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The Impacts of the Existence of a Higher Purpose on Biotech Busi- ness Model

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Abstract

This work examines how the adoption of an extra-financial purpose affects the organizational equilibrium of biotech companies, with a focus on employee effort, talent selection, and firm signaling. Its distinctive contribution is the use of theoretical modeling to rationalize a purpose-driven business strategy. The mathematical approach is largely absent from strategic management literature.

Drawing on utility theory and game theory, we develop a model in which employees differ in their sensitivity to organizational mission. We show that authentic purpose-driven firms attract idealist employees willing to accept lower wages in exchange for social utility, thereby sustaining higher effort levels and increasing the probability of research success. Opportunistic firms that mimic a social mission face effort reduction and turnover once employees update their beliefs. An open business model acts as a credible signal in a separating equilibrium, allowing authentic firms to distinguish themselves at no cost.

The model is applied to patient centrality as a concrete utilization of higher purpose in biotech, supported by industry expert interviews and a labor market survey. The findings suggest that, far from being a purely philosophical choice, adopting a genuine higher purpose constitutes a rational competitive strategy in the biotech industry.

Keywords: Higher Purpose, Biotechnology, Business Model Canvas, Mathematical Model, Utility Function

Abstract in lingua italiana

Questo lavoro esamina in che modo l'adozione di uno scopo extra-finanziario influisca sull'equilibrio organizzativo delle aziende biotecnologiche, con particolare attenzione all'impegno dei dipendenti, alla selezione dei talenti e alla segnalazione aziendale. Il suo contributo distintivo consiste nell'uso della modellizzazione teorica per razionalizzare una strategia aziendale orientata allo scopo. L'approccio matematico è in gran parte assente dalla letteratura sulla gestione strategica.

Attingendo alla teoria dell'utilità e alla teoria dei giochi, sviluppiamo un modello in cui i dipendenti differiscono nella loro sensibilità alla missione organizzativa. Dimostriamo che le aziende autenticamente orientate a uno scopo attraggono dipendenti idealisti disposti ad accettare salari inferiori in cambio di utilità sociale, mantenendo così livelli di impegno più elevati e aumentando la probabilità di successo della ricerca. Le aziende opportunistiche che simulano una missione sociale devono affrontare una riduzione dell'impegno e un aumento del turnover una volta che i dipendenti aggiornano le proprie convinzioni. Un modello di business trasparente funge da segnale credibile in un equilibrio di separazione, consentendo alle aziende autentiche di distinguersi senza alcun costo.

Il modello viene applicato alla centralità del paziente come applicazione concreta di uno scopo superiore nel settore biotecnologico, supportato da interviste con esperti del settore e da un'indagine sul mercato del lavoro. I risultati suggeriscono che, lungi dall'essere una scelta puramente filosofica, l'adozione di uno scopo superiore autentico costituisce una strategia competitiva razionale nel settore biotecnologico.

Parole chiave: Scopo superiore, Biotecnologia, Business Model Canvas, Modello matematico, Funzione di utilità

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Introduction

Engaging in extra-financial purposes is a growing topic among contemporary organizational strategy. The objective of this master thesis is to provide an overview of the impacts the existence of a higher purpose can have on the functioning of biotech companies. Motivated by an increasing need for meaning in business and the considerable leverage of the biotech/biopharma industry, this thesis seeks to rationalize philanthropic strategic choices within a competitive market context.

In the course of this thesis, it seems necessary to determine the current state of academic research on the aforementioned topics. First, we will define the concept of higher purpose, how the literature embraces the topic, and why firms decide to adopt one. The relation of higher purpose with other similar frameworks will also be discussed. In the same path of defining concepts, it seemed important to address biotechnology and the business model of those companies specialized in biotechnology. The Business Model Canvas will be used for a clear overview of the different aspects of the industry. Thereafter higher purpose application will be extended to the case of patient centrality. This example will show how patient centric initiatives can be implemented when they are put into practice.

The rationale will then be explored in greater depth and a theoretical model will be conceived to understand the implications of biotechnology companies towards a purpose-driven business model, regarding the set of values the company carries and its financial requirements. It is the core of this work and the real added value regarding the formalization of how engaging in a purpose can lead to a competitive advantage .

Finally, to conclude this work, we will give reasons for the existence of such a framework, taking into account the realities of a free-market economy. Arguments will be supported by testimonials from industry experts and professionals. The financial requirements of the firm and the access to financing opportunities will be assessed, as well as the perspective of the founder. these are all the elements that will constitute our thesis.

1 | Higher Purpose

1.1. Higher Purpose Definition

A higher purpose, when it exists, is part of the founding elements of a firm. Thakor & Quinn (2020)[51] and Thakor (2022)[52] have synthesized the key components of company as this: A firm's strategy is a plan for allocating resources to achieve business objectives, such as maximizing shareholder value. It is the *how* of the company's operations. A firm's vision is an aspirational picture of what the company aims to become in the long term. For example, Microsoft's well-known vision: "A computer on every desk in every home." It is an inspiring goal, sometimes unattainable, that guides the company's direction. Vision answers the question "Where are we going ?" A mission statement details the economic activities a company will undertake to realize its vision. It represents the standard of operational effectiveness that a company aims to achieve. Essentially, it is a declaration outlining the objectives necessary to pursue the company's vision. For example, Johnson & Johnson states that they "blend heart, science and ingenuity to profoundly impact health for humanity." (Johnson & Johnson, 2025)[22] The mission answers the question, *What do we do?*

While there is no universally agreed-upon definition of higher purpose in the literature, several common elements emerge from various interpretations. It may be relevant to note that higher purpose and pro-social behavior are considered the same concept. (Thakor, 2022)[52]

1. Van Aaken, Splitter, and Seidl (2013)[57] conceptualized pro-social behavior as a strategy to transform economic capital into social or symbolic capital.
2. Gartenberg, Prat, and Serafeim (2019)[17] suggest that purpose does not necessarily have to be explicitly prosocial but should be seen as the company's "*reason for being*."
3. Henderson and Van den Steen (2015)[19] describe purpose as "*a concrete goal or objective for the firm that extends beyond profit maximization.*"

4. For Thakor (2022)[52], the higher purpose explains why the company exists, it is its reason for being, beyond financial requirements.
5. Quinn & Thakor (2018)[41] define it as a prosocial contribution goal that transcends typical business objectives, such as profit maximization, yet remains intrinsic to the organization's core activities.

Despite the apparent differences in these definitions, they share a common thread that we try to compile in our own definition. For the purposes of this work, the concept of higher purpose is defined as a day-to-day dedication to a cause bigger than the company itself, which interacts with the mission and is deeply rooted in the company's culture. It represents a contribution goal that goes beyond conventional business objectives such as maximizing shareholder value. Where the profitability of the company, its financial fulfillment might be considered the outcome, the standard purpose of a company; the higher purpose is the next step, the non-financial goal with positive externalities.

1.2. Characteristics of Higher Purpose

A notable point emphasized in literature is the importance of the authenticity of the purpose. For Gartenberg, Prat and Serafeim (2019)[17], the higher purpose is not even what the company states it is, but what the acting employees see as the purpose. Thakor & Quinn (2020)[51] proved that in an organization, authenticity, meaning the willingness of senior management to act on prosocial activity, allows the equilibrium wages of employees to decline and increase higher purpose investments.

The cost issue is central in this area, the question of the amount of resources that should be invested to reach, approach the goal remains unanswered. Evidently, some costs are obvious, in the case of companies that offer reductions for underprivileged people or if a percentage of the profits are distributed to NGOs, the financial cost is clear and computable. However, it is not always the case, sometimes the costs are less concrete, more blurred. Nonetheless, Quinn & Thakor (2018)[41] report that in the vast majority of examined cases, authentic higher purpose involved a financial sacrifice by the firm at some point in time, even when it was not an immediate sacrifice of resources. Unsurprisingly, the big question remains whether to consider them as costs or investments.

Polman & Winston (2021)[39] argue that a well-executed plan to achieve a net-positive culture consists only of investments (conceptually, not on the books), as everything the firm loses, it will gain in reputation, sales or employee engagement. For them, the competitive edge to do good and mean it is far greater than the cost-cutting strategy. For

example, Unilever launched a campaign with the government to raise awareness in dental hygiene in Vietnam, it reduced tooth decay in kids under ten years old from 60% to 12%. At the same time, they developed a new market for their toothpaste. Further examples are provided in Polman & Winston (2021) [39]. They even argue that doing good things, without foreseeable economic gain, develops a relation of trust with customers and NGO's. Quinn & Thakor's focus remains on cost, whereas Polman & Winston look at strategy, partnerships and market share. Indeed, involvement in a bigger cause, in a higher purpose in which customers can relate, can favor attractiveness compared to competitors; that is, however, much more complicated to assess. Our take is that an authentic positive higher purpose can be considered investments through indirect mechanisms; chapter 5 shows that expenditures related to higher purpose generate returns through increased effort, supporting the interpretation of investment.

1.3. Motivation to Adopt a Higher Purpose

Higher purpose is not like other corporate frameworks because it is really part of the company's strategy and culture. It is not just for marketing or compliance purposes; a higher purpose is intrinsically embedded in the spirit of the organization. It is not driven by legal requirements, nor does it provide a descriptive road map for action. Instead, it serves as an intention, a guiding principle that shapes decision-making and behavior. Naturally, the reasons for cultivating prosocial behavior within a company are complex. In this section, we offer some insight into why organizations choose to adopt such practices.

One might initially assume that this reflects a flaw in Friedman's shareholder primacy model; shareholders and managers, being human, bring their own moral values into the company. However, that is not what literature perceives. van Aaken et al. (2013)[57] describe it as social practice through the lens of the Bourdeusian framework. The authors conclude that pro-social behavior is neither purely strategic nor purely altruistic, but a complex social practice shaped by the pursuit of capital (e.g economic, symbolic and social capital) and power within specific fields.

Oppositely, Orlitzky et al. (2011)[32] take an economic angle of analysis and underscores that cost benefit frameworks provide a robust foundation for understanding strategic Corporate Social Responsibility (CSR). But also consider leadership and institutional perspectives that can offer a more holistic view.

However, the *virtuous circle*, where profit and social good mutually reinforce each other, lacks universal empirical support (Porter & Kramer, 2002)[40]. When companies prioritize public relations gains over substantive impact, or when they delegate social initiatives to

independent charitable foundations (as often seen in contentious industries-tobacco, petrochemical...), they miss opportunities to leverage their core competencies and expertise to generate meaningful social value. The purpose in which a company is engaged has to be aligned with its business model.

Moreover, real-world examples exist of companies engaging in Corporate Social Responsibility (CSR) without economic incentives, challenging the assumption that profit maximization is the only driver of pro-social behavior. Matten & Crane (2005)[27] see companies as corporate citizens, who also bear moral obligations, and remind that all companies are made of individuals, with their ethical commitments.

Henderson & Van den Steen (2015)[19] use the specter of individuals, affirming that employees want to act on pro-social actions on a personal level, within the boundaries of their firm. The combination of all employees' beliefs put into action is what creates the engagement of the company. This situation might also cause a principal-agent issue if employees decide to invest more time or resources in the purpose than what the shareholders and/or managers have planned. Especially since firms committed to a cause tend to attract people engaged in the same cause. (Kristof-Brown et al., 2005)[24]

Higher purpose reflects a commitment to ethical and moral responsibilities that extend beyond profit maximization, even within a market economy. This is what makes it compelling: it challenges Friedman's views, a company is ultimately composed of stakeholders, not only shareholders. It doesn't adhere to purely logical rules but operates on what might be called *guts management*. We want to ask the question: *What if managers believe companies have a moral duty to society or the environment? How would this change how companies work, how they treat people, and how the economy functions, while still staying in a market system?*

1.4. Higher Purpose and Other Frameworks

Higher purpose and corporate social responsibility (CSR) are two very similar concepts, that are often confused. Sarkar & Searcy (2016)[45] analyzed multiple definitions of CSR to conclude that CSR implies that "*firms must foremost assume their core economic responsibility and voluntarily go beyond legal minimums to be ethical in all their activities and take into account the impact of their actions on stakeholders in society, while simultaneously contributing to global sustainability*". This definition closely mirrors the one of higher purpose. However, the two concepts are not identical. The key distinction lies in the notion of purpose: while CSR can be a set of practices, higher purpose implies that the company's very existence and actions are fundamentally driven by its purpose, it is

strategically embedded in the firm's operations. For instance, a firm that finance a NGO without direct or indirect links with the company activity can be CSR compatible without having a higher purpose; in contrast a company setting internal policies on recruitment and cost allocation can have a clear higher purpose without fitting in the CSR guidelines.

Corporate Citizenship (CC) is a concept created through the lens of ethics and politics. It argues that companies are like people and do have rights and moral duties, even if they differ in terms of legal framework. (Matten & Crane, 2005)[27] This approach is more similar to ethical thought about how companies should operate than to a concrete economic concept. In literature, there is no consensus on what CC really means practically. (Valor, 2005)[56]

Smart simplicity consists of guidelines to strategically improve efficiency, it rests on two ideas :

- People are rational and do things because it makes sense for them,
- Performance is based on what people do.

