it indicates which transferable skills and competencies are most needed from the perspective of European doctoral students. These include acquiring third-party funds and projects (1), cooperation, communication, and presentation (2), leadership and management (3), time and project management (4), publication, promotion, and transfer of research results (5), teaching methods (6), research ethics and good scientific practice (7) and entrepreneurial thinking (8). (The number in brackets indicates the place in the ranking).

When attempting to analyse young researchers in the labour market (outside academia), it is worth looking at the expectations of employers. Many reports on the competencies will be needed in the future. The time perspective of these reports varies greatly. The report discusses the future of skills. Employment in 2030 (Bakhshi et al., 2017) describes ten skills the ideal employee should possess in an intensely and dynamically changing environment. These include sense-making, social intelligence, cross-cultural competency, virtual collaboration, new-media literacy, novel and adapting thinking, cognitive load management, design mindset, transdisciplinarity, and computational thinking. It is easy to see that the listed competencies range is part of the so-called soft, social competencies, which have recently gained importance.

In the Future of Jobs Report (2023), published by the World Economic Forum, among the workforce skills that will become increasingly important in the coming years (2023-2027) are creative thinking, analytical thinking, technological literacy, curiosity and lifelong learning, resilience, flexibility and agility, systems thinking, AI and big data, motivation and self-awareness, talent management, service orientation and customer service, leadership and social influence, empathy, and active listening, dependability and attention to detail, resource management and operations, networks and cybersecurity, quality control, design and user experience, teaching and mentoring, environmental stewardship, programming, marketing and media, multilingualism, reading, writing and mathematics, global citizenship, sensory-processing abilities, manual dexterity, endurance, and precision. The report reports that cognitive skills are gaining ground fastest, reflecting the increasing importance of complex problem-solving skills in the in the workplace.

Researchers focus on creating new knowledge, innovation, and conducting research. Their competencies are strongly oriented towards analysis, theorizing and developing new methodologies. Many times, scientific achievements and discoveries find application in business.

On the other hand, market specialists focus on applying existing knowledge to practice, managing operations and delivering tangible results. Their competencies are more related to the practical application of technology and tools, as well as management and communication. Depending on the sector, positions, and competencies may overlap.

2.3 Challenges and problems faced by young researchers

The difficulties faced by young researchers are different, encompassing institutional, organisational and private (personal) challenges. They are dependent and independent of themselves.

Among the organizational challenges independent of the researchers is, for example, the employment policy of the university. There are instances where the number of doctoral students exceeds the number of available full-time positions at the university. This results in a situation where not everyone who defends their doctoral thesis is able to secure employment.

Doctoral school, carried out under the statutory procedure, delays entry into the labour market by four years. According to the regulations, a doctoral student (young scientist) should focus on academic work. Consequently, a job outside the university and gaining experience is not a priority. All the more so if they hope to find employment at the university. Of course, taking up a job outside the university is allowed. The cost of living is high, and living in a university town is also high, so additional financial resources are sometimes needed. The doctoral school period is also a time for starting a family. Economic issues are also crucial, and a scholarship may not be enough.

If a young scientist is not employed at a university and has dedicated himself to this research and teaching work only after his defence, he starts seeking employment. The employer does not always appreciate the four years of a doctorate, and the research competencies do not always coincide with the market, i.e. those sought after among job candidates. Because of their high qualifications and competencies, young researchers seek an engaging, developmental and well-paid job.

As has also already been mentioned, scientific work is distinctive. It requires certain personality traits and competencies. Not everyone will function well in such a professional environment. Job insecurity causes doctoral students to experience anxiety, stress, and burnout. They feel exhausted and sometimes have a sense of loneliness. Their research may have difficulties, mistakes, and the need to repeat it. It is important to stress here that scientific work includes periods of intense activity but also periods of stagnation and creative impotence. Scientific work and development depend on evaluating more experienced and successful scientists. A negative review of an article or a lack of funding for a research grant can hamper a research career.

