

Part 5 Why don't I do a PhD?

Case 1:

Ever since you were little, you have dreamed of becoming a *researcher*, and of finding a solution, an idea or a theory that would revolutionize the world. Someday, you too would be able to say, "Eureka, I've got it!"

You also know what research involves and it doesn't put you off. You've already talked at length about it with your mother who has her own PhD in biology. **So, for you, doing a thesis is definitely a big YES.**

Case 2:

Working your whole life without ever seeing the fruits of your labor, turning into a veritable lab rat and never having contact with anyone, it's not for you, and neither is teaching. On top of this, you don't see what PhD study could offer you today other than deterring your entry into the world of work. You have your engineering diploma from École Polytechnique in the bag, which should be enough to open the gateway into renowned big businesses like THALES or SAFRAN and help you find your first engineering position to support you in your next step... **So, for you, doing a thesis would be more of a NO, but aren't these all just FALSE PERCEPTIONS?**

Case 3:

You're a real IT buff, especially when it comes to theory.

You like the idea of research, but not if it means spending your whole life in the lab. For your long-term career, a position in industry or at a company is much more attractive.

PhD study does appeal to you, but you are afraid it will hinder you further down the line. There are several reasons for this. You would stay in education for longer without seeing any real extra value for doing so, you might have a preconceived idea of the idea of being pigeonholed into one specialization or a stereotyped view of what being a researcher entails, and so forth.

Furthermore, during your group science project, you had the chance to develop a software that could do with some more improvement, but which could prove to be very rewarding in the future. You really want to launch a start-up project for it. **And so, as for doing a thesis, you're really NOT SURE...**

In all these different scenarios, which nevertheless only represent a small sample of reflections that you might have about PhD study and completing a thesis, we can see that research is not an easy notion to define. It is tricky to approach and therefore even harder to integrate into your (both professional and personal) life plan.

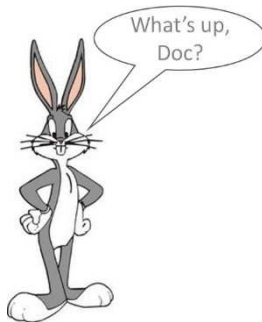
Part 5 of this Handbook will shed some light on the subject and maybe even encourage some vocations in PhD study.

A doctorate is...

A higher education course, completed through research and for the benefit of research and innovation¹, but more specifically, it constitutes:

1 The **highest, globally recognized** academic diploma

- ✗ **On the international level**, if you complete five years of further study (for an engineering degree, for example), you are considered as having an intermediate level of study and this perception is all the more evident in the French higher education system (*Licence-Master-Doctorat*). The PhD enjoys virtually worldwide recognition and is thus, logically the **highest possible qualification** one can obtain by following a program of **higher education**.
- ✗ In **Anglo-Saxon countries**, "**PhD**" is being used more and more commonly as a title in résumés, for example, taking the format "Pierre Martin, PhD", even if it is actually a French doctorate.



Parenthetically...

- 1/ A PhD carries with it a certain significant **social recognition**, for example, in Germany, where you can request for the title of "Dr." to be indicated on your identity documents.
- 2/ In France, the **doctorate awards the bearer with the title of docteur, regardless of the field** of study and research. So, contrary to common use, doctors aren't necessarily doctors of medicine².

2 The completion of a **research project**

- ✗ Innovative
This word pertains to that which is **new and resulting in the revision or transformation of something existent**, through the **structured** invention or construction of knowledge or technology. More broadly, it can



¹Translation of official definition given on the website of the French Department of Higher Education and Research - <http://www.enseignementsup-recherche.gouv.fr/cid20185/le-doctorat.html>

²A doctorate of medicine is actually more similar in form to a dissertation than a true thesis. It is not a "real" doctorate in the traditional sense of the term. In the United States, medical doctors are given the title of MD and not PhD (unless of course they have a PhD!).

refer to innovative tools (conceptual, methodological, etc.) that allow for the development of new understanding or the extended capacity for further work.

✗ Time-limited research

Depending on the field, a PhD generally lasts **three years, for the so-called exact sciences** (a.k.a. hard sciences: biology, mathematics, mechanics, etc.) and six to seven years or more for other disciplines (humanities and social sciences, economics, law, philosophy, etc.). For many disciplines, as a PhD researcher, you receive a salary from your *grand école* or university of doctoral study. You will therefore have the **hybrid status** of both **student and employee** (under a **doctoral contract or another type of contract**³).