Smart simplicity states that management rely on the understanding of human behavior where the objective is not to influence the outcome but rather to understand what people will do given some circumstances and influence them into doing what is expected of them. The role of management is therefore to build processes, means to make the workers to do willingly what they are destined to. To achieve this, there are three ways: resources, objectives, and constraints. The key elements is to create value and increase performance through cooperation and engagement. (Tollman et al, 2016)[53] Engagement is a way to lubricate the engine of a company, if a worker's objectives are not bigger than the simple application of the rules, the operations will not be carried out successfully. This element of meaning is remarkably similar to the idea of higher purpose.

Regarding the net positive theory, Polman & Winston (2021)[39] explain that working in a company is a responsibility. The deep question they ask is *why* does a company exist, what is its purpose. They then proceed to explain *how* executives can achieve a purpose and how an extra-financial purpose is compatible with economic requirements. Even more, they argue that engagement, transparency and authenticity are needed elements to grow a competitive edge. The technicalities of how to lead a company towards net positive are well-explained through real-life cases in their book, to which the reader is referred for a detailed account of implementation strategies.

To summarize our thoughts on all these frameworks, CSR would descend from economics, Corporate Citizenship from political science, Smart Simplicity describes how companies

can improve qualitatively, Net Positive gives concrete strategic guidelines, and Higher Purpose would come from a philosophical perspective on business.

There are numerous concepts linked to these notions of corporate ethics, some are designed to assess and classify the non-financial outcomes; we may name the SDGs by the UN or the CSRD as the mandatory framework by the EU. There are also multiple concepts such as Environment-Social-Governance (ESG) which constitutes three pillars to analyze CSR. Nevertheless, the analysis of these frameworks falls outside the scope of this work, which focuses specifically on higher purpose as a strategic concept.

2 | Business Model of Biotech Companies

2.1. Biotechnology Definition

Biotechnology is a broad concept referring to the use of biology, the science of living organisms, for specific applications on materials, processes, and products for the creation of new knowledge, enhanced or new products, and services. Even though it may seem modern, biotechnology has been used for a long time, for instance, the selective breeding for better types of crops, or the processes for wine making. However, since the understanding of genetics, great efforts have been made on the role of DNA, RNA, and proteins, which paved the way for utilizing bacteria as a cornerstone in biotechnological advancements. Afterwards, biotechnologies have experienced an exponential interest and the field of study is now wider than ever: Nanotechnologies, molecular biology, computer technology, etc. (OECD, 2018)[31]

However, this definition might seem too broad for us as we want to focus on biotech companies, those firms that increase the knowledge we have on biotechnologies, they lead research and development of new solutions or new applications for modern problems. These firms innovate new solutions or applications to address modern challenges, rather than simply incorporating biotechnologies into their existing processes, as seen in industries such as brewing, generic drug production, or industrial fertilizer manufacturing. (Arundel et al., 2007)[2] To achieve this, we will explore the business models of biotech companies and examine how they operate.

2.2. Biotechnologies Categorization

It seemed relevant to assess an overall overview of the biotech industry and how the literature depicts it. Practically, the most prominent distinction is made by their different purpose; there are four main categories that are commonly agreed: red, white, green, and blue. (Brinson Brothers, 2020)[3]

The most common type of biotech companies is the red biotech, or med-tech they are focused on pharmaceutical applications and the development of drugs, antibodies, vaccines, etc. Their field of application is the health sector, and their purpose is the development of new medicine-related solutions using biological means.

White biotechnology operates on the chemistry and processing sector. The purpose of these technologies is the improvement of industrial processes, in terms of quality, efficiency and waste. Moreover, it is the creation of new bioprocesses and the understanding of the role of biological matter in applied chemistry. (Tang & Zhao, 2009)[50]

Green biotechnologies, on the other hand, are related to the environment: land, fields, forests, plants, etc. The two main categories are agriculture with research on land use, type of crops, preventing crops disease, etc. The other is related to environmental issues, in the vernacular sense of the term; it is linked to depolluting contaminated sites, developing biofuels, reusing biological wastes, etc.

The last category is blue biotechnologies, their applied field is water, as the habitat. The definition of blue biotechnology differs from the pattern of the last three precedents, mainly because it does not only refer to the type of application. The target elements, water, can also refer to the marine environment as the source of mechanisms and techniques for other fields of study. (EU Blue Economy Observatory, 2024) [29]

This work dedicated to understanding the business models of the biotech industry and how they operate. The focus will be on red/medical biotech. As outlined earlier, the extent of biotechnology is extremely wide. However, med-tech companies are the most common market-wise and the other categories are more recent as they try to resolve more modern problems. That is the reason that the literature and this work might use "biotech" as a synonym of med-tech, even though theoretically biotech companies correspond to a broader business model, including blue, green, and white categories.

2.3. Motivation

Med-tech covers all kinds of tools and products used to treat diseases and health problems. These technologies help doctors diagnose illnesses earlier, offer less invasive treatments, and get patients healthy again, sometimes even cutting down on hospital costs. Med-tech includes things like medical devices, digital health tools, biotech, and healthcare services. But in this section, we will only talk about companies that use biology to create new health technologies.

From a business standpoint, it is interesting to explore how med-tech firms navigate

through very specific issues. Pharmaceutical drugs stand out due to their highly regulated nature, combined with costly and uncertain research and development (R&D) efforts before even reaching the market. This makes their business model very different not only from other industries, but also from the other categories of biotech. (WHO, 2026)[59]

From a philosophical point of view, adopting a higher purpose and developing a treatment to medically help fellow human beings have the same ethical root cause. Therefore, associating the two concepts appears coherent.

By all means, elements we might include in our analysis could be transposed to other types of businesses active in other biotechnologies (green, white and blue) that might operate in similar conditions, but we do not vouch for the accuracy of our theory on other industries.

2.4. Industry Layout

Biotech companies operate within an intricate network of actors, each playing a role within the research and development chain. The OECD (2015)[30] divides research & development in three phases:

“Basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view. Applied research is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective. Experimental development is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.”

Let’s apply those concepts to the pharma biotech R&D industry. Basic research, usually conducted by universities, focuses on exploring fundamental biological mechanisms, principles, or phenomena without an immediate commercial goal. It fuels the pipeline of new knowledge and technologies required by firms to engage in applied innovation.

Applied research in biotech is the intermediate step between basic discoveries and practical applications. It focuses on solving specific problems, such as developing a new therapy or diagnostic tool. The concrete activities can for example include the identification of a biological target, like a protein linked to a disease and the validation for drug development. It can include pre-clinical studies, where drug candidates are tested in lab models, through cell-culture or animal studies, to obtain results on the effectiveness and safety of the

candidates. The goal is to translate scientific knowledge into tangible solutions, such as drug candidates or therapies with clear potential.

The need for experimental development arises when a validated drug candidate from applied research is considered ready to enter clinical trials and manufacturing scale-up. It involves clinical trials, or more precisely, conducting phase I, II, and III trials to test the safety, dosage, and efficacy of new drugs or therapies in humans. During these clinical trials, the final form of the product is developed, by trial, error and restart. It is a heavily regulated stage, creating the need for regulatory submissions of pre-clinical and clinical information to the regulatory authorities (e.g. FDA in the US, EMA in Europe,...). During this phase, manufacturing processes are designed, in a way to produce the best quality, at scale, bearing in mind capital and operational expenditures. Most of the time, it is done collaborating with pharmaceutical companies and contract manufacturing organizations (CMOs). It ultimately transforms research findings into commercial products or processes, ensuring they are safe, effective, scalable, and compliant with regulatory standards. (Deore et al., 2019)[13]

Additionally, the drug development process is lengthy and expensive, often taking 12–15 years and costing from hundreds of millions up to \$4.5 billion to bring a single drug to market. Only a small fraction of compounds that enter the pipeline ultimately receive approval. (Schlander et al, 2021) [46] This situation is the reason the search for financing opportunities for each step of the process is a key issue in the biotech industry.

2.5. Biotech vs Pharmaceutical Companies

Biotech and Pharmaceutical companies are generally considered part of the same sector as they operate on medical drugs and therapies. However, those companies are generally split into two main types: biotech and pharma companies. While the line between them is not always clear, there are some important differences.

Pharma companies are usually larger, and they have a portfolio of approved drugs and a flow of new ones in development for various diseases. Historically, pharma companies started in the chemical industry, so they originally focused on small-molecule drugs. However as biotechnology advanced, pharma companies decided to work also on large-molecule drugs, often by acquiring smaller biotech firms. The expertise of big pharma lies in identifying cutting-edge technologies within highly specialized medical fields (skills and knowledge synergies). Strategically, they excel at anticipating future market needs and directing their medical research or acquisitions of smaller biotech firms accordingly. Typically, they reduce the risk of drug failure by specializing in the later stages of FDA

approval and product commercialization. Since they already have approved products, pharma companies are usually profitable, with strong cash reserves and easier access to funding. (Lo & Thakor, 2022)[26]

On the other hand, biotech companies are usually smaller, with fewer employees, less revenue, and fewer products. They typically operate in early development stage, and their focus tends to be on biological drugs (large-molecule drugs, like proteins or antibodies) rather than chemical drugs (small-molecule drugs). (Lo & Thakor, 2022)[26]

The reason biotech companies are usually smaller is intuitive: risk. For simpler molecules and higher go-to-market success rates, larger organizations benefit from synergies in production, administrative efficiency, and the rigor of clinical trials (especially if they specialize in a very specific medical field). However, biotech SMEs face higher systemic risk because they focus on more unresolved issues, where success depends more on creativity than on following a rigid procedure. Early-stage success is not easily scalable, and the number of projects a biotech would need to fund its early-stage research through later stage successes is simply too large to sustain without significant cross-research synergies.

These differences naturally impact economic analysis, and in this work, we chose to focus on the perspective of biotech companies. We will explore the various theoretical business models that exist in this sector, in order to address the critical financing challenges well-known in this industry and also examine questions of purpose and meaning, as we have previously discussed.

2.6. Biotech Business Model Canvas

Now that this distinction has been made, the following section examines the business model of those companies. To develop our analysis, we will use the standard Business Model Canvas format, widely adopted in scientific literature. This framework will enable a clear and concise presentation of all the concepts discussed. It can be defined as a visual and structured tool used to analyze the key components of a business model. It consists of nine interconnected building blocks, which together provide a holistic perspective of how a company creates, delivers, and captures value. (Fritscher & Pigneur, 2014)[16] This exercise has been inspired by the work of Horvath et al. (2019)[21] and Tölle & Herbst (2016)[55]. The following section will be organized as such: the nine building blocks will be developed in detail individually and thereafter key elements will be synthesized into the simplified visual framework.

2.6.1. Value Proposition

The value proposition is essentially what makes a company's product or service stand out. It explains where in the value chain a company can extract their fair share and what customers are getting from the company.

For biotech companies, the value proposition resides in the ability to find a therapy, a drug, a mean to medically help patients. Their added value comes from the research conducted on a specific topic. Most of the time, an idea arises on the basis of a scientific discovery at a university or research institution. A great amount of analysis is conducted on the feasibility, the improvements, of the solution. Prior to that, the existing market has to be assessed: a drug/treatment can be better if it is more efficient or if it has less negative side effects. (De Luca et al., 2010)[11] If a biotech brings something to market that is just as good as what is already available, it does not really fill a need nor create value.

Asking what their goals are, what they are bringing to mankind, how it is better and is there a good chance of success, etc, is a prerequisite for investors, because they know that at one point, they will need a way to monetize the research. (Tölle & Herbst, 2016)[55]

The end-of-the-chain recipient, known as the patient, brings all direct value to the whole pharmaceutical sector. The most important goal that every company in this sector should bear in mind is: taking care of people is helping society. On a philosophical standpoint, it is ethically good to donate/invest money in scientific research, no matter what. But what interests us is the value proposition from an economic standpoint. The value a drug has when it helps one patient, impacts their family and friends, the employer, etc. A healthy society is where people are happy, secure and productive. Providing health brings direct economic value. (Vogenberg, 2004)[58]

2.6.2. Customer Segment

The first step in this segment is to identify who the customers are actually, because of how important it is for the structure of the business model. Customers could be viewed as a reflection of the value incorporated into the firm. Market segmentation allows companies to group customers with similar attributes, enabling targeted offers, channels, relationships, and pricing models. (Osterwalder & Pigneur, 2013)[33]

In this instance, the end-user, the patient is not necessarily the direct customer; but remains the target. Revenues can come from investors, pharma companies, governments and patients but every link of the network has the end objective to make the patient bet-

ter. Therefore, defining who will be the end-user is a key step in the founding of a biotech company at the seed stage. Generally, the focus is set on a particular technology targeting a particular disease or condition. From this choice, all decisions will be impacted: target the research, develop relationships with the right organizations (pharma companies, hospitals, NGO's, etc), delegate the development of a discovered molecule applicable in another field, etc. The role of the patient is not to be overshadowed. (Stergiopoulos et al., 2020)[49]

In the complex network of actors playing a role in the pharma-biotech sector, the mission of the physician is vital because they bring the drugs to patients. One of the key task of drug developers is informing physicians of the quality, effectiveness, price, risk of negative effect, etc, without neglecting to promote your image to all company stakeholders, including the manufacturer, patients, doctors, and investors. (Tölle & Herbst, 2016)[55]

About investors, not that we consider them as customers, but they are bringing value to the firm, and this value is not only capital but also advice and governance skills. Having a type of specialized business angels is always to the company's advantage, not having to convince investors of the very long lead times related to the industry is a luxury. Interestingly, due to the costly nature of the research industry, some biotech companies even specialize in finding funding, they have real expertise in *investment marketing*, meaning, the attributes, the means that make investors and big pharma want to invest in this particular field. (Lo & Thakor, 2022)[26]

2.6.3. Customer Relationship

The customer relationship describes the ways a company use to be in contact with their customer segments and how they respond to it.(Osterwalder & Pigneur, 2013)[33] The customer relationship in the innovative sector during the early stages of development is very different from the traditional perspective; however, relationships with investors are crucial and the role of the end-user is more prominent than before with the rise of patient-centricity.