Among the problems are relationship issues. Conflicts, competition for grants and scholarships or lack of support from the supervisor also bring academic work to a standstill.

The gender issue is not insignificant. Modern science requires commitment and high mobility, including international mobility (internships, conferences). Women are often constrained by family and caring

responsibilities, which are firmly culturally conditioned. Furthermore, for this reason, interruptions in scientific work occur. Sociologist Ewa Krzaklewska (2018) points out that women and men scientists are not equal. These inequalities are more pronounced in the sciences. The researcher points out that university women are assigned additional administrative tasks that take up much of their time and distract them from their main research path. They also have to prove themselves more so that they can be judged at the same level as men. Studies indicate that a woman has to have more publications to get the same position. There is an increase in the number of women with doctoral degrees, but this is not true for habilitation and professorship. They fall off somewhere along the way, at different career stages, and move into business, where they can get better pay and working conditions. Such a phenomenon is referred to in the literature as the 'hole pipeline'. In addition, studies strongly suggest that the pandemic significantly slowed women's scientific activity. They wrote and published less because they cared for the home and dependents and helped with classes, lessons, etc., at the expense of their scientific careers. The COVID G.A.P study indicated that some women published more due to reduced responsibilities, greater flexibility and time gained. However, most of the 100 female scientists surveyed indicated difficulties in their work. In particular, they suffered from a lack of access to laboratories or the library, a disrupted workday schedule, boundaries between home and work life, or extra time spent preparing online classes. Respondents also struggled with feeling responsible for the children in their care and their home education (even if they had the support of their partners in this regard). Decreased motivation and impaired concentration, mental health problems, in some cases significantly exacerbated by the pandemic, were also a problem (Lambrechts, Larasatie, Boutelier, Guta, Leonowicz-Bukała, Martinez-Suarez, Prashad 2021).

Other difficulties that may arise in the job search process of a young researcher are mainly a mismatch between skills and the needs of the labour market, lack of work experience outside the university, financial expectations, limited job mobility due to having a family, lack of knowledge of the potential employer about the job characteristics of the university.

It is important to remember that universities are hierarchical organizations, and the doctor (young scientist) is not an independent academic. Their independence comes from their activity, achievements and obtaining a habilitation. In many situations, young scientists cannot decide on their own; the approval of the supervisor, manager, or dean is needed. On the other hand, employers outside the university expect a high degree of independence and initiative. This does not mean that scientific work lacks autonomy, but the researcher depends on higher grades up to a certain point.

2.4 Academic advising

The subject of research career design is essential. In the case of the university, it is part of the implementation of the tasks arising from the European Charter for Researchers. Universities need to take action to create a researcher-friendly working environment. In this context, it becomes a priority to support researchers at every stage of their professional development, as this impacts the future choices of researchers and the attractiveness of a career in research and development. As socially responsible institutions, universities must effectively plan the process of career guidance and academic counselling to equip graduates (including young researchers) with the skills to navigate the open labour market, including developing competencies called 'employability'. The career counselling process should be extensive, including consultations, training, assistance in creating a marketable CV, job search and analysis, or even psychological care.

As Małgorzata Rosalska (2018) writes, academic counselling is only just beginning its career in Poland. It is slowly being introduced. One of the four academic counselling target groups is PhD students (young researchers). Academic counselling is a proposal that helps the student (in this case, the doctoral student) to plan and organize educational and non-academic activities to make the most of individual potential, university resources, and allies in the academic and professional environment to increase the chances of achieving educational, professional, personal and social goals.

Academic advising is a process employed by academic advisors to assist students with exploring life and vocational goals, academic programmes and individual course selection (O'Banion, 1972).

According to the European Charter for Researchers, employers and, or funders should ensure that career guidance is available to researchers at any stage of their career, regardless of the type of contract, either within the institutions concerned or in collaboration with other structures (ECR 2005).