✗ Supervised within a research unit

You won't be working alone. **You will be coached and supervised in your work** by one or more advisers who will be there to **guide you through your thesis**. You are normally assigned to the laboratory (or research center) where your main adviser is based. In some cases, however, you can also **join a broader research team** belonging to your lab, a different lab, a lab within another organization (e.g. an R&D division in an industry or a company), etc.



✗ Promoted and validated by the scientific community

Aside from developing new practical and theoretical knowledge, research work also entails **passing on the results** you obtain in the form of articles, which are intended for publication in scientific journals, use in conferences and seminars, or indeed, for filing patents... The **dissemination of research** also includes transferring practical knowledge and application to companies and any other fields that contribute to the advancement of society (through paid teaching or advising, creation of technical fact sheets, etc.).

✗ Recognized through the completion and defense of a thesis

"A PhD diploma is issued upon the successful completion of the thesis defense or the presentation of all original research." – Education Code

The thesis is the **document that you are required to write and present before a jury to obtain your PhD degree**. The phrase "doing a thesis" is often used instead of "doing a PhD", as the thesis constitutes the bulk of the work!

Your thesis defense marks the end of your PhD studies and allows you to present your research and discuss it with a panel of specialists (thesis adviser(s), researchers, experts,

³Find out more from the relevant Doctoral School on terms for the contracting and funding of your future PhD.

etc.). This is an **essential step** in terms of your professional identity and recognition, which will give you the **opportunity to display the quality of your work and show your dedication to it**. It is also a chance to share your work with the professional colleagues and peers who supported you along the way.

3 A professional experience in research

- ✗ Studying for a PhD is a veritable **professional experience**.

Studying through the medium of research enables future PhD holders to **develop a great number of subject-related and cross-disciplinary skills**, some of which will be unique to their chosen area of research.

These skills, particularly the cross-disciplinary ones, are not limited to research and the academic world. They may be also be transferred to other public, voluntary or private sectors, both in research and elsewhere⁴.

Moreover, this transferability is what tends nowadays to capture the attention of potential recruiters.

- ✗ Through this first "real" experience, researchers, as well as displaying their **technical expertise** in a specific field, also demonstrate the guarantee of **real professional skills** like determination, commitment to quality, openness, adaptability, perseverance, and the ability to cooperate and learn independently. The thesis defense lets PhD hopefuls show their capacity to develop skills, aptitude and knowledge in communication (writing, public speaking, reasoning etc.), pedagogy, group management, driving and managing a project, developing partnerships, researching funding, etc., especially in the context of "non-research" activities (an assignment completed at a company, non-profit activities, teaching, etc.).



⁴For more details, see the Order of May 25, 2016, setting the French national framework for the education of and the terms for issuing a national doctorate diploma.

4 Your prospects aren't so limited after all...

On top of being the highest-possible academic qualification you can receive and offering proven scientific and methodological expertise, a PhD also gives you executive status.

Whatever your chosen specialization, the opportunities that come with having a PhD are manifold: in business, industry, research, education, or toward even more in-depth study!

After receiving your degree, and according to your career plan⁵, several different avenues will be open to you:

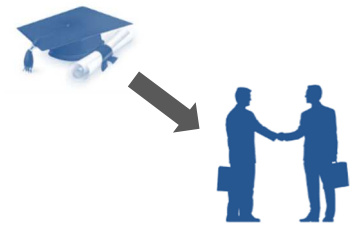
✗ Work in the private sector, in research or elsewhere

While it has not yet reached the level of social and professional distinction it enjoys in, for example, the English-speaking world and Germany, the doctorate is becoming ever more attractive to private employers in France.

As such, just like with other executives (engineering graduates, master's graduates, etc.), a significant number of companies and industries are recruiting more and more PhD holders⁶, or even EXCLUSIVELY PhD holders, in a variety of sectors⁷ and organizations⁸, appointing them to R&D-oriented roles or otherwise.