Patient-centricity is an interesting concept in which the focus is set on the patient rather than on the drug (old conventional point of view). Despite their diverse approaches, public, private, and academic sectors share a commitment to engaging patients at every relevant stage of the medical product life cycle. The purpose is to take patients' needs into account, improving their overall wellbeing. (Stergiopoulos et al., 2020)[49] This concept will be extensively developed in the following chapter.

Biotech also must develop a relation of trust with physicians, as they represent the firm to

the patients and the patients to the firm. Organizing educational activities, conferences, and Q&A meetings for doctors is important in order to spread knowledge and skills related to the products. Nevertheless, the role of the physicians is to correctly inform the biotech SMEs of the practical dispositions, the patients' concern, etc.

The relationship with investors is different, the management team must develop a strong relationship with the business angels, to inform them of advancements, delays, pushbacks, new strategies, etc. But the role of business angels is to guide the managers, as they often follow multiple biotech SMEs, and to trust them in the daily operations. This relationship obviously depends on the type of investors and is much more standardized with advanced financing projects (cf revenue streams). Before maturity, some incubators play the role of catalysts between biotech SMEs, investors and other partners like universities and other companies.

2.6.4. Channels

Due to the traditional nature of customer segmentation in biotech SMEs, their communication channels have also remained relatively simple. Historically, interactions with large firms were conducted primarily through in-person meetings, while new customer connections were often established at professional platforms, such as conferences and workshops. (Horvath et al., 2019)[21]

However, digital communication channels enable companies to reach customers all over the world, but they also introduce challenges due to varying drug development standards across countries. Tölle & Herbst (2016)[55] suggest that these differences in regulatory environments may drive biotech companies to outsource activities globally, through efficient exchange of information via digital platforms. In the current landscape, it is crucial for biotech companies to leverage virtual platforms internationally to remain competitive.

2.6.5. Revenue Streams

The sources of revenue depend on the different stages of advancement in the biotech business. We will proceed by introducing the financing cash, the most important for young biotech, before entering the operating cash flows.

At first, like in any other business, the only investors are the three F's: Family, Friends and other Fools. But very soon, the assignment of financing is relegated to business angels and venture capitalists (VCs); this type of financing, characterized by high risk, unpredictable returns and very long lead times is ideal for venture capital mainly due to the

inherent uncertainty about the research which is independent of the quality of the work performed in the innovation sector. (Pisano, 2006)[38] Early-stage funding often exceeds \$20 million, with investors expecting an 8–12-year horizon before exiting their investment. In these conditions, biotech incubators can serve as organizations that facilitate access to loans, public financing, and financial management support. There are also other creative solutions, such as crowdfunding schemes which operate as social network-based financing platforms, offering specific incentives to attract participating investors. During the expansion phase additional funding sources grow in importance, including investment funds, pension funds, leasing mechanisms, and mezzanine debt. These diverse funding options help sustain growth and innovation during this critical stage. When the business becomes mature, institutional creditors offer new solutions such as syndicated loans, IPOs, equities, or depositary receipts. These financing mechanisms provide the required capital to support growth, innovation, and market expansion. (Paun, 2019)[36]

On the other hand, biotech business models are not a Ponzi scheme, finding intrinsic streams of revenue is crucial. Even before an exit strategy, licensing a technique of a discarded molecule is frequent, as well as charging for consulting services related to a very narrow topic of research. Essentially, if we break down the different business models enumerated by Segers (2017)[47] there are 3 fundamental types of revenue streams depending on the models. Product-based streams rely on the sales of commercialized products or on licensing fees over the physical drug; the business then depends on the sales of a product, similar to a traditional goods company. Platform-based streams monetize findings based on technology licensing and contracting research. Finally, service-based revenue streams allow biotech companies to earn income by charging fees for specialized services, including preclinical and clinical trial management, bioinformatics, manufacturing of biological products, and expert consulting or regulatory support for other biotech or pharmaceutical firms. By all means, those streams can be combined, and hybrid models obviously exist. Some are focused on optimizing open innovation, with upfront payments, milestone payments and royalties on sales, whereas others are IP-oriented, monetizing patents, by licensing, royalties or sale. There is also the extreme case of virtual business models, outsourcing revenue using virtual R&D management.

2.6.6. Key Resources

Small biotech SMEs leverage specialized resources to create value. Rhyne (2009)[42] showed that three factors critical for success are a strong management team, a strong intellectual property position and access to funding. The team, composed of strong managers and highly specified personnel, made up of skilled scientists, researchers and tech-

nicians, is the founding block of the enterprise. Intellectual property is also what makes a biotech company valuable from an outside perspective and is at the core of the revenue streams. Patents are at the base of many income flows like royalties, licensing, avoiding cheap competitors, etc. The access to funding is, also, a resource in the sense that the skills and conditions that ease the access to funding are critical for the survival of a biotechnology; as a capital intensive industry, the survival of a biotech company depends greatly on the ability to stay solvable and get investors to pour money in the research. This point has already been developed in the revenue streams.

2.6.7. Key Activities

Key activities are the main actions carried by a company to make their business model work. (Osterwalder & Pigneur, 2013)[33] Without surprise, the key activity of biotech companies resides in research and development, it is what drives everything they do. R&D is vital not only for discovering biomaterials or their unique properties but also for transforming that discovery into a marketable product.

By definition, a drug is a substance intended for diagnosing, curing, mitigating, treating, or preventing diseases, or for altering the structure or function of the body (excluding food). (FDA, 2017)[15] Since drugs interact internally with the body, their development is subject to very high standards and global regulations. These regulations structure the drug development process into clear, sequential phases, where success in one phase is required for advancing to the next.

The drug development journey typically includes three main stages: discovery and development, preclinical research, and clinical research. Each stage presents unique challenges and requirements, making the process both demanding and critical for bringing new treatments to patients.

The discovery and development phase includes an identification of the target, the biological origin of a disease and potential targets for intervention using techniques like data mining, genetic association, and pathway analysis. When this target has been validated, a chemical lead that is synthetically stable, feasible, with acceptable characteristics will be identified and optimized. The drug will be then developed as a bioavailable, stable, and optimal dosage form, considering physicochemical properties and administration routes.

Preclinical testing evaluates the drug's safety and efficacy in animal models, including pharmacokinetic and toxicological studies, including an Investigational New Drug (IND) Process where application with regulatory authorities, including preclinical data, manufacturing information, and clinical research protocols needs to be filled. (Deore et al.,

2019)[13]

It is then time for the clinical trials, carried out in three phases:

- Phase 0: Conduct first-in-human trials with sub-therapeutic doses to gather pharmacokinetic data.
- Phase I: Test the drug's safety and dosage in a small group of healthy volunteers or patients.
- Phase II: Evaluate the drug's effectiveness and side effects in a larger group of patients.
- Phase III: Confirm the drug's ability, monitor side effects, and compare it to standard treatments in a large group of volunteers.

At last, a New Drug Application (NDA) is submitted to regulatory authorities (FDA,EMA, etc), including all preclinical and clinical trial data, proposed labeling, and safety updates. The authorities review the NDA and decide whether to approve the drug based on safety and efficacy data. If the drug is accepted, mass production starts and the drug becomes available to the public. There is also a post-marketing surveillance to monitor the drug's long-term safety and effectiveness in real-world settings. (Deore et al., 2019)[13]

Typically, biotech companies operate in the discovery and development, and preclinical research phases. They also can carry out clinical trials, but it depends on the exit strategy and the risk they are willing to take. If a pharmaceutical firm wants to buy a promising drug, they tend to do it during the early stages of clinical trials, as they are specialized in the final stages and commercialization. However, some biotech companies become big firms and market the product themselves. The only common characteristic is that biotech organizations are specialized in applied research, where they translate scientific insights into practical applications. According to Cole (2021)[9], the chances of a product failing through development stage is 36%, it is 68% at approval stage and 40% at the last launching stage.

In summary, key activities in R&D may include identifying biological targets (e.g., disease-associated proteins) and validating them for drug development. It also encompasses pre-clinical studies, where potential drug candidates are tested in laboratory models through cell-culture or animal studies to assess their efficacy and safety. Ultimately, their goal is to convert scientific knowledge into promising drug candidates or therapies with clear clinical or commercial potential.

Driving innovation is not sufficient, managing intellectual property allows firms to stay

resilient. At each step of the way, the company has to ensure that their competitive edge is protected by intellectual property laws. In the Pharma-Biotech sector, it is especially the case due to expensive research and high replicability of the results. It is crucial for an organization active in innovation to take control over those issues because the value of the end-market will directly depend on the active time of the patent before it falls within public domain.

2.6.8. Key Partners

The key partners are the stakeholders with which a company form an alliance to reinforce their business model. So, it is important to understand that biotech SMEs are part of a network, a link in the industry. Biotech companies play a role between academia, which discovers new fundamental technologies, and big pharma, which commercializes them. Due to the multidisciplinary nature of biotech, large corporations increasingly form alliances with SMEs to access specialized knowledge and intellectual property (Cavalla, 2003)[5]. This interdependence is growing, biotech needs funding and technical validation, while big pharma relies on external innovation to replenish its pipelines. It is a non-zero-sum game. Mergers and acquisitions (M&A) are frequently happening between a promising biotech company and a mature pharma company. It is a quick and profitable exit for early investors, better than an IPO in most cases; and the biotech benefits from the expertise of big pharma in Phase 3 FDA Approval. The pharma company can then add a new drug to their portfolio, reducing uncertainty. (Salle & Thomas, 2020)[44]

2.6.9. Cost Structure

“The cost structure describes all costs incurred to operate a business model.” (Osterwalder & Pigneur, 2013)[33] In the biotechnology sector, SMEs deal with a complex cost structure. This is mainly because of the need for constant innovation, following strict regulations, and worldwide commercialization. The biggest expense for these companies is R&D. Clinical trials are very expensive, costs increase exponentially as the company moves from early trials to later stages, where more patients and more complex studies are involved. To give an order of magnitude, if a company requires 60 patients for phase 2a, it is approximately a thousand for phase 2b; and entering phase 3 is just an enormous outflow of cash. To control these costs, biotech SMEs often choose to outsource tasks like clinical trials and research to other companies, which helps them keep their in-house teams small.

Another important cost is licensing, especially when the company gets technologies or compounds from universities or research centers. These agreements usually include up-

front payments, milestone payments, and royalties, which can be a big financial burden. Production costs are generally lower compared to R&D, but they are still important. For example, shipping biotech products globally can be expensive because they often need special conditions in logistics and insurance. As biotech companies grow and start selling their products globally, marketing and sales costs become more significant. This includes spending on travel and networking, as teams need to attend international conferences and customer meetings to stay updated on industry trends and connect with potential clients.

Overall, the cost structure of biotech SMEs is characterized by high upfront R&D and operating and marketing expenses in a mature stage of development. (Tölle & Herbst, 2016)[55]

2.6.10. Design

On the following page, there is a synthesized Business Model Canvas, under its graphic form.

2.6.11. Discussion

While the business model canvas framework is accepted by the scientific community, it has undergone numerous improvements and innovations from the industry that we could have explored. However, although these innovations are relevant, we chose clarity. That said, we acknowledge that improvements such as the "Sustainable business model" (Joyce & Paquin, 2016)[23] or the "Evolving business model" (Fritscher & Pigneur, 2014)[16] could have been interesting to integrate. Additionally, there are many other innovations in the field of business models, particularly those involving isolated blocks. (Pieroni et al., 2019)[37]

2.7. Open Business Model

In biotechnology, the concept of open business model corresponds to the idea that information, knowledge is supposed to be shared. Royalties, licensing, public domain, consulting, conferences, are many ways to foster an open culture in the biotech industry. It can serve multiple purposes: a source of revenue, the admission in a network of organizations, public interest, etc.

