

POWERED BRAIN

INCREASING CONCENTRATION THROUGH ELECTRICAL BRAIN STIMULATION

You are the founder of “Powered Brain.” Your technology is a transcranial direct current stimulator (TDS) designed to increase concentration in users and help address some neurological disorders. Users attach the device to their skull when they want to increase their mental focus, where it delivers a DC electric current to the outer brain.

You are certain that your use of this technology can benefit users, and that it provides a safe and effective alternative to other methods for increasing concentration. However, the potential impacts of and attitudes toward the technology are not fully understood. There are some concerns of possible long-term adverse effects on performance and behavior amongst users—especially children. There are also social and ethical concerns over the use of the technology to enhance performance, as opposed to addressing medical conditions. Here, there are worries that the device may give some users an unfair advantage in their jobs, in their studies, and even in competitive sport. In addition, the technology currently lies in a legal and regulatory gray zone that continues to evolve. At the same time, there are a growing number of hobbyists experimenting with TDS, with relatively few constraints. There is some talk of national and international codes of conduct and standards being developed to guide the development and use of the technology.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- What emerging social trends in behaviors and attitudes could support or impede success?
- What are some of the potential short and long term physical and mental health impacts of your product, and how might you navigate these?
- What are some of the low probability but high impact future risks associated with your product?
- What are some of the potential disconnects between your product and how it's being marketed, and your organizational values?
- How might emerging regulations, standards, and governance frameworks affect your business?



RISK INNOVATION
NEXUS

POWERED BRAIN

CRITICAL RISK DIMENSIONS

SOCIAL & ETHICAL FACTORS



Ethics
Perception
Social Justice & Equity
Social Trends

UNINTENDED CONSEQUENCES OF EMERGING TECHNOLOGIES



Black Swan Events
Co-Opted Tech
Health & Environment

ORGANIZATIONS & SYSTEMS



Bad Actors
Organizational Values & Culture
Governance & Regulation
Reputation & Trust
Standards

AI OPTIMIZE

IMPROVING BUSINESS DECISIONS THROUGH ARTIFICIAL INTELLIGENCE

You are the CEO of “AI Optimize”—a company that specializes in developing custom machine learning solutions for other businesses that are designed to automate critical business decisions. Your service is based on a novel deep learning platform that uses multiple sources of data to provide rapid advice and insights on critical business operations, including personnel, manufacturing, supply chain management, marketing, and fiscal decisions. By using a combination of data from public and private sources, including employee activities and behavior, solutions provided by AI Optimize have been shown to improve production efficiency and increase profits by between 5% - 10%. However, to ensure this level of performance, AI Optimize requires full access to data related to a business’ operations, including monitoring employees. In most cases, it is not possible to trace how AI Optimize’s algorithms arrived at their recommendations. However, a growing number of examples demonstrate that, despite this, the technology leads to business improvements in most cases.

AI Optimize also offers a further level of service, where their technology can be configured to make key business decisions without any human intervention. The reliability of the technology is such that, where this option has been implemented, some companies have seen quarterly profits exceed projections by between 60%-90%.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- How does your product have the potential to compromise the privacy of clients and their stakeholders?
- To what extent might your product potentially lead to a loss of agency in terms of accountability for decisions and actions?
- Are there ways in which your organizational culture could potentially impede the long term success of the company?
- Could the ways your product is developed, marketed and used undermine business and investor trust, and reputation?
- How could the evolving global politics around the use of data and AI potentially affect your business?



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AI OPTIMIZE

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SOCIAL & ETHICAL FACTORS



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Black Swan Events
Co-opted Tech
Loss of Agency

ORGANIZATIONS & SYSTEMS



Geopolitics
Governance & Regulation
Organizational Values & Culture
Reputation & Trust

FOSSIL-BE-GONE

ADVANCED BIOFUELS THAT SURPASS FOSSIL FUELS ON PRICE AND PERFORMANCE

You are an executive in the company “Fossil-Be-Gone,” a self-identified “green” company which uses an innovative technology to convert agricultural feedstock into a direct replacement for gasoline. The company’s core technology is a genetically modified bacteria that can be tailored to convert different types of plant matter to a gasoline replacement. The process leads to a highly cost-effective fuel that has the same performance as a high octane rating gasoline. At present, feedstocks include corn, soybean, and wheat. By-products include a nutrient-rich slurry that, when treated and diluted, can be used as a fertilizer.