However, the question arises as to who can or should advise researchers. While there are cells and units at universities that support researchers in obtaining research funding, organize meetings and provide information on competition deadlines and modes, units dealing with career counselling (career counselling) are lacking. The reasons for this can be attributed to the complexity of the process. Competitions often have clear regulations, with rules covering representatives of all sciences. Employees from the grant units often check applications from an administrative perspective, meeting criteria. They do not have to be physicists, biologists or psychologists. However, things are different here if we are already talking about a specific representative of science, a specific person, a specific scientist and his or her career. A scientific career development specialist (career counsellor, career advisor) should know the discipline because general principles may not be sufficient. Each scientific discipline has its characteristics. Therefore, it seems evident that each unit (department) should have a career development specialist to support researchers in a specific field and discipline.

Career counselling can be a vital and effective tool for young researchers facing challenges in the labour market, especially in the context of difficulties obtaining a full-time position at university. Through professional support, counsellors help to identify alternative career paths, develop critical skills and increase competitiveness in the labour market. As a result, young researchers can better manage their careers and achieve career success, whatever path they choose. Counselling targeted at young researchers prevents wasted human capital, frustration and career failure.

3. CAREERS AND THEIR ALTERNATIVE PATHS

A doctoral student's natural and desirable career path after the defence is an academic career—professional advancement in the form of a habilitation. However, not every young doctor has this opportunity. The second issue is that after four years of doctoring and functioning at a university, someone may decide this is not their job and working environment. Such situations also occur and cannot be ruled out and downplayed.

In 2021, 5283 people in Poland obtained a doctoral degree. According to the Social Insurance Institution, 207 (3.9%) were not in their registers, meaning they were not employed. It is a positive indicator that 91.6% of young researchers found employment less than a month after obtaining their doctorate (ELA, 2021). However, it is not always the university. According to the data in the same report, in the first year after the defence, 47.4% of PhDs have experience working at a university (but without specifying the form of employment), 37.9% of young PhDs immediately after the defence experienced a contract job at a university (full-time) and about 25% were self-employed. Interestingly, in the context of the issue discussed, 1/3 of the respondents combined work at a university (research and teaching) with work outside the university. In Poland, graduates of doctoral schools (young doctors after their defence) are interested in and count on employment at the university. This gives them a sense of stability, especially financially, a high degree of work flexibility and the possibility of additional work outside the university. In comparison, in Germany, about 90% of SET doctoral graduates from leave the university immediately after completing their doctorate and start working in industry and other non-academic fields (Nicol, Lietzmann 2019).

According to the report above (ELA, 2021), PhDs in the labour market (outside academia) are doing well. If they find employment, they earn more than a person without a PhD. PhDs in the social sciences earn the most, up to 60% higher salaries than master's degree holders. Doctorates in medical sciences, health sciences, engineering and technical sciences come second in earnings. PhDs in theology achieve the lowest salaries.

Given the situation, the question can be posed, “Is it worth doing a PhD?” What are the opportunities and possibilities, and what are the hindrances when there is no chance of a full-time position at the university? Market analysts (Sala, 2023) estimate that a PhD helps if you want to stay at university

(which is obvious). However, if the situation is about the job market outside the university, they suggest MBAs. They are shorter than a PhD school and sometimes more practical. A doctoral degree helps build prestige in professions of public trust, such as doctors or lawyers. It raises the hope of better, expert advice. The exact process takes place in the financial and consulting industry.

The lack of employment opportunities at university is often a surprise and a massive disappointment for young researchers. A permanent stipend provides a certain sense of security and stability, but the lack of work experience becomes a barrier that is difficult to overcome. Researchers can choose several paths: teaching, managerial, entrepreneurial (own business), full-time work in a profession compatible with their qualifications, and retraining. The discipline in which the researcher specializes is not irrelevant. It is generally believed that it is easier for representatives of technical sciences with a doctoral degree to find a job outside academia.