Segers (2017)[47] has developed a classification system for the different types of business models existing in the biotech industry. Biotech companies have essentially two different ways to develop innovation, by keeping their inside knowledge or sharing skills with

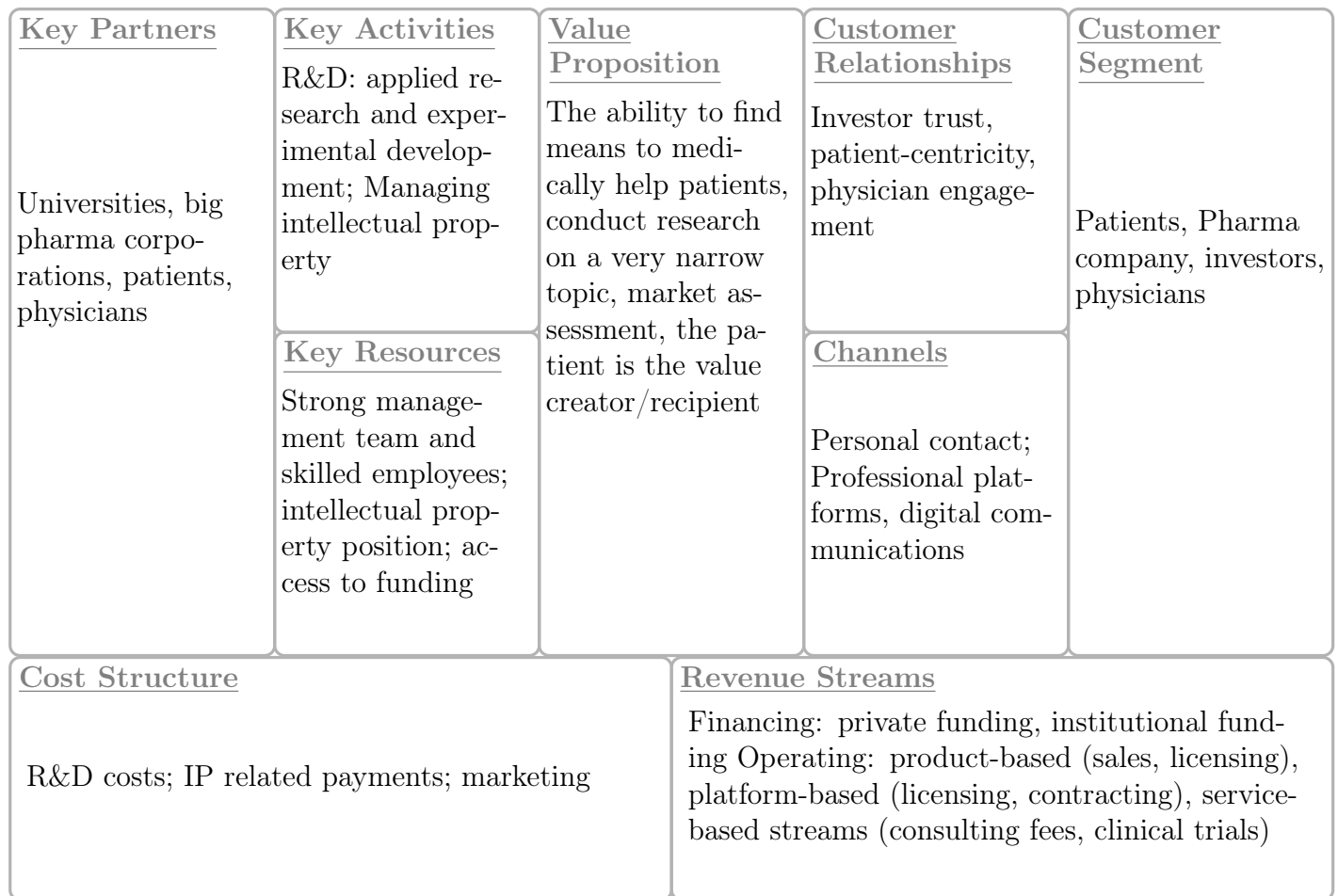


Figure 2.1: The Business Model Canvas of pharmaceutical biotechnology SMEs

other biotech firms. His idea is that characteristically, traditional “closed” business model rely solely on in-house R&D and know how where an open business model is a strategy that actively seek and integrate external ideas, technologies, and partnerships alongside their internal resources to drive innovation and growth. Open business models emphasize collaboration and shared value creation. Segers (2017)[47] developed 22 categories of business models that position a company on a specter of openness of innovation.

Open innovation is an idea that might seem controversial but is in fact misunderstood, it does not mean "free information available for others to copy". Patents for instance, are drivers of open innovation, through technology protection and bargaining motives, like enabling licensing, cross-licensing, and R&D collaborations. (Holgersson & Granstrand, 2017)[20]

Shin et al (2018)[48] analyzed U.S. pharmaceutical companies from 2001 to 2016 and found that large companies have become less efficient over time, despite heavy investments, while a restricted group of smaller, newer companies are performing well. They found out that the successful companies focus on cutting-edge technologies such as cell therapy or genetics and often sell their innovations to larger firms. They conclude that collaboration and open innovation help companies reduce risks and improve efficiency, but remain challenging as too much openness can also lead to fiercer competition or leaked secrets. The study advise pharmaceutical companies to embrace new technologies, partnerships, and flexible business models, as the industry is changing, and adaptable companies are more likely to succeed.

Another dimension is taking into account the sustainability relative to openness in the business model. As Horvath et al. (2019)[21] articulated, the characteristics of a business model vastly influence their capacity to be part of a circular economy. The depiction of biotech business models clearly shows a link between the ease of adopting a circular model and the openness of its innovation.

2.8. Financing Market Discussion

The process of developing a drug is lengthy and costly. Cost estimations vary from \$161 million to \$4.54 billion depending on the topic investigated and the size of the firm. (Schlander et al, 2021)[46] Furthermore, it roughly takes 15 years before the drug is available to the public. Pisano (2006)[38] argues that biotech’s traditional business models fails to be sufficiently profitable and despite their indispensable role in driving innovation, they suffer financial fragility. He then offers a more “rigid” role in the industry, with more vertical integration, fewer independent biotech companies, leaving the fundamental science

to universities and developing open licensing (licenses to multiple pharma companies). The question of why the financial world funded the biotech boom in the beginning of the century is legitimate if, like Pisano expressed, it was not profitable enough. Lazonick & Tulum (2011)[25] make the argument of boost by public funding, and the prospect of a ‘quick’ return by venture capitalist and pharma companies through speculative stock market exits, rather than as long-term, committed investment.

Yet, those were historical issues entangled in the biotech industry, but what is the financial situation, the big trends behind today’s market. Bruneo et al., (2024)[4] noticed that the beta coefficients of companies in the pharmaceutical sector tend to decrease when the market is under an overall crisis (subprime/covid-19), leading to a potential benefit in downside risk protection. They also notice that biotech with bigger market cap outperformed those with lower size mostly because small biotech are more sensitive to external changes, like regulations and the investing market, due to a bigger systematic risk. This is consistent with the insight Pisano (2006)[38] expressed. It also seems that small biotech companies are not great on average but sometimes, some can largely outperform big biotech.

In this sector, the role of research and development is crucial to ensure future revenues, when, for instance, latent patents expire. On average, big pharmaceutical companies allocate 20% of their sales revenue to R&D initiatives. But it is generally much higher for biotech companies, specializing in research and development. The metric is quite biased since the revenues of these companies are very low but for example, Allogene therapeutics spend more than 2500 times their revenue on research and development. (Mikulic, 2025)[28]

In this capital-intensive industry, many solutions exist to tackle these financing issues.

- Having a complete set of rich venture capitalists ready to invest in your very promising technology.
- Find innovative ways to finance your solution, by exporting some technologies, licensing your formulas for problems you did not expect to tackle (derived solutions), etc (Paun, 2019)[36]
- Being adaptable and efficient, to shorten the time between research and marketization. Sharing your knowledge with other biotech fasten also your development. (Segers, 2017)[47]
- Cut operating costs. Share your lab to reduce the rent, find workers willing to be paid less, ...

This is a non-exhaustive list with elements that can be combined. Our work will be to understand the competitive impact of having a higher purpose in the biotech industry, those solutions will be included in our research.

3 | Patient Centricity as Higher Purpose

This chapter aims to combine the past two chapters and apply a higher purpose in the case of a biotech company. Working with a higher purpose in this industry makes sense and we intend to explain why. In a second part, we will explain how the application of a higher purpose can be done in a biotech company through patient centricity.

3.1. Industry Motivation

The biotech/biopharma sector is inherently positively oriented, it aims to create treatments to improve patients health. It does not mean that all companies in the sector have a higher purpose. On the contrary. The implementation of pro-social behavior is embedded in the company's culture, on a daily basis, in the minds of employees, not only in the nature of the final goal. It is even more important to adopt a cause precisely because the purpose can be easy to define.

Obviously a higher purpose can be the final goal but the implementation must follow. For example, a company may choose to defeat a rare disease, it can be their chosen purpose, if the true goal is conveyed within the company's operations. There must be a clear position so that everything is in place to achieve this goal. But at the same time, some biotech companies might decide to make the sector more environmentally sustainable. In that case the higher purpose is experienced daily as a goal but also on the influence that this company will have on the sector. Managers need to assess the way operations are carried out in accordance with the purpose (how technology is sourced, how the manufacturing process will be developed, how tests are carried out, etc.), while keeping in mind that their activity remains R&D in biotechnology. Lastly, purpose can be incorporated with business objectives. Let's take patient centricity, the objective here is to obtain a treatment using the patients' point of view. The goal is intimately linked to the activities, it would be unthinkable to disengage patient centricity in a construction company. The objective therefore impacts the activities, the operations themselves. As

in other higher purposes, it impacts efficiency, the way operations are undertaken, but here, the purpose is inseparable from the activities involving patients.

Tollman et al (2016)[54] states that engagement in the workforce should not be difficult to achieve in biotech/biopharma industry due to the nature of the sector. The purpose may be easily found but we do not completely agree with them. The commitment, as shown by (Gartenberg et al, 2019)[17], needs authenticity, which is not necessarily the case in all biotech organizations. Then, the pro-social goal must be included in the company's culture. It should not just be a slide in the start of the year presentation. The commitment must be constant and understood by the employees. If employees are convinced, the competitive edge is certain.

In summary, if the search object in the biotechnological sector allows an easily findable goal, this does not mean that it should remain the higher purpose. The definition of a higher purpose is what is daily perceived as the company objective. What is interesting from a strategic point of view is that the biopharma/biotech industry easily structures a higher purpose. That is why, in this sector more than in any other, developing a cause-driven culture that will engage the workforce is essential.

3.2. Impacts on the Business Model

In this section, we will take the example of patient centricity as a higher purpose. We will develop how patient centricity integration can affect the business model of biotech companies. First, patient centricity can be defined as the emphasis of R&D companies on individuals receiving care rather than on the drug itself. The goal is to prioritize patient needs and improve their quality of life by involving them at every meaningful stage of the medical product journey. (Stergiopoulos et al., 2020)[49]

Initiatives and incentives may vary greatly between med-tech organizations. Some drug developers struggle to take into account patient perspective if the risk of death is sudden and diseases/conditions are hardly detectable beforehand. For example, it is complicated to assess the patient perspective in the case of intracerebral hemorrhage. In contrast, diseases such as HIV required patients feedback from their appearance; pharmaceutical companies needed to understand the symptoms and profile of patients to tailor a treatment that would be the most efficient taking into account the lifestyle and habits of sufferers (e.g. priority of effects to treat; at home or at the hospital; the number of pills; morning or afternoon) Interview:Dechamps, Marc.(2026, May)[12]

Concretely, to assess and understand the changes on every side of the organization, we

will use the business model canvas, as previously explained.

3.2.1. Value Proposition

Ultimately, the end-of-the-chain recipient, known as the patient, brings all direct value to the whole pharmaceutical sector. Adopting patient centricity can influence not only how the value proposition is perceived but also how it is delivered. For biotech companies, patient testimony can determine the type of research to conduct and for instance, a biotech can decide to direct the innovation towards patient-based conditions. Concretely, patient involvement allows finding unmet patient needs so that better choices can be undertaken about what to focus on and what to develop next. (Du Plessis et al, 2017)[14]

Moreover, patient feedback can alter the way of delivering the treatment in a more thoughtful way, and influence how the treatment can be more effective and positively perceived by the patients. Deciding for instance if the treatment is injected or ingested, how often the patient need to take it, the number of pills that must be taken, etc, has a direct impact on patients' will to strictly follow the process, the monitoring, and therefore the effectiveness of the treatment. Interview:Dechamps, Marc.(2026, May)[12]

The treatments can also be personalized and custom-made for different types of profiles. Tailoring the cure to the individual may be of a real added value in some circumstances, patient-centric initiatives allows to go in this direction. Eventually, helping patient is the ultimate purpose, as well as the value proposition. Interview:Panier, Valery.(2026, March)[35]

3.2.2. Customer Segment

Patient centricity can help identify which patients are the most important to target. let's take a fairly simple example. If we have a new technique that could be developed to treat a certain type of disease, taking into account feedbacks from patients is a good way to realize the type of people who suffer the most from the disease, but also what people suffer from and in what proportion. All this information can help us identify the segment on which the biotech company will position itself. Patient centricity may lead to focus on niche market, where patients are not taken care of enough. Applying patient centricity before the choice of the "target market" has the structural impact to focus on orphan drugs. This might be a strategic decision to avoid crowded research with fierce competition, but it is clear that searching for financing opportunities in a domain nobody ever succeeded can be difficult. Interview:Dechamps, Marc.(2026, May)[12]

3.2.3. Customer Relationship

Customer relationship represents the element of business model canvas where Patient centricity manifests itself the most. The whole idea is to strengthen the involvement of the end-customer.

Building trust is a key step in the process because you cannot involve patients without their trust. Make them part of the activities involving them for the sake of the research would not be possible without their good will. In order to reach an acceptable level of trust, being transparent is almost required. (Du Plessis et al, 2017)[14] The element of openness as a strategic edge could also be considered a relationship facilitator. What matters most for both the company and patients is ensuring that patients are actively involved in the analysis and decision-making process. One effective way to achieve this is by educating them about the treatment or engaging *expert patients*. Expert patients are individuals who are deeply knowledgeable about the challenges involved in developing effective drugs or treatments. (Du Plessis et al, 2017)[14]

Finally, to take up the argument advanced by Polman and Winston (2021)[39], make stakeholders involved in the decision process is the best way to have ambassador of your brand. In our case, patients feel involved when they are required to explain what they are feeling, what they had to endure, etc ; they become part of the enterprise in many more ways than previously. The way they feel perceived shifts from experimental subjects to active parts of the decision process.