This is particularly evident in the world of cutting-edge industry and private research, in highly demanding fields where, in order to remain relevant in the market, it is necessary to keep up to date with the latest technological, scientific, technical and academic advances. Those wishing to occupy these executive roles must also have a highly specialized technical background.

Such a profile corresponds with that of a PhD holder, who unquestionably has the specific expertise required, as well as the other previously mentioned skills.



✗ Research in the public sector: researcher (research fellow, research director), professor-researcher (status) or research engineer

Researchers and professors-researchers both contribute to the development of knowledge and understanding, the advancement of research within their discipline and the transfer and/or distribution of the skills involved within universities, *Grandes Écoles* (generally an **ESR**) or any other (public) research organization such as CNRS, INSERM, INRIA, etc.

⁵See. Parts 1 & 2 of the Handbook

⁶As researchers and engineers (consultants, project management) as well as in support (HR, finance, etc.), business and marketing positions, etc.

⁷Finance, Data, AI, fashion, transport, aviation, etc.

⁸Start-ups, major industrial groups, consulting firms, stock markets, etc.

- A researcher focuses on pure or applied research, explores ideas, develops projects, conducts experiments, spreads scientific knowledge by publishing her work and exposing it within the national and international scientific community, participates in conferences and symposia, etc.

There is a difference between:



- **Research fellows**, who are appointed to a permanent civil service position on the decision of the director general of the public science and technology institution where they are employed.
 - **Research directors**, who in addition to their research role, are meant to develop, facilitate and coordinate work in research and scientific outreach.
- Professors-researchers are either university lecturers or professors. They are charged with the dual task of developing pure and applied research and imparting students with all the knowledge that stems from these fields. They help develop and transmit knowledge and understanding, and provide students with direction, advice and guidance. Aside from contributing to the development and promotion of pure and applied research, they also help spread culture and foster international cooperation. They carry out their research work in university laboratories most often associated with major research organizations (CNRS, INSERM, INRIA, etc.).
 - Research engineers help conduct work falling under the responsibility of their institution that is related to research, training, management, spreading knowledge and promoting science and technology. They are charged with guidance, facilitation and coordination in technical or administrative fields, and ensure the successful completion of teaching missions. As such, they may be responsible for any specific or general studies or other tasks. They may work as supervisors, mainly for technical staff.

Research engineers work in institutions of higher education, major scientific and literary institutions, institutions under the authority of the Ministry of National Education (CEREQ, ONISEP, C.N.D.P., CNED, CNOUS, I.N.R.P., CIEP), and education boards.

ATTENTION:

The terms "researcher" and "professor-researcher" can be ambiguous:

- A job title; a role of research and/or education
 - A status, as defined and regulated by the law⁹:
 - This status may refer to the Corps of Lecturers and the Corps of University Professors, within the French Civil Service.
- In these two cases, it is important to note that only after passing the competitive examination for civil service work in the public education sector (concours de l'agrégation) and receiving a qualification may you (as a doctor of your discipline), apply to become a university lecturer.**

⁹Decree n° 84-431 of June 6, 1984, setting the common statutory provisions applicable to professors-researchers and the special status of the Corps of University Professors and the Corps of Lecturers (consolidated version of March 23, 2017)

After five years of teaching and research work, you may then complete your professorial thesis, known in French as the *HDR (habilitation à diriger des recherches)*, which will enable you to become a master's or PhD thesis adviser for students.

Later on, you can do the competitive examination for employment as a university professor (candidates are, on average, aged in their forties).

- The status may also refer to the Corps of Research Fellows and Research Directors. In this case, it is obtained through passing the competitive examination for employment based on credentials and research work in each public research institution or organization in question.

It should be noted that entry into the Corps of Research Engineers (civil service category A) is done, just as with researchers, by way of a competitive examination set within the public institution or organization concerned.