Fossil-Be-Gone has been built on a values-platform of environmental conservation, sustainable practices, climate change mitigation, and supporting local communities. The process is well-suited to developing refineries that use local agricultural produce and serve local markets. And while the process has some negative environmental impacts, these are kept in check.

As the efficiency of the technology improves, it is becoming more profitable for farmers to sell their produce to Fossil-Be-Gone rather than to other buyers. And as the company grows, it is having an increasingly disruptive impact on local communities and businesses.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- How could the political and social views and beliefs of potential investors, consumers and influencers potentially affect future investment and growth?
- Despite this being conceived of as a “green” company, are there potential environmental risks associated with the technology, the product, and the waste produced from the process?
- How could the technology being used potentially impact people and the environment across its life cycle, from the initial feedstock used to the product’s eventual use?
- How might potential disconnects between foundational company values and practices affect the company?
- How might evolving standards and norms around sustainable practices and the circular economy affect the business?



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FOSSIL-BE-GONE

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**Health & Environment
Product Lifecycle**

**ORGANIZATIONS
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**Organizational Values & Culture
Reputation & Trust
Standards**

ADAPT-A-SEED

GENETICALLY MODIFIED CROPS DESIGNED TO COMBAT CLIMATE CHANGE

You are the founder of a startup that aims to develop beneficial genetically modified crops using a technology that helps tailor plants to changing climates, while being socially responsible. Your product uses gene editing to rapidly prototype and produce crops that include rice, corn, and bananas to shifting climate conditions, while serving the needs of local communities. As part of your business model, you work with local communities to identify agricultural challenges and opportunities, and produce products that are tailored to their needs. While your products are sold at a premium price, you do not place restrictions on how farmers use seeds and plants once they have been purchased.

Your company has a guiding set of principles that promote the socially beneficial use of genetic technologies, empowering local communities, supporting sustainable practices, and making evidence-based decisions. You are convinced that your technology is safe, although little research has been carried out on the long term safety of your products, and that your company will benefit the lives of millions of people if it succeeds. At the same time, you need to convince investors that you are a safe bet, and that your business model is scalable and has the potential for substantial long term profits, especially within developing economies.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- How might perceptions by key stakeholders and influencers affect your business?
- How might the cultural practices, beliefs and lifestyles of key stakeholders affect your business?
- How might your product lead to long term health impacts?
- How could your product potentially impact the environment?
- In what ways could focusing on developing economies potentially affect the business?



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ADAPT-A-SEED

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Organizational Values & Culture
Reputation & Trust

SEVEN TWENTY FOUR

CASHLESS CONVENIENCE STORES THAT ARE OPEN 7 DAYS A WEEK, 24 HOURS A DAY

You are the founder and CEO of “Seven Twenty Four,” a franchise of convenience stores that are built on the concept of the cashless economy. Seven Twenty Four stores allow customers to purchase goods using an app and an online account, but not cash or credit card. Because the system is cashless and web based, it is highly automated, allowing stores to operate around the clock, and without human store managers in some cases.

Customers use the stores by signing up with the Seven Twenty Four app, and simply scanning the products they want to purchase with their smartphone. RFID tags in the products allow their location and status to be recorded, ensuring high levels of security and reliability. Franchise stores primarily sell groceries, food, and essential electrical goods, and are designed to provide local communities with many of their needs. There is some discussion of enabling customers with implanted RFID chips to purchase items by linking their chip to their online account.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- How could your business model lead to people in some communities being disadvantaged, and how might this affect your business?
- In what ways could your collection and use of customer data threaten their privacy?
- How might your technology reduce the ability of franchise owners and customers to have control over their businesses and lives?
- In what ways could emerging practices undermine your reputation and the trust of investors, customers, and local communities?
- What developments and changes in regulations might create barriers in the future?