3.2.4. Channels

Discussing about channels means determining what and how communication streams are used with patients, but not exclusively. Patient centricity can drive the adoption of direct-to-patient channels, such as telemedicine, home-based clinical trials, or direct shipping of treatments. This reduces barriers to access and improves patient convenience. Moreover, it is important to include transparency, clear communication about trial results, side effects, and pricing, to build trust. The more stakeholders of any kind are informed and educated, the more authentically it can impact the firm's reputation.

From another perspective, marketing channels might be reinforcing the idea of patient involvement and the role they have had, rightfully. Marketing strategies might take into account the customization for patient and be able to target different types of patients/customers segments. (Du Plessis et al, 2017)[14] An overlooked side of patient centricity in this work that is widely used in practice is the application of concept to

marketing. Some firms conventionally develop a drug and decide at a later stage to tailor the marketing to the different profiles of patients, in order to reach a bigger market. It is a marketing strategy used by many industries but can be considered "patient centric" in the case of drug developers. Interview: Panier, Valery. (2026, March) [35] By all accounts, the application of this sole method does not correspond to the adoption of a higher purpose.

3.2.5. Revenues Streams

Patient centricity does not directly influence the revenues streams, however it can impact the profitability. As discussed in the customer segment section, the choice of market influences the size of the revenues. New solutions could arise to monetize the amount of data collected directly from the patient, as it is a valuable source of information. This dataset is a rightful source of revenues because it allows firms to adapt and tailor treatments in accordance with the patient's perspective. Revenues may be focused on what *matters*, and patients/drug buyers may be willing to pay more for a well-suited treatment. It is also a great tool to optimize and target resource allocation. Adopting patient centric initiatives can also impact the financing opportunities and the research for capital; this interpretation will be developed in the last chapter.

3.2.6. Key Resources

Traditional business model put the emphasis on the drug/the treatment, consequently, the key resources not only are skilled workers, but also intellectual property, digital infrastructure, etc. The added value brought by a patient-centric purpose rests in considering those patients as a source of information on how treatment is perceived from their point of view. Patients feel involved when they are required to explain what they are feeling, what they endured, etc ; it can be a source of very prolific suggestions. The real-world data provided by close contact with patients is a critical resource to understand treatment effectiveness and how to improve it. If we add cross-functional teams that include patient advocates, clinicians, and data scientists, R&D can be better aligned with patient needs.

3.2.7. Key Activities

When the choice to adopt a patient-centric model comes, it is reasonable to assume that many activities previously performed will have to change, new actions will be undertaken. The industry has embraced this approach through numerous initiatives (Stergiopoulos, 2020) [49], such as:

- Establishing patient advisory boards and focus groups
- Collaborating with patient advocacy groups
- Implementing adaptive trial designs and licensing
- Leveraging open design and crowdsourcing
- Offering patient counseling and education
- Pioneering direct-to-patient clinical trials and telemedicine
- Developing patient apps for clinical data collection
- Engaging patients through social media and online platforms
- Among other context-specific initiatives.

This list is subjective, one may come up with new ideas and implement other activities that could be considered patient-centric. All these activities are now embedded in the classic operations operated by biotech companies. Their objective is obviously to meaningfully involve patients to increase their knowledge, their dataset but also to involve them in a decision-making manner. The objective of those combined initiatives is not to listen to patients but rather to understand what bother them, what would make the solution more efficient, and how to design the treatment to fit the patients' behaviors.

3.2.8. Key Partners

Patient were always considered partners of the industry, but considering them as active agents of change highlights a new dimension. Patient advisory groups and direct patient involvement in research and development contribute valuable insights. They help to identify unmet needs and shape study protocols to guide trial execution, data analysis, and sharing of results. They also play a key role in risk-benefit assessments and development of risk management strategies. (Du Plessis et al, 2017)[14]

Employees and doctors are vector of improvement and patient participation. They relay information and it is important to consider them as partners for change and that they themselves adopt a patient-centric perspective. Applebaum et al (2010)[1] even advise to strengthen employee empowerment, as they suggest that truly customer-centric organizations shift decision-making power as close to the patient as possible.

3.2.9. Cost Structure

The cost structure is affected by the adoption of the patient-centric model, as certain practices such as the participation of patients in test studies as editors allows the company to have another perspective. Listening to the patient may result in a different level of involvement and determining the right engagement willingness by each patient can lead to resource allocation optimization. Some other practices such as the implementation of adaptive trial designs, have the same purpose. In the following section, we will detail the application of our model and how it can impact the cost structure, specifically how some workers might find the same utility by being paid less.

3.2.10. Design

Here is the synthesized Business Model Canvas, under its graphic form. It represents the different elements of the variation between a traditional biotech business model and a patient-centric business model.

<u>Key Partners</u> Patients as active agents, employees and doctors are vectors between the biotech companies and the patients	<u>Key Activities</u> Focus group, adaptive trials, patient education, telemedicine, etc	<u>Value Proposition</u> Influence how the research is conducted, find unmet needs; new treatment delivery method, new custom-made treatments	<u>Customer Relationships</u> Building trust, education on the treatment, verbalization of the lived experience	<u>Customer Segment</u> Better patient targeting; niche market
<u>Key Resources</u> Patients as source of information and suggestions			<u>Channels</u> Direct-to-patients channels, transparency with patients, tailor-made marketing	
<u>Cost Structure</u> New practices; resource allocation optimization; adaptive trial design			<u>Revenue Streams</u> Different profitability; choice of market; targeting on what matters for patients	

Figure 3.1: The variation in Business Model Canvas in the case of patient centricity

4 | Theoretical Model of Employee Effort and Organizational Purpose

4.1. Introduction

Treating, healing, and curing are beneficial for our society and for individuals. That is the ultimate purpose of a biotech company in the pharmaceutical industry. Contrasting helping human condition with the pursuit of value is not the right solution, we should be able to combine those goals. The objective of this section is to look at higher purpose in biotech business model through the unusual perspective of mathematical demonstration.

This chapter aims at following a logical storyline. First, a base model is built introducing the variables, utility functions and first order condition. After, the assumption is made that all employees are identical and a specific function is introduced. Then, the concept of higher purpose is included to explain the differences between the different categories of company. The logical conclusions of adopting a higher purpose are shown in this section. Afterwards, a generalization of the social utility is added and openness/transparency is introduced in the analysis of their business model. This chapters ends with the application of the theoretical model to the example of patient centricity with the different components interacting.

Our take is that biotech companies have interests engaging in a higher purpose, through the substitution of financial incentive (wages, bonus) by pro-social incentive and the strengthening of employees' effort. This model applies to biotech SMEs in the R&D phase, as defined in chapter 3.

4.2. Base Model

Let us assume a biotechnology company conducting research on a selected technology. The company chooses a research topic that has a probability p of being successful. This probability p expresses the intrinsic risk of a technology becoming an accepted therapy or drug, independent from the effort put into it. The process through which biotech firms attempt to maximize this probability (e.g. pre-research or benchmarking against other technologies) is not relevant here.

This decision leads to the following hypotheses:

1. Biotech companies have already chosen their topic when founded.
2. Companies conduct research according to available resources, and if utility is maximized, additional research can be conducted in parallel, i.e. output increase as the capacity grows.
3. Unlike other industries, biotechnology depends on external feasibility: even maximal effort cannot fully control outcomes due to biological uncertainty. This is captured by p (Pisano, 2006)[38].
4. Workers are monetarily risk-neutral

4.2.1. Variables and Parameters

- N : Number of employees
- $e_i \in [0, 1]$: Effort level of employee i
- w_i : Fixed wage
- $k_i > 0$: Marginal disutility of effort (effort cost parameter / ability parameter).
- $R \in \{0, 1\}$: Project outcome ($1 = \text{success}$)
- $p \in [0, 1]$: Exogenous probability that the research topic is promising

Let individual cost of effort (Thakor, 2022)[52] be:

$$\frac{1}{2}k_i e_i^2$$

Let average effort be:

$$\bar{e} = \frac{1}{N} \sum_{i=1}^N e_i$$

The probability of success is:

$$\mathbb{P}(R = 1) = p \cdot f(N, \bar{e})$$

where $f(N, \bar{e})$ is function depending on N and $\bar{e}$, directly varying $\mathbb{P}(R = 1)$; with

$$\frac{\partial f}{\partial \bar{e}} > 0, \frac{\partial f}{\partial N} > 0,$$

otherwise, incentives may not exist.

And with

$$f(0, \cdot) = 0,$$

otherwise, no work can be done without employees.

And with decreasing marginal effort:

$$\frac{\partial^2 f}{\partial \bar{e}^2} < 0$$

This concavity reflects the diminishing impact of the effort on the probability of success. The effort here does not correspond to the number of hours worked, but rather to the combination of this work with the intellectual effort and creativity that this type of research and development requires.

4.2.2. Utility Function

We introduce the utility function to represent the employees' motivation to work.

The utility function is:

$$U_i = w_i - \frac{1}{2}k_i e_i^2$$

The derivative of the utility function is:

$$U'_i = \frac{dU_i}{de_i} = 0 - k_i e_i$$

This function is decreasing, and the optimum $U' = 0$ is at $e_i^* = 0$. Each employee chooses e_i to maximize U_i , taking the effort of others as given. This creates a strategic game that may admit Nash equilibrium with low or zero effort.

4.2.3. Introduction of a Success Bonus

To tackle this issue, each employee i receives a bonus b_i if the project succeeds.

The expected utility of employee i is:

$$U_i = w_i + b_i \cdot \mathbb{P}(R = 1) - \frac{1}{2}k_i e_i^2$$

Substituting the probability of success:

$$U_i = w_i + b_i \cdot pf(N, \bar{e}) - \frac{1}{2}k_i e_i^2$$

In this case the derivative is:

$$U'_i = \frac{dU_i}{de_i} = 0 + b_i p \frac{\partial f(N, \bar{e})}{\partial \bar{e}} \cdot \frac{\partial \bar{e}}{\partial e_i} - k_i e_i$$

Since

$$\frac{\partial \bar{e}}{\partial e_i} = \frac{1}{N}$$

Therefore

$$\frac{dU_i}{de_i} = \frac{b_i p}{N} f_{\bar{e}}(N, \bar{e}) - k_i e_i$$

Solving for optimal effort:

$$e_i^* = \frac{b_i p}{k_i N} f_{\bar{e}}(N, \bar{e})$$

Consequently to our definition of e_i

$$e_i^* = \min \left\{ 1, \frac{b_i p}{k_i N} f_{\bar{e}}(N, \bar{e}) \right\}$$

Effort incentive scales with $\frac{1}{N}$, formalizing the intuition that larger teams weaken personal incentives, which results in classic moral hazard.

4.3. Simplified Case: Identical Employees

4.3.1. Simplified Case

In order to make the model more standard, the agents will be considered identical. We are therefore developing a general model with a more intuitive understanding.

Assume:

- $k_i = k$
- $b_i = b$
- $e_i = e$

Then $\bar{e} = e$ and the Cobb-Douglas function result:

$$f(N, e) = (Ne)^\gamma$$

with

$$0 < \gamma \leq 1$$

The Cobb Douglas serves here as an explanatory function for the elements of productivity. It gives a good mathematical insight on how the different elements of productivity (e , N) react together.

The employee utility becomes

$$U = w + bp(Ne)^\gamma - \frac{1}{2}ke^2$$

From the utility function, we obtain:

$$\frac{dU}{de} = bp\gamma N^\gamma e^{\gamma-1} - ke$$

The first-order condition is:

$$bp\gamma N^\gamma e^{\gamma-1} = ke$$

which implies:

$$e^{2-\gamma} = \frac{bp\gamma N^\gamma}{k}$$

As $2 - \gamma > 0$ for every $\gamma \in (0, 1]$, we can write:

$$e^* = \left(\frac{bp\gamma N^\gamma}{k} \right)^{\frac{1}{2-\gamma}}$$

e^* is a global maximum as the objective function is concave in e :

$$\frac{d^2U}{de^2} = bp\gamma(\gamma - 1)N^\gamma e^{\gamma-2} - k < 0$$

The strict concavity requires $\gamma < 1$, the case $\gamma = 1$ corresponds to constant yields and is treated as a limit case.

The inner solution is valid when

$$bp\gamma N^\gamma \leq k$$

beyond that, the constraint $e \leq 1$ is saturated.

The individual optimal effort e^* increases with N

$$\frac{\partial e^*}{\partial N} > 0$$

but each employee's marginal contribution to the probability of success decreases with N ,

$$\frac{\partial \mathbb{P}(R = 1)}{\partial e_i} = \frac{p \cdot \gamma \cdot N^{(\gamma-1)}}{N}$$

due to diminishing returns at the team scale. The bigger the team is, the harder it gets to create, innovate and consolidate individual result.

4.3.2. Interpretation

In practice, what we want to explain with this function is that innovation in biotechnology depends on work well done, on creativity in developing solutions and on collaborations between workers. We used a Cobb-Douglas in this instance because it expresses the fact that a company's success is proportional to the number of employees and their effort, while having a negative curvature, meaning the diminishing impact of an additional employee in the team. In this case γ reflects the elasticity of the ease of a particular research. The partial derivative

$$\frac{\partial e^*}{\partial b} > 0$$

shows that a higher bonus increase effort and

$$\frac{\partial e^*}{\partial k} < 0$$

shows that a higher effort cost decrease e^* .