	Public	Private
Where	<ul style="list-style-type: none"> - Universities and around 100 <i>Grandes Écoles</i> and institutions of higher education - 25 public research organizations (C.N.R.S., INSERM, INRA, INRIA, CNES, C.E.A., CNES, IFREMER, etc.) grouped into 5 National Research Alliances - 25 academic and scientific clusters, including 20 "communities of universities and institutions", a.k.a. COMUES (<i>communautés d'universités et établissements</i>). - private foundations (the Institut Pasteur and the Institut Curie) - Academic foundations and foundations for scientific cooperation - 34 institutes of the Carnot network 	<p>At a company (usually in R&D) NB: public research may also lead to or contribute to working FOR private research...</p>
Funding	<p>Public research laboratories are partly funded by university budgetary allocations, public research organizations and funding agencies, such as the French National Agency for Research (A.N.R.). They benefit from other financial endowments from local and regional government, charities, industry and the European Union. They can also receive funding from the private sector (research chairs, PhDs in businesses, etc.).</p>	<p>For private research, the French government supports innovation programs led by small and medium-sized businesses, through Bpifrance and the research tax. The international attractiveness of France and its hosting of foreign companies also contribute to the funding of research in industry.</p>
Purpose	<p>Obligation of means more so than results. Less of a fixed framework, "more freedom" in research work, unless working in partnership with the private sector.</p>	<p>(Financial) means are given and there are thus certain obligations surrounding results (specific project and goal). Fixed framework with "less freedom" in research work.</p>

✗ Moving on to your postdoc

Work completed during a thesis often constitutes one's first professional experience within a research center or laboratory. It could be the base for broader research work that you wish to foster and promote through postdoctoral study.

Postdoctoral research, completed at another institution and often in a different country, is an excellent way to discover a new research culture or thematic.

✘ Working abroad

Remember that if your goal is to work abroad, certain countries will ONLY recognize your expertise if you ALREADY HOLD a PhD.

✘ Embrace entrepreneurship

More and more PhD graduates nowadays are getting the most out of the fruits of their research by setting up a business.

Supporting them in such endeavors are incubators like that of the Drahi X-Innovation Center, associations such as the Association Bernard Gregory (ABG) or competitions like the Concours Docteurs-Entrepreneurs. For several years now, this competition, run by ABG, has been honoring the best entrepreneurial initiatives from PhD candidates reaching the end of their thesis or from recent graduates who received their PhD within the last three years.

Ultimately, a PhD is...

...a qualification completed after a master's degree or equivalent, concluding with the holder receiving the **highest academic rank recognized by the international university system**

...the completion of research work that is:

- Innovative
- Done within a specific time limit (from 3 or 4 years, to over 6 years)
- Supervised by a PhD research director at a research facility
- Published within and acknowledged by the scientific community
- Ratified through the written preparation and oral defense of a thesis

...a professional research experience

...a diploma that opens many doors

So... to PhD or not to PhD?

1 A PhD is for...

Before embarking on the journey towards a PhD, the first and most important question to ask is:

"Why do I want to do a PhD?"

I can already see you taking a pause, looking up pensively, reflecting, and eventually coming up with answers like:

"To obtain the highest academic qualification recognized worldwide", "to be able to teach at a university", "to go into research, because I'm good at what I do", "I'm not too sure what to do next and I'm not ready to start working right away", etc.

The answer given will vary greatly for each individual, but these types of answers aren't likely to help you much in your reflection.

In order to come up with better, more pertinent responses, there is actually another essential question to ask along with the first one:

"Have I got good reasons for doing a PhD?"

ATTENTION: The word "good" should not be interpreted here as "valid" or "commendable"; terms that are both motivated by one or more reasons that should not be judged. "Good" reasons refer to those that are "sufficiently motivating, providing you with enough driving force over time, so that you can eventually defend your thesis and receive your PhD".

Let's look at some reasons that could inspire you to do a PhD:

✗ "Good" reasons to do a doctorate

- You love to study and be intellectually stimulated
- You love research and are very attracted by it
- Your doctorate will lead you to a very specific objective
- You want to see an idea brought to life
- You have the means to do it

✗ "Bad" reasons to do a doctorate

- To earn lots of money

- Because you have always had good grades
- For social prestige
- To please those around you
- Because you are scared of unemployment

These different "good" or "bad" reasons may seem a bit obvious to you on reading them, but they are important to keep in mind if you are considering a PhD degree.

You should always be as honest as possible with yourself when doing this type of reflection, not losing sight of the fact that you will inevitably have both good AND bad reasons for doing a thesis. The most important thing before deciding to go for it is to make sure you know which side the scale tips towards.

2 Is doing a **PhD** in step with my **life plan**?

Once you have **clarified your (professional and/or personal) plan**¹⁰ (even if you only know for the next five years or so) and reflected on the pros and cons of doing a PhD, have a go at the following exercise.