Alternative career paths for young researchers outside academia can include various options. Here are some examples. However, it is essential to remember that this is a very individual and, therefore, general issue, but one worth considering in your plans. The career alternatives outlined below are often interconnected and intertwined. It is challenging to isolate separate paths that are not connected. This is because it is possible to work in a learned profession (full-time), and it is also possible to be self-employed, to be a subcontractor for larger companies, to train, to educate and to publish. Neither option is mutually exclusive.

The first area is industry. Young scientists can work in research and development (R&D) companies as researchers, innovation specialists, scientific consultants or project managers. R&D companies invest heavily in people; they need specialists because they can obtain funding for their research. According to CSO data (2020), most researchers on the internal staff in research-specialized entities were university employees (78.0%).

The second sector is the public sector. State entities also need highly qualified people who know the specifics of the phenomena in question and the methodology to study it. The work of researchers in government agencies and international organizations dealing with public policy, the environment or public health can result in documents, guidelines, and reports containing remedial models, courses of action and recommendations for decision-makers and investors.

The non-profit sector is also an option to consider. Foundations and associations founded by scientists have a significant impact on the functioning of societies, especially local ones. This professional activity offers a high degree of autonomy and the opportunity to conduct research projects or participate in social innovation projects.

Self-employment and contracted services can also provide an alternative career path for young researchers. A good understanding of the market and using knowledge and acquaintances from doctoral school can be crucial in building a competitive advantage. Academic entrepreneurship is a thriving area. Young researchers can also use the university infrastructure, e.g., business incubators operating at universities, and set up their companies with support. This is an excellent way to enter the non-academic labour market or to combine both areas, as you can cooperate with the university as a subcontractor.

Knowledge and methodological skills make the young scientist well-placed in educational, training and consultancy activities. He or she can work as an academic teacher in the private sector (without pursuing an academic career). He or she can also work in the education system as a teacher-specialist or consultant (e.g. psychologist). The education and training industry can seamlessly combine with one's own business. In such an alternative career vision, all the attributes that a young researcher possesses can be used: up-to-date expert knowledge, scientific and teaching competence, and experience.

An exciting area is media and communication. We have been observing the development of various types of social media for a long time. There is nothing to prevent a fashion scientist from maintaining a social media account, a YouTube channel or a website to popularize expertise, science, and teaching. He can publish popular science studies in the media and work as a science journalist and editor (he/she can write and review a scientific text). He/she can become a kind of influencer or spokesperson for research institutions or R&D companies.

These exemplary alternative career paths offer young researchers various career opportunities outside traditional academic paths, enabling them to apply their knowledge and skills in various fields and activity contexts.

4. SUMMARY

During the four-year period of doctoral school, young academics are expected to focus on building their research skills, developing their competencies and pursuing an individual research plan that culminates in a doctoral thesis. They have no guarantee of employment at the university where the doctorate was pursued. Continuing as an academic is one of the many possibilities after obtaining a doctoral degree. However, to be able to plan certain activities that fit in and build an effective employment policy at universities, one must identify the needs and plans of young researchers. One of the modern universities' key responsibilities is to monitor their graduates' career trajectories, including those who have obtained doctoral qualifications. By entering doctoral training, participants distance themselves from the labour market for four years and, in some exceptional situations, perhaps even longer. The price of academic success can be very high, and financial gratification can be deferred. Commitment to research, publication and conference activities, teaching loads, and internship trips — these are activities that significantly limit and sometimes prevent building a position and brand in the labour market.

Young scientists should have a plan for themselves. An alternative vision or even several for their career. They are skilled professionals whose knowledge and skills can be used in various ways. The benefits will be for the individual and society as a whole.

The career design process is ongoing and dynamic and is strongly influenced by the individual. It is essential to undertake comprehensive preparation, gain an understanding of the opportunities available in the market, and develop self-knowledge to inform decision-making. Regardless of whether a young researcher's career will be pursued in or out of academia, it is vital to prioritise continuous development, networking and updating knowledge.

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