The Cobb-Douglas might not be the optimal function but it gives us a good glance at how the different inputs interact. Our qualitative results do not rely on this specific choice and could extend to any increasing, concave success function in average effort.

4.3.3. Visual Representation

With the help of Claude AI, a visual representation of the simplified case of the model using a Cobb-Douglas function is available at www.masterthesiseliotburnick.com (Claude, 2026)[8] The reader can navigate through the tabs: "Parameters", "Curves" and "Comparative statics" and can change the values of the utility curve. The objective is to allow the reader to have a graphical approach of the model. The demand was "For the following section[4.3], can you come up with a visual representation that will ease the reading ?"

4.4. Extended Model: Firm Types and Employee Preferences

In this next section, we will introduce in our model the elements of a higher purpose. The decision was made to formalize both the companies and the employees on a discrete basis.

4.4.1. Firm Types

Firms are characterized by the following.

- Stated goal $T \in \{S, A\}$ (Social, Asocial)
- Founder motivation $\theta \in \{C, M\}$ (Cause-driven, Money-driven)

Stated Goal T	Motivation θ	Type	Meaning
S	C	SC (Social, Authentic)	Higher Purpose
S	M	SM (Social, Opportunistic)	Pro-social Marketing
A	M	AM (Asocial)	Traditional Shareholder Value

Type AC is excluded as AC is dominated by SC in terms of recruitment and marketing.

T is public and chosen by the firm; θ is private information of the founder.

SC corresponds to a biotech with higher purpose (e.g. patient centricity); SM corresponds to organizations with pro-social marketing, which can be considered as dishonest social companies (e.g. green washing); and AM are firms with traditional business model.

4.4.2. Employee Types

Employees are either

- Idealists (I): gain utility $\mu > 0$ if the firm is SC
- Neutral (N): indifferent to mission, they never receive μ

μ is the utility that idealists feel when they work for a biotech that engages in pro-social activities, such as workers feeling helpful when working for a patient-centric drug developer.

Let $\rho \in [0, 1]$ be the probability that an S firm is authentically motivated, known by employees.

$$\rho = \mathbb{P}(\theta = C \mid T = S)$$

4.4.3. Expected Utility Before Revelation

Before entering an organization, employees form a belief on the type of organization and build an expectation based on ρ .

Expected non-monetary utility for an idealist in a social firm:

$$\mathbb{E}[\mu] = \rho\mu$$

Total expected utility before revelation:

$$U_i = w + b\mathbb{P}(R = 1) - \frac{1}{2}ke^2 + \mathbf{1}_{\{\tau=I, T=S\}}\rho\mu$$

4.4.4. Utility and Effort Choice After Revelation

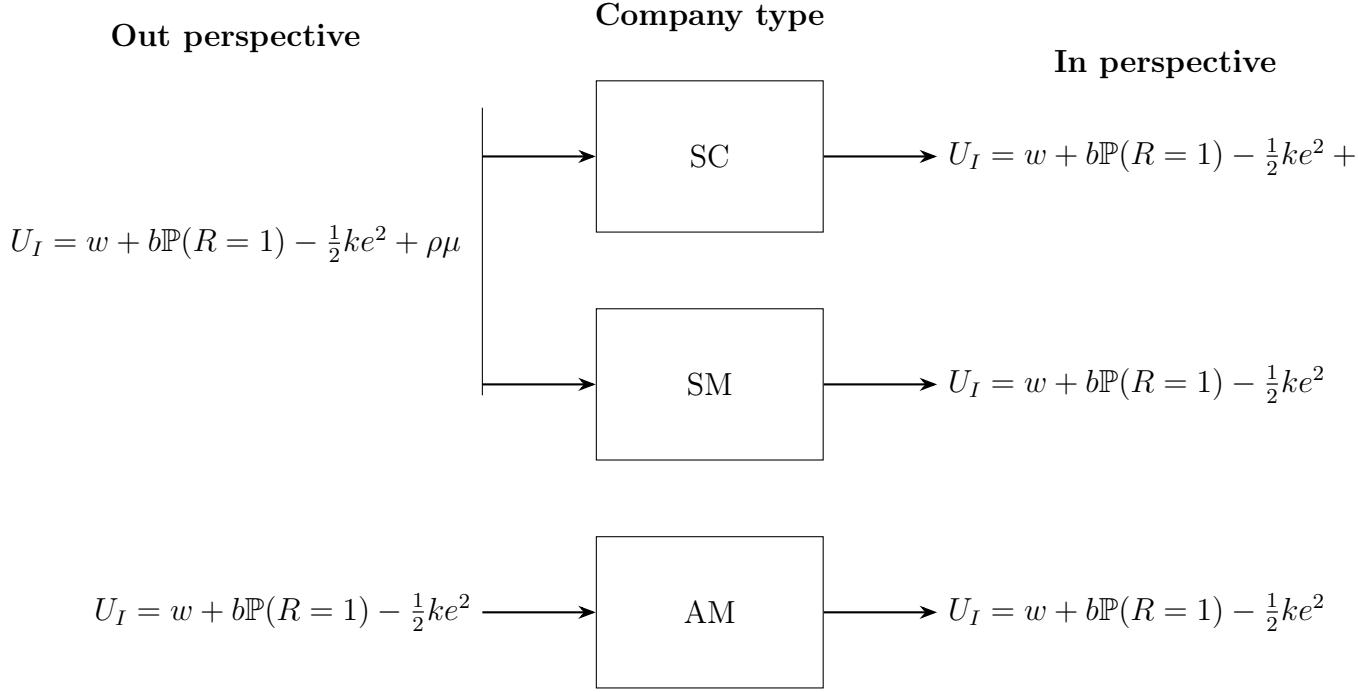
After a few weeks, when employees understand the company culture, which decisions are made and how resources are allocated, they realize if the founder motivation θ is C or M

Total utility after revelation

$$U_i = w + b\mathbb{P}(R = 1) - \frac{1}{2}ke^2 + \mathbf{1}_{\{\tau=I, T=S, \theta=C\}}\mu$$

The effort is chosen after learning θ , leading opportunistic firms to face lower effort from idealists which creates a disciplining effect on fake social firms

4.4.5. Visual Representation



4.4.6. Dissonance

For a Authentic Social company SC , the difference of utility between *Out* and *In* perspective for an Idealist is :

$$\Delta U_{I-SC} = \mu - \rho\mu = \mu.(1 - \rho)$$

Which is strictly positive.

For a Unauthentic Social company SM , the difference of utility between *Out* and *In* perspective for an Idealist is :

$$\Delta U_{I-SM} = 0 - \rho\mu = -\rho\mu$$

Which is strictly negative.

For a company without a higher purpose, AM , the difference of utility between *Out* and *In* perspective for an Idealist is null

The only negative realization, source of dissonance, is caused by the unauthentic social firm, SM .

However, a company without a higher purpose, AM , need to increase $w + b\mathbb{P}(R = 1) - \frac{1}{2}ke^2$

relatively to Social firms.

$$[w + b\mathbb{P}(R = 1) - \frac{1}{2}ke^2]_{AM} > [w + b\mathbb{P}(R = 1) - \frac{1}{2}ke^2]_S$$

Where AM firms must mitigate the utility μ of S companies by increasing financial incentives (w, b) and/or accepting a lower expected effort e from employees.

4.5. Social Utility Function

In order to push the idea further, we will develop another way of formalizing the utility of employees. To unify different approaches, μ can be replaced by the concept of *Social Utility*, which can be dissected into different elements. It may therefore have other interpretational implications.

Based on Henderson and Van den Steen (2015)[19], we define:

- u : intrinsic satisfaction from helping a cause
- v : reputational utility (social recognition)
- $\lambda \in [0, 1]$ weigh how intrinsic and reputational motives are additive rather than complementary.

Neutral employees derives no intrinsic or reputational social utility. The discrete gain μ in the previous section corresponds to the special case $u = \mu, v = 0, \lambda = 1$, giving $U_S = \mu$. This section generalizes this framework.

The social utility is

$$U_S = \lambda(u + v) + (1 - \lambda)uv$$

Expected social utility when authenticity is uncertain:

$$\mathbb{E}[U_S] = \rho U_S^{SC} + (1 - \rho)U_S^{SM}$$

In opportunistic social firms, employees receive no intrinsic satisfaction from helping a cause, u is null. This effect is due to the fact that fake missions destroy meaning and that real implication in a higher purpose requires authenticity. (Quinn & Thakor, 2018)[41] However, employees may still obtain reputational benefits v from association with a socially branded organization. The definition of λ has also a major impact on SM firms. For $\lambda = 0$, full complementarity, $\mathbb{E}[U_S]$ become null, because reputational utility only comes from an association with the intrinsic satisfaction. For $\lambda = 1$, the "utilities" are

purely additive.

The expected social utility becomes:

$$\mathbb{E}[U_S] = \rho [\lambda(u + v) + (1 - \lambda)uv] + (1 - \rho) \lambda v$$

The total utility for an employee becomes:

$$U_i = w + b \cdot \mathbb{P}(R = 1) - \frac{1}{2}ke^2 + \mathbb{E}[U_S]$$

4.6. Business Models Openness

In standard classifications of biotechnology business models, Segers (2017)[47] distinguishes between closed and open business models. We build on this distinction by emphasizing the informational implications of openness. In both cases, firms are observably either asocial (A) or social (S), these attributes are communicated through marketing and public positioning. However, under an open business model, aspiring employees may observe whether pro-social behavior is authentic. Open business models increase transparency, raising $\rho \rightarrow 1$. This setting has the structure of a signaling game¹: firms differ in an unobservable type (authentic $\theta = C$ or opportunistic $\theta = M$), and openness serves as a publicly observable action that may reveal this type. Open firms share information that may reveal both positive and negative organizational features, thereby exposing previously unobservable authenticity of purpose. Openness exposes true motivations and benefits firms with authentic higher purpose. (Polman & Winston, 2021)[39] Because this transparency is potentially risky, openness is assumed to be costly for some firm types. This cost asymmetry generates distinct incentives across types and allows openness to act as a credible signal.

4.6.1. Firm Types

Let's assume firms choose an openness level

$$o \in \{0, 1\},$$

where $o = 1$ represent an open business model and $o = 0$ a closed one. This choice is publicly observed by all stakeholders.

¹A signaling game is a situation in which a sender gives a signal to a receiver that suggests an underlying state: e.g. a shop offers warranty to customers if a product is reliable

Adopting an open business model cause a related cost:

$$c_\theta(o).$$

We assume:

$$c_C(1) = 0, \quad c_M(1) = c > 0.$$

and $c_\theta(0) = 0$ for both types

Authentic firms are naturally aligned with openness, whereas opportunistic firms face risks of exposure, higher employee turnover, internal conflicts or reputational cost, captured by the cost c .

4.6.2. Stakeholders Perspective

Employees form beliefs about firm type conditional on the observed openness choice:

$$\rho(o) = \mathbb{P}(\theta = C \mid o).$$

In equilibrium:

- If $o = 1$ is chosen only by authentic social firms, then

$$\rho(1) = 1.$$

- If $o = 0$ is chosen by both types, then

$$\rho(0) = \rho,$$

where ρ corresponds to the prior belief that a social firm is authentic.

4.6.3. Impacts of the Firm's Decision

Under this interpretation, for sufficiently large c only authentically social firms (SC) have an incentive to adopt an open business model in order to attract employees. Greater openness among biotechnology firms reduces the risk that employees join inauthentic social firms. If openness is sufficiently widespread, this mechanism may generate a virtuous cycle in which social firms tend toward authentic pro-social behavior. In a sense, openness acts as a catalyst in the labor market, and allows the proportion of companies with higher

purpose to grow alongside the number of idealists.

For authentic social firms, SC ,

$$U_{SC}^{\text{open}} = V(1), U_{SC}^{\text{closed}} = V(\rho)$$

For inauthentic social firms, SM ,

$$U_{SM}^{\text{open}} = V(1) - c, U_{SM}^{\text{closed}} = V(\rho)$$

Where $V(x)$ can be interpreted as the profit of the company. $V(\rho)$ is increasing in ρ because a higher belief of authenticity induces a stronger effort from idealists, thus increasing $\mathbb{P}(R = 1)$ and the expected benefit of the firm. So we have

$$V(1) \geq V(\rho)$$

for all $\rho < 1$.

Opportunistic social firms (SM) prefer remaining closed if:

$$V(1) - c < V(\rho)$$

Where the threshold is

$$c^* = V(1) - V(\rho)$$

SM stay closed if $c > c^*$ because the gain that it would get by imitating SC is not cost-effective.

Table 4.1: Equilibrium and deviation

Type	Equilibrium	Utility	Deviation	Utility after deviation
SC	$o = 1$	$V(1)$	/	/
SM	$o = 0$	$V(\rho)$	go to $o = 1$ if $c < c^*$	$V(1) - c$

SC never has an incentive to choose $o = 0$, considering the equilibrium, any firm choosing a closed model is interpreted as opportunistic, which imposes $\rho(0) = 0$. For $c \leq c^*$, there may be a mixing equilibrium in which SM adopts $o=1$; the formal analysis of this equilibrium is beyond the scope of this work. Given the utility structure of the model, openness allows SC firms to capture the full intrinsic benefit u and to induce higher

effort from idealist employees. In contrast, SM firms lose access to intrinsic utility u , face reduced employee effort, and bear the cost c when adopting openness.