RISK INNOVATION
NEXUS

SEVEN TWENTY FOUR

CRITICAL RISK DIMENSIONS

SOCIAL & ETHICAL FACTORS



Privacy
Social Justice & Equity
Social Trends

UNINTENDED CONSEQUENCES OF EMERGING TECHNOLOGIES



Co-opted Tech
Loss of Agency

ORGANIZATIONS & SYSTEMS



Governance & Regulation
Organizational Values & Culture
Reputation & Trust

BRIGHT FUTURES

USING CRISPR GENE EDITING TO GIVE YOUR CHILDREN A HEAD-START IN LIFE

You are the founder and chief scientist of a startup called “Bright Futures” that offers parents the chance to predetermine the genetic makeup of their children, using cutting edge gene editing. You are based in a developing country where there is less regulatory oversight of the use of gene editing technologies in humans, but serve clients from around the world who fly in to use your services. Your technology uses the latest in genetic science to edit embryonic DNA in ways that increase the chances of certain traits developing in the resulting child. And while you clearly state that you cannot claim with certainty that your procedures will lead to specific traits and abilities, you have a long list of wealthy parents who are willing to take a chance. Specific characteristics that you claim your procedures may help increase the chances of developing include intelligence, athleticism, attractiveness, competitiveness, and creativity.

While you fully recognize that you are operating in an ethical, legal, and regulatory gray area, you firmly believe that your services improve the lives of your clients and their children, and that they are based on sound science. And while your services are only accessible to the very wealthy, you argue that by pioneering them, you are opening the way to similar services becoming less expensive and more accessible.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- How might ethical concerns affect your ability to grow and succeed as a company?
- How might the religious, social and political perspectives and beliefs of investors, clients, and influential stakeholders affect your future business?
- How might heritable traits associated with your technology affect the business?
- What are some of the low probability but potentially high impact future risks associated with your service?
- How might future national and global regulations affect you?



**RISK INNOVATION
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BRIGHT FUTURES

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Social Trends
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Intergenerational Impacts
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TRUST ME

AN APP THAT DETERMINES THE TRUSTWORTHINESS OF THE PEOPLE YOU INVITE INTO YOUR HOME

You are the founder and CEO of a startup called “Trust Me” that is based on an app designed to “vet” professionals, tradespersons, and others who you invite into your home. The app is designed to help users assess the trustworthiness of strangers who enter their home, whether they are salespersons, carrying out maintenance or home improvement tasks, providing professional services, or are guests at a social gathering. The app allows you to enter information on the person such as their name, gender, age, and where they live. It also allows you to take a photo of them. This information is cross-referenced against a growing database of social media activity and other sources, and the results assessed by an AI to assign a “trustworthiness” index to the person. The process usually takes between 30 - 90 seconds.

The mission of Trust Me is to increase the safety and security of users by helping them decide who they do and do not invite into their home, based on data. You are aware that there are ethical issues around the use of your technology. However, you firmly believe that this is a technology that will improve lives if developed and used responsibly, and you are committed to ensuring that it places decisions on who users trust on a more evidence-based footing.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- How might your product lead to perceived or actual discrimination, and how might this affect your business?
- How could your product compromise privacy in ways that in turn compromise business success?
- What are some of the ethical concerns that may affect your business?
- In what ways might your product reduce the ability of users and others to have agency over their lives?
- How could evolving regulations and practice norms around the use of personal data affect your business?



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TRUST ME

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NO-PAIN MEAT

3D PRINTED PROTEIN THAT LOOKS, FEELS, AND TASTES LIKE IT CAME FROM AN ANIMAL

You are the Chief Scientist for a new company called “No-Pain Meat” that is using a technology to produce 3D printed meat products that was initially developed for organ replacement bioprinting. Using cultured cells, your technology can bioprint protein that looks, feels, and tastes like a cut of meat from an animal after it has been allowed to mature for between 5 - 10 days. While expensive, your products have a substantially lower environmental footprint compared to conventional farming, involve less waste, and do not involve slaughtering any animals. You also claim that they are less susceptible to microbial contamination compared to traditional meat products.

No-Pain Meat is based on a mission and values statement that emphasizes environmental sustainability and a future free from using animals for food. The company is committed to using the latest science to improve lives and the environment. This is reflected in part in a policy of only accepting funding from investors with a similar value-set, and in supporting charitable causes that are aligned with the company values.

KEY QUESTIONS FOR HELPING IDENTIFY ORPHAN RISKS

- In what ways might consumer perceptions affect the success of your product, especially in the use of a technology designed to print human organs?
- What are the potential environmental impacts of the process you use?
- How might your process lead to adverse health and environmental impacts across the product life cycle, from feedstock through to consumption and waste disposal?
- In what ways could disconnects between organizational values and practices/behavior undermine success?
- How could emerging norms and standards around product labeling and use of the term “meat” affect your business?



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NO-PAIN MEAT

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