EXERCISE *Am I really ready to do a thesis?*

To find out, while keeping your perspective on your career plan, write out answers (in order to keep a useful record of your thoughts) to the questions listed below.

Research and me
What does research mean to me?
Am I more interested in pure ¹¹ or applied ¹² research?
How can a PhD help me? What would be the added value of such a qualification, in comparison with my École Polytechnique degree? What career prospects would PhD study open up for me?
What are the reasons and motivations that would drive me to delve into PhD study? Are they relevant to building my (professional and/or personal) life plan?
Is gaining research experience essential to my life plan? Why?

¹⁰This **first step is ESSENTIAL**. If you haven't yet completed it, do so with help from Parts 1 to 4 of this Handbook.

¹¹All "experimental or theoretical work undertaken with a view mainly toward acquiring new knowledge on the foundations of observable phenomena or facts, and without providing for any direct practical application" - (Translation of extract from JORF 2006/C 323/01, December 30, 2006).

¹²All "research activities that [...] aim to identify possible applications of the results of a pure research project or to find new solutions that enable the company to achieve a specific, predetermined objective. The result of an applied research project consists of a probative model of a product, operation or method" - (Art. 49 septies F, Annex III of the General Tax Code).

On the other end of the spectrum, what reasons would dissuade me from pursuing PhD study? Are these reasons personal (e.g. tastes, motivations, strong preconceived ideas, etc.), material (e.g. funding, logistics, desire/need to enter the workforce as soon as possible, etc.) or otherwise?
Is my decision final or not? What elements, factors, etc. could potentially change my mind?
OK, I am motivated to do a PhD, but...
Have I taken into account all the implications of this? Will I be able to cope in the long term (financially, psychologically, physically, etc.)?
At present, do I consider myself able to work totally independently? Will this level of independence be enough for my future research work?
Do I want and am I able to work for at least the next three years, often by myself, on scientific issues that will sometimes be very vague?
Am I interested in more general scientific issues or issues specific to my field of expertise?
Is my level of (spoken/written) French good enough? Is my (spoken/written) English good enough, particularly if I am considering doing a PhD abroad?
Do I have the skills needed to write scientific publications? If not, will I be able to develop them easily enough?
Regarding the duration of PhD study...
Do I want to start a project that will last at least three years? Will I be able to handle the pressure? Am I sure I won't get fed up with it?
Am I aware that PhD study involves organization and knowing how to manage my time over a very long period?
Am I aware that there will be deadlines (presentations, writing articles, various reports, etc.) to be respected consistently all throughout the project? Do I realize that I will frequently have to inform superiors of my progress (my thesis supervisor, potential funding organizations, project owner if my thesis is part of a larger scientific project, etc.)?
Suitability of my profile/project with the research topic in question
Do I have an idea of what research topic I might cover? Is it consistent with the latest scientific and/or technological advances in the field? Does it relate to broader objectives? Does it have a future?
Does the field of research I chose after all my consideration really suit me? Does it match my knowledge, my interests and my expectations for the next five years? Am I passionate enough about it to pursue it and ultimately become a specialist in my field?
Are my chosen research project, research facility and institution all in line with my career plan?
Do I have the necessary basic knowledge?

Am I able to and do I want to explore other fields of expertise in order to undertake my future research project?

What will be my areas of interest over the next few years? Will the fields pursued during my thesis still suit me and will I still like them? If not, do I have a plan B? What about a plan C?

Find out more...

Some useful sites:

- ✗ Association Bernard Gregory: founded in 1980, ABG is a French association that prepares and assists PhD graduates in their pursuit of a career in the business world.
<https://www.abg.asso.fr/en/>
- ✗ ANDès: Established in 1970 by Ivan Peychès following the initiative of Pierre Aigrain, ANDès is the National Association of PhD Holders in France.
<https://andes.asso.fr/>

Now then, what have you decided?

Career and Development Center

➤ Papianille Mura

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➤ Emilie Lecomte

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Alternatively:

SOIE website

<https://portail.polytechnique.edu/soie/fr/carrieres-oi/orientation-et-insertion-professionnelle-accompagnement-carrieres>

SOIE email address

orientation-carrieres@polytechnique.fr