4.7. Application of the Theoretical Model in the Case of Patient Centricity

Our model pretends that developing a higher purpose and, in this case, a patient-centric culture, helps to develop a competitive advantage, reduce the alleged salary and increase the level of effort of the type of employees that this organization will attract. The mathematical model argues that companies that adopt a pro-social behavior will attract employees of idealistic types, that is to say, who value a social utility in working for an honorable goal. This social utility will then appear as the substitution of a part of the monetary salary; it will also maintain a high level of effort as workers stay involved in the company purpose. Here is the reasoning that leads to this type of situation in the patient-centricity case.

When applying the model, patient centric company can be considered as a social authentic firm ($T = S; \theta = C$). We can assume that for employees working in biotech/biopharma industry, the nature of social utility U_S comes from the healing of the patient, so one could extend the notion to the *well-being* of the patient. They thus obtain an utility to involve them if it results in patient empowerment, tailored treatments and the consideration of patient conditions. For example, employees who feel personally affected by a disease (via their family, friends, etc.) will be more inclined to involve the fate of patients in their analysis and research as it will bring them back to their emotions. For idealists, it would not make sense to ignore the patients' situation. In this sense, the social utility of idealists is strictly positive, $U_S > 0$ which will substitute a part of the monetary utility $w + b\mathbb{P}(R = 1)$.

Similarly, the effort level e^* will be sustained. Idealists working for a patient-centric organization have their values synchronized with the values of the firms, the level of work delivered by the employees will therefore stay high on the long term, as long as no "moral dissonance" arises. That is why dishonest patient-centric biotech company, SM , such as those utilizing only patient-centric marketing (customization), will not retain idealists in its workforce. The dissonance $\Delta U_{I-SM} = -\rho\mu$, will drive them away. The authentic patient-centric firms SC continues then to optimize efforts and work done; they induce $\rho \rightarrow 1$, which maintains an increased effort e^* of the idealists.

Furthermore, the competitive edge relative to the market, not only internal operations

also has its impacts. An authentic patient-centric company knows its patients, understand what is needed to be done to improve the patients life. They also have quantitative information and raw data that might put them with a head start. This discussion leads to a managerial objective that must be pro-social. To illustrate the three points we discussed, here is the testimony of the president of Baylis Medical, Frank Baylis, cited in Applebaum et al (2010)[1]:

" Without this [patient-centric] focus, we would probably end up as a company without a soul or direction, focused solely on profits. What would stem from that is that the type of people we would recruit, the type of people who would want to work for us, would all change. We would lose good people. We would lose an essence of our being and in that vacuum would appear the standard profit focus. Not a company that I would be interested in working for. Interestingly, with this change, customers would sense it as well. And the reason they buy products from us would also change. I believe there would be less loyalty to the company and consequently less willingness to forgive our errors or to buy from us if we were not more price competitive. Essentially this would have a negative impact on our profits."

All the reasoning about the employees, how the "good ones" would go, but also on the said competition is clearly explained in his testimony. In their case, having a patient-centric focus is clearly a source of competitive advantage.

On top of that, if a patient centric business model tends to be open $\rho = 1$, another dimension appears. As our model showed that an open business model helps with the fluidity of idealists available, there would be fewer errors of dissonance (non-idealists with patient-centric firm and idealists in non-patient-centric firm). The signaling game establishes that a patient-centric firm has a utility $V(1)$ for being open, and an inauthentic firm needs to incur the cost $c_M > 0$ to become open, or else has the utility $V(\rho)$ where $\rho(0) = 0$ in equilibrium for a perfect market. The signal sent to the labor market allows authenticity and attracts idealists.

5 | Empirical Results and Organizational Incentives

5.1. Introduction

After a detailed analysis on how patient centricity impacts biotech companies, the next logical step is to ensure that our assumptions are empirically correct. Theoretically proving our point did not seem enough to back our thesis and decision has been made to summon industry professionals and stakeholders. Different approaches have been taken to assess the current biotech market. Our purpose here is to assert that our model assumptions were based on concrete evidence.

Afterwards, to resume our framework, the decision has been made to generalize the learnings from the application of a patient centric drug developer to the general framework of higher purpose in biotech companies. What has been defined in early chapters, demonstrated in the theoretical model and applied in the case of patient centricity, requires formalization for the general application of higher purposes. It seemed relevant to address the primary objectives of companies, make connection with free market theory, and take the point of view of both funders and founders of biotech. This chapter aims at reassuring readers not convinced by the model by providing real-world insights. It also aims at comforting the idea that choices are not purely philosophical but also rationally interesting while reviewing most of the concepts, ideas and takes that have been mentioned in this work.

5.2. Real-life Anchor from Industry Experts

In order to back up our model, we decided to meet and discuss with industry experts. To better understand the sector, we interviewed Valery Panier, a senior consultant in the healthcare industry. After his Phd, he decided to join BCG and stayed there to this day. He climbed all the rungs of the hierarchical ladder and was North America Leader of BCG's health care business from 2018 to 2023. He is currently a senior consultant in

technologies specialized for pharmaceutical companies. He provided great guidance on the strategic aspects of our research, and his holistic perspective offered deep insights into the characteristics of the industry. Interview:Panier, Valery.(2026, March,February)[34][35]

Then, we met with Christophe Coppens, an advisor of lifetech.brussels (part of hub.brussels) which is a meeting point for health professionals in Brussels. His role is to connect researchers, businesses and institutions (hospitals, universities, etc) and to help entrepreneurs through the legal maze of Belgian law. Mister Coppens has a deep understanding of the industry in Belgium and is familiar with a considerable number of professionals. He guided us through the issues entrepreneurs and institutions face and what their priorities were. Interview:Coppens, Christophe.(2026, March)[10]

Lastly, we interviewed Marc Dechamps. He is a trained biologist that worked his whole career in the pharmaceutical sector. GSK was his employer for 30 years, and he filled company management jobs. He was part of the original team of ViiV Healthcare, a firm specialized in HIV treatment. He shifted toward biotech/med-tech ten years ago and managed multiple entities. He is now CEO of Bioxodes, a biotech developing a new solution for IntraCerebral Hemorrhage (ICH). He also co-founded the Advanced Master in Biotech and Medtech Ventures at Solvay Business School of Economics and Management. Our discussion was very prolific and he highlighted the practical aspects of patient centrality. His experience helped to demonstrate the varying ability to adopt patient-centric approaches depending on the drug: while incorporating the patient perspective is impossible with ICH, it is necessary for HIV treatments.

The outcome of the interviews results in a deep understanding of the sector globally and locally. Through the perspective of professionals, we apprehended the different players and their role in the industry. We cite them each time their approach was helpful. The transcripts of the interviews are available upon request.

5.3. Labor Market Assessment

5.3.1. Data Collection

To assess idealists, we decided to gauge the labor market in the biotech/biopharma industry. In order to achieve this, we contacted, through professor Vergauwen, Mrs Flammang, coordinator of the Advanced Master in Biotech and Medtech Ventures at Solvay Business School of Economics and Management. We were able to ask multiple questions about the purpose and profile of future biotech employees, through an extensive online questionnaire.

5.3.2. Results

Three students completely responded to the survey, here is the complete trail of questioning.

Questions	Student N°1	Student N°2	Student N°3
Why are you/were you attending this advanced master?	Aim to work for a pharmaceutical company	Aim to work in a biotech company	To launch your own biotech/medtech company and Aim to work in biotech company
How did you end up in this field/industry?	Family background	Family background, Interest in medical research, Personal affinity	Interest in medical research
What is your primary motivation regarding your professional activity?	A moral goal greater than oneself	Do what you love	Continuous learning, making a meaningful impact, and delivering high-quality work while growing professionally.
What is your secondary motivation regarding your professional activity?	Professional success relative to peers	Salary/money	Financial stability and recognition of my contributions, alongside continued professional growth.
For which one of these employers would you prefer working?	A pharmaceutical company	A biotech SME	A pharmaceutical company

Continued on next page

Table 5.1 – Continued from previous page

Questions	Student N°1	Student N°2	Student N°3
On a scale of 1 to 5, how much does working for a company with a social/environmental purpose motivate you?	5	4	4
Would you be willing to accept a lower salary to work for a company with a purpose in line with your convictions?	Yes	Yes	Yes, to some extent, if the role offers meaningful impact and fair overall conditions.
Why?	Because I said my first goal is to help families like mine few years ago. And I want to achieve that	Purpose in life	I value working for a company aligned with my convictions, but I also believe compensation should fairly reflect my skills and responsibilities. I would consider some flexibility if the overall opportunity including impact, growth, and work environment is compelling
Are you familiar with the concept of patient centricity?	No, not really	yes	yes

Continued on next page

Table 5.1 – Continued from previous page

Questions	Student N°1	Student N°2	Student N°3
What is your opinion on this concept? Are you well informed on the matter?		Good evolution, sometimes easier said than done	I believe patient centricity is fundamental, as it ensures that decisions and innovations are driven by patients' needs and experiences. I'm well informed on the topic and understand its impact on improving outcomes and quality of care.
Do you believe more medtech/biotech organizations should adopt patient-centric initiatives?		yes	yes
Should patient-centric companies become the norm for all new ventures in Medtech?		yes	Yes, as a guiding principle, while balancing innovation, feasibility, and regulatory constraint
Here are some patient-centric initiatives [See 4.2.7 Key activities] What would be the most valuable in your opinion?		Offering patient counseling and education	Offering patient counseling and education

Continued on next page

Table 5.1 – Continued from previous page

Questions	Student N°1	Student N°2	Student N°3
Are you sceptic of some features of patient-centricity? if yes, which one?		Engaging through social media because of censorship (case for Women's Health) and adaptive clinical trial design	patient-centricity is valuable, but it needs careful implementation with attention to diversity, clinical evidence, and system sustainability
How old are you?	23	25	32
What is your gender?	Woman	Woman	Man

The first questions were about the reason they chose the biotech/med-tech sector, and this advanced master specifically. Student n°1 answered extensively on the subject, and to preserve the aesthetic balance of the table, we decided to report it here: *"At 14 years old I had to face several cancer cases in my family and I lost some important people for me. I promise myself that I would do something to help families like mine. I decided to do studies in biomedical engineering but then, during those studies I discovered that if I wanted to have a real impact on patient lives I needed to know more about this field. That's why I decided to follow this master to understand more the business side and not only the technical one.[...] By doing this master and meeting with people and by the number of participants that is increasing you can see that you have more and more people that really want to have an impact on people's lives and that's why they are choosing this field."*

Later on, a question was referring to patient centricity. Student n°1 stated that she was not familiar with the topic but that it seemed a good idea based on how the question described it. Therefore, answers from student n°2 and n°3, well informed on the matter, appear more relevant to assess.

5.3.3. Interpretation

It is clear that a sample of three students does not represent the actual population; however it gives insight that corroborate our model assumptions. This survey has taught us that *Idealists* exist, and that they have different objectives, different views; they are not all the same.

Based on their answers on the willingness to accept a lower salary to work for a company with a purpose in line with their convictions, we can assume they all are idealists, as they all responded yes, even though student n°3 includes the financial dimension in his response. If we analyze their primary and secondary motivations regarding their professional activity; student n°1 emphasizes on purpose and then on professional success relative to peers; respectively intrinsic utility of helping a cause u and social recognition v . Student n°2 wants to do what she love and getting paid fairly for it. For her, utility comes from herself and not the projection other people might have on her. That is a free spirit. Student n°3 stress the importance of learning and making a meaningful impact, as well as growing professionally by delivering high-quality work; financial stability and recognition will follow.

Student n°1 is a textbook idealist, she is driven by purpose, due to a personal situation. It is really crucial to understand that both her and a purpose driven organization would benefit from a cooperation. Student n°2 analyzes utility on different scopes, on daily operations by wanting to do what she loves, on a short term, by getting a fair compensation and on a long term perspective, by having a big purpose. Student n°3 is more pragmatic in his approach and includes concrete elements of analysis. He acknowledges the importance of a cause but remains aware of the surrounding environment, how he is valued on the job market, and the level of work he can achieve; for him professional growth is key. Interestingly, he seems more driven by the advancement of science than on the impacts it could have; that is a scientific perspective.

5.4. Firm's Objective

From an economic perspective, the maximization of shareholders value remains the standard motive. In the biotech industry, the initial investment can be divided in personnel costs and non personnel costs (technology, equipment, rent, etc). In those personnel costs, there are the wages $\sum_{i=1}^N w_i$ and the bonus for every important successful miles along the way $\sum_{i=1}^N b_i \cdot \mathbb{P}(R = 1)$. When the objective is to maximize the return of the investment, increasing the value of the project V if successful is not possible as it depends on the end market¹. [see appendix] The two levers are then maximizing the probability of success while minimizing the level of initial investment. In this instance, higher purpose can be very impactful. The role of the organization is to decide in which direction the business is heading.

¹In biotech, small increases in early-stage success probabilities have enormous option value because they compound across phases.

The firm can choose:

- Bonus levels b_i
- Wages w_i
- Number of employees N
- Purpose positioning
- Openness of information

5.4.1. Impact on Effort

Purpose gives the firm three channels of value creation: reduction of costs, higher effort, and focus on more accurate work. Adopting a purpose allows to synchronize the objective of the workers and the one of the company. Employees no longer work only for wage and bonuses, but also for the higher purpose, if it is in line with their convictions. The higher purpose can mitigate the principal-agent problem, as it becomes the goal of both the shareholders and employees. Even if comparatively, you may have lower personnel costs due to non-monetary utility, the true competitive edge is on the incremental effort and its focus. Employees may exert higher and more focused effort, which leads to a higher success probability $\mathbb{P}(R = 1)$.

Purpose attracts idealists which are ready to accept a lower wage w_i or exert a higher effort e , but remains sensitive to authenticity, beatable via openness. Openness is the catalyst in this formula. Opportunistic signaling generates short-term gains but long-run inefficiencies through turnover, reduced effort, and reputational loss; whereas true signaling allows trust in companies for idealists. The signaling game reinforces the position of the authentic firm competitively. (Segers, 2017)[47]

5.4.2. Adverse Selection and Imperfect Signaling

The presence of purpose-driven organizations also affects labor market dynamics. Opportunistic social firms may attempt to mimic authentic social firms in order to attract idealistic employees. However, such strategies are typically unsustainable in the long run.

Once employees update their beliefs about the firm's true motivations, opportunistic organizations may experience higher turnover among idealistic employees. Over time, these firms tend to retain mostly neutral employees who are less sensitive to the authenticity of the firm's mission.

Additionally, the absence of genuine alignment between employees and organizational purpose can worsen principal-agent problems. Without a shared mission, effort must rely more heavily on monetary incentives and monitoring mechanisms. Nevertheless some might argue that the existence of a purpose might lead idealists to neglect the financial side of the organizational objectives, hence the reason to include the purpose within your activities, not consider it a side project. The operational process have to be built in a way to achieve a higher purpose by proportionally sustaining the company's operations, leading to the previously mentioned non-zero sum game.

5.4.3. Conclusion

No company can ignore its economic obligation and duty of profitability. However, it does not necessarily have to be the driver of operational activity. Engagement in a higher purpose is a strategic organizational choice that affects firm value indirectly through employee selection, effort, retention, and long-run project success probabilities. From a market wise perspective, authentic purpose-driven firms build therefore stronger organizations with improved employee motivation and lower long-term agency costs.

5.5. Leveraging the Model into Financing Opportunities

At first glance, engaging in a higher purpose, in a pro-social behavior, is not a usual way to guarantee funding, to say the least. Venture capitalists are well known to be money-driven, and they are seeking the best return on investment, as their role suggests. Interview: Panier, Valery. (2026, February) [34] However, behaving purpose-driven should not in any circumstance be a burden. We argue that having a higher purpose is an investment argument, even if the search for funding is done only to VCs without concern for your particular cause. Ultimately, what founders need to do is to sell the projects to the investors, arguing about the probability of success, the required level of capital and the possible return of the target market. We provide answers in these three aspects. The probability success is directly dependent on the engagement of the teams within the organization, as we showed in the effort model. The capital required can be tempered by the partial substitution of employee monetary utility in social utility. The target market is not directly influenced by the existence of a higher purpose but can be impacted by the underlying chosen cause (e.g., patient centricity) and if founders need to prove the sensibility to this topic, our valuation chapter in the Appendix provides a framework.

The work we provided highlights philanthropist rationality, human nature reacts better to good than evil. But when humans try to make rational decisions, they tend to dismiss these notions. As would a VC in an investment position. It should not because an organization is rationally better when it takes into account non-monetary dimensions of employee motivation. When a company undertakes a higher purpose, every aspect of work on the matter can be used as an argument. Highlighting the financial rationale behind the purpose is a way to convince VCs. Obviously those justifications are convincing only if VCs remain neutral and are not anti-purpose ideologically.

5.6. Founder's Perspective

During an encounter with Valery Panier (2026, February)[34], one key element he put emphasis on was the founder's vision. The founder is responsible for the beginning of the company, giving the initial momentum and vision of what biotech will be. As Harwood et al (2011)[18] showed, firm behavior is aligned with moral or ethical motivations of the founder. If a short summary has to be drawn of the characteristics of a successful innovator, this would take into account technical knowledge, in order to understand the underlying business, the creativity to find new solutions and beat big pharmaceutical companies and relations to bring skilled and rich people on board, while staying connected to the worlds innovations. (Chiu, 2006)[7] Innovators are typically serial entrepreneurs, they usually start a biotech one after another, successful or not. A key aspect of their personality is that money is not the primary objective, purpose and reputation are. They feel the need to do something good for society, but it is intrinsically linked with the need to be perceived as one of the great people in our History; e.g. being *the one who tackled pancreatic cancer/Alzheimer's*. Their purposes might be admirable, but they also want to be remembered for it. This train of thoughts brings back the model in which social utility depends both on the praiseworthy goal and the reputation of achieving such a goal.

Most of the time, the founder is a shareholder with x % of company's share, and there lies the probable future personal gains

$$x.V.\mathbb{P}(R = 1)$$

where V is the discounted value of the future cash flow of the company. [see Appendix]

From a social utility point of view, the founder's motivation remains $\theta \in \{C, M\}$ (Cause-driven, Money-driven). Where

$$U_S = \lambda(u + v) + (1 - \lambda)uv$$

represent the founder utility to work for a company with a higher purpose. Let us decompose the formula: u represents personal fulfillment, the joy of making a real difference, v the social recognition, the admiration or respect they receive from others. These two factors don't just add up; they can also amplify each other, $\lambda \in [0, 1]$ weigh how intrinsic and reputational motives are additive rather than complementary. In our example of a biotech founder, we might expect a small λ , meaning a high complementarity of the utilities. Let us assume two cases, one where a founder succeeds to launch a viable company fighting a rare disease for a dozen people around the world. Although the founder will have a positive utility from helping those few dozen people, the recognition from peers will be good for the successful enterprise but not as great as he might aspire to. In contrast, the social utility will skyrocket if the founder tackles a major disease such as pulmonary cancer. He will receive a personal utility for helping so many people, with this achievement comes great reputational utility.

In the preliminaries of the model, we stated that the authenticity of the founder is key to developing a higher purpose.(Gartenberg et al, 2019)[17] Therefore it seems relevant to ask if a founder only motivated by reputation, v , can legitimately adopt a higher purpose. We do not know the answer to that question; however, it is clear that founders only motivated by helping society will more than likely adopt a purpose in their company culture. For Instance, the scientists-entrepreneurs Prof. Ugur Sahin, M.D. and Prof. Özlem Türeçci, M.D. , co-founders of BioNTech stated that their drivers were scientific curiosity and being useful for society. (Salako et al, 2021)[43] In the industry, some people (idealists, supposedly) want to work for them for their integrity, as it is well-known that their intentions are upright and they maintain a purpose culture wherever they work. Interview:Panier, Valery.(2026, March)[35]

The advantage of being a serial entrepreneur in this sector does not only lies in the personal utility. One of the benefits of those innovators is not only the actual biotechnological knowledge but the advanced know-how to navigate a start-up through the meander of a very specific and highly regulated industry. For example, serial scientists-entrepreneurs develop preferred repeated VC funding relationships. (Chiu, 2006)[7] They also develop a network of interested and interesting people and organizations that understand the technicalities of the rigorous environment.

6 | Conclusions and Future Developments

6.1. Main Conclusions

In the course of this work, many positions have been taken. The main take is that adopting a higher purpose, meaning an extra-financial goal embodied within the company's culture and activities, can lead to a competitive advantage in the case of biotech companies. The review of the literature in the early chapters addressed many concepts such as higher purpose, biotechnology and patient centricity. They are formatted under the Business Model Canvas to analyze and compare the different aspects mentioned in the academic world. The more innovative part of this thesis was organized around three main parts.

First, we developed a theoretical model that dissects how a purpose-driven firm can gain an edge through the optimization of personnel costs and the maximization of the level of synchronized effort. The objective of employees to boost their social utility leads to an increase in the probability of success relative to the costs encountered. In this game, openness plays the role of catalyst by signaling to stakeholders the firm's stance, their true nature. Competitively, it results in an advantage for honest enterprises.

Secondly, the application of a higher purpose entangled in the company's operations and in every side of the business model had the objective of showing how it is conducted through the example of patient centricity. The different elements of the business model are articulated from a patient centric perspective in order to scrutinize how a biotech organization operates with a deeply embedded purpose.

Third, the shift of perspective has the objective of reviewing the topic through the extra-managerial lenses. Through interviews of biotech students and pharmaceutical professionals, an on-the-ground anchor has been demonstrated. Furthermore, the angle of founders and the research of financial arguments to convince venture capitalists gather points of view to bring together the different stakeholders.

6.2. Future Development

In the course of this work, many concepts and ideas have been developed but even more theories on the matter have not been characterized. Other analysis can be conducted to widen the scope of the business sector, the model might be applicable and interesting to assess for other industries.

The theoretical model in itself can be improved, and interpreted differently or more deeply for some elements. The analysis of the open/closed business model, for instance, could be deepened with the formalization of the profit $V(\rho)$ and the implication of open SM companies. In the same order of idea, a model which include multiple utility curve for employees simultaneously, inspired by quantum physics, might be compelling from a formal economic standpoint.

Finally, a wide fieldwork that would be able to survey the market to assess our storyline and explain the underlying elements of analysis might also be in order.

The scope of further research in the domain is unfathomable and our belief is that a whole aspect of strategic modeling remains to be discovered.

6.3. Last Words

The intention of this work was never to sell a social project. Our choice was not driven by ideology, and we believe that this thesis was handled in good faith in a way that rightfully proved that biotech organizations are rationally better when they take into account non-monetary dimensions of employee motivation. We hope that our approach on the topic managed to offer a new perspective and that new thoughts will be developed on the subject of strategic higher purpose in the biotech industry.

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A | Biotech Valuation

This section develops a stylized framework for valuing a biotechnology company throughout the clinical development process, following the risk-adjusted net present value (rNPV) approach commonly used in the literature. (Chandra and Mazumdar, 2024)[6] The model characterizes investment timing, phase-specific technical risk, and the valuation of the project conditional on regulatory approval.

A.1. Timeline

The clinical development process is assumed to consist of four sequential stages, corresponding to Phase I, Phase II, Phase III, and NDA submission. Investment outlays occur at the beginning of each stage, while technical success or failure is realized at the end of the corresponding phase.

- Phase I investment at t_1 ,
- Phase II investment at t_2 ,
- Phase III investment at t_3 ,
- NDA submission investment at t_4 ,
- Product launch and terminal valuation at T .

A.2. Inputs

The valuation framework is parameterized by the following inputs:

- Investment outlays, paid upfront at the start of each phase:

$$(I_1, I_2, I_3, I_4).$$

- Phase-specific probabilities of technical success:

$$p_i = \mathbb{P}(R_i = 1), \quad i = 1, 2, 3, 4,$$

where R_i is an indicator variable equal to one if phase i is successfully completed.

- A constant discount rate:

$$r.$$

- The value of the firm conditional on successful product launch, representing the net present value of post-launch cash flows or an exit valuation:

$$V_{\text{launch}}$$

which corresponds to $V(1)$ in the main model when $\rho = 1$ (open *SC* firm with maximized probability of success).

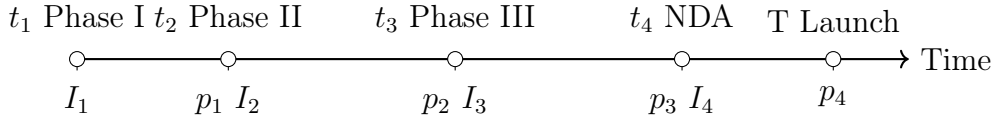


Figure A.1: Clinical development timeline with investment outlays, success probabilities, and terminal valuation.

A.3. Assumptions

The model relies on the following assumptions:

- Technical outcomes across phases are statistically independent.
- Failure at any phase results in immediate termination of the project.
- All investment expenditures are sunk once incurred.

A.4. Discounting

Future cash flows are discounted using a standard exponential discount factor:

$$DF(t) = \frac{1}{(1+r)^t}.$$

A.5. Valuation Function

Under the assumptions above, the value of the biotechnology project at time $t_1 = 0$ is given by the risk-adjusted net present value:

$$V_0 = -I_1 - \frac{p_1 I_2}{(1+r)^{t_2}} - \frac{p_1 p_2 I_3}{(1+r)^{t_3}} - \frac{p_1 p_2 p_3 I_4}{(1+r)^{t_4}} + \frac{p_1 p_2 p_3 p_4 V_{\text{launch}}}{(1+r)^T}.$$

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List of Symbols

Variable	Description
p	Exogenous probability that the research topic of a biotech is promising
N	Number of employees
w	Fixed wage
k	Marginal disutility of effort
R	Project outcome: 1=Success/0=Failure
e	Effort level
U	Utility function
b	Bonus
γ	Parameter in the Cobb-Douglas function
μ	Additional utility of idealists
ρ	Probability that a S firm is authentically motivated
T	Stated goal of a company
θ	True motivation of a company
U_S	Social utility
u	Intrinsic satisfaction from helping a cause
v	Reputational utility
λ	Parameter of the Social utility function
o	Openness level
$C_\theta(o)$	Cost of openness level depending on the true motivation
$\rho(o)$	Probability that a firm is authentically motivated, knowing its openness level
V	Value/Profit of the company

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