

# Informa

A data analysis tool, that will reduce costs for pharmacies in Belgium. And try to improve health by predicting a certain path a patient will take.

Created by: 410078@student.fontys.nl  
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# Technology Impact Cycle Tool

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## Impact on society

What impact is expected from your technology?

*This category is only partial filled.*

### **What is exactly the problem? Is it really a problem? Are you sure?**

A data analysis tool, that will reduce costs for pharmacies in Belgium. And try to improve health by predicting a certain path a patient will take.

### **Are you sure that this technology is solving the RIGHT problem?**

*This question has not been answered yet.*

### **How is this technology going to solve the problem?**

*This question has not been answered yet.*

### **What negative effects do you expect from this technology?**

*This question has not been answered yet.*

### **In what way is this technology contributing to a world you want to live in?**

*This question has not been answered yet.*

### **Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.**

The impact of the technology could be both big and relatively small. The goal would be to manage what people use the technology on and set a limit to what the impact could be. This project is supposed to help and not replace anything and by having this as a given people might look at the technology in a different way.

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## Hateful and criminal actors

What can bad actors do with your technology?

*This category is only partial filled.*

### **In which way can the technology be used to break the law or avoid the consequences of breaking the law?**

The pharmacy is not allowed to change prescriptions for the sake of the patient's health. Even though there is a cheaper alternative. If you do not have a medical degree, you are not allowed to prescribe medication. The program should not be used as a replacement for the doctor's opinion on which medication should be used.

### **Can fakers, thieves or scammers abuse the technology?**

*This question has not been answered yet.*

### **Can the technology be used against certain (ethnic) groups or (social) classes?**

*This question has not been answered yet.*

### **In which way can bad actors use this technology to pit certain groups against each other? These groups can be, but are not constrained to, ethnic, social, political or religious groups.**

*This question has not been answered yet.*

### **How could bad actors use this technology to subvert or attack the truth?**

*This question has not been answered yet.*

### **Now that you have thought hard about how bad actors can impact this technology, what improvements would you like to make? List them below.**

After considering the various nefarious means that this data can be used for We decided to improve our data security and the ways our program can be accessed by the users so that it is more difficult for bad actors to use our program's data in a way that would benefit them.

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## Privacy

Are you considering the privacy & personal data of the users of your technology?

*This category is only partial filled.*

### **Does the technology register personal data? If yes, what personal data?**

The medicine purchases of customers are kept. The customer is saved by a patient token.

### **Do you think the technology invades the privacy of the stakeholders? If yes, in what way?**

*This question has not been answered yet.*

### **Is the technology is compliant with prevailing privacy and data protection law? Can you indicate why?**

*This question has not been answered yet.*

### **Does the technology mitigate privacy and data protection risks/ concerns (privacy by design)? Please indicate how.**

*This question has not been answered yet.*

### **In which way can you imagine a future impact of the collection of personal data?**

*This question has not been answered yet.*

### **Now that you have thought hard about privacy and data protection, what improvements would you like to make? List them below.**

This technology keeps track of the amount of medicine certain patients purchase with the date and sometimes the supply time provided. However, patient names are never used, and instead, a patient token is generated to be able to differentiate between different patients. The only personal information that is kept visible is the gender and the year of birth for the patients. All specific information is not included in order to ensure that the privacy of the users is kept securely and that the patients cannot be identified using the provided data.

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## Human values

How does the technology affect your human values?

*This category is only partial filled.*

## How is the identity of the (intended) users affected by the technology?

The new system does not change anything about the way that the identity of users is influenced, which is different from the current system.

## How does the technology influence the users' autonomy?

*This question has not been answered yet.*

## What is the effect of the technology on the health and/or well-being of users?

*This question has not been answered yet.*

## Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.

After considering the various nefarious means that this data can be used for We decided to improve our data security and the ways our program can be accessed by the users, so that it is more difficult for bad actors to use our program's data in a way that would benefit them.

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## Stakeholders

Have you considered all stakeholders?

*This category is only partial filled.*

**Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by answering these questions.**

**Name of the stakeholder**

Pharmacist

**How is this stakeholder affected?**

-

**Did you consult the stakeholder?**

Yes

**Are you going to take this stakeholder into account?**

Yes

**Name of the stakeholder**

Patient

**How is this stakeholder affected?**

-

**Did you consult the stakeholder?**

Yes

**Are you going to take this stakeholder into account?**

Yes

**Name of the stakeholder**

Doctors

**How is this stakeholder affected?**

-

**Did you consult the stakeholder?**

Yes

**Are you going to take this stakeholder into account?**

Yes

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Name of the stakeholder

Rob, from informa

**How is this stakeholder affected?**

-

**Did you consult the stakeholder?**

Yes

**Are you going to take this stakeholder into account?**

Yes

**Did you consider all stakeholders, even the ones that might not be a user or target group, but still might be of interest?**

-

**Now that you have thought hard about all stakeholders, what improvements would you like to make? List them below.**

From interviewing one of our stakeholders it became clear there is a lot of information to be gathered that will be helpful in our understanding of this domain that will help us create a tool that will support the pharmacy in the best way possible.

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## Data

Is data in your technology properly used?

*This category is only partial filled.*

### **Are you familiar with the fundamental shortcomings and pitfalls of data and do you take this sufficiently into account in the technology?**

The people who buy a lot of medicine are more influencing the system. This bias will be taken into account.

There is a difference between women and men in prescriptions, and extra data must be added for the dataset to account for general descriptions.

### **How does the technology organize continuous improvement when it comes to the use of data?**

*This question has not been answered yet.*

### **How will the technology keep the insights that it identifies with data sustainable over time?**

*This question has not been answered yet.*

### **In what way do you consider the fact that data is collected from the users?**

*This question has not been answered yet.*

### **Now that you have thought hard about the impact of data on this technology, what improvements would you like to make? List them below.**

The dataset is incomplete; this could be improved upon. We should advise the company to have a better data collection system, to gain more benefits from AI systems. For now, this means that we have certain limitations to the system. For half of the time, we don't know when the medicine is purchased. So a sales forecast would be not as accurate as desired. For Health improvement YOB is also inaccurate.

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## Inclusivity

Is your technology fair for everyone?

*This category is only partial filled.*

## Will everyone have access to the technology?

*This question has not been answered yet.*

## Does this technology have a built-in bias?

One person could have a big influence on the system when it buys a lot of one medicine. Doctors set limitations for the amount of medicine a patient can purchase.

## Does this technology make automatic decisions and how do you account for them?

*This question has not been answered yet.*

## Is everyone benefitting from the technology or only a a small group? Do you see this as a problem? Why/why not?

*This question has not been answered yet.*

## Does the team that creates the technology represent the diversity of our society?

*This question has not been answered yet.*

## Now that you have thought hard about the inclusivity of the technology, what improvements would you like to make? List them below.

When actually implementing this technology a doctor should be part of the development of the system. The decision on cost-saving should not only be beneficial for the pharmacies but should also take the health of patients into account.

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## Transparency

Are you transparent about how your technology works?

*This category is only partial filled.*

### **Is it explained to the users/stakeholders how the technology works and how the business model works?**

The system predicts what medicines must be in inventory and it improves the patient's health by everyone's data.

### **If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?**

*This question has not been answered yet.*

### **Is it possible to file a complaint or ask questions/get answers about this technology?**

*This question has not been answered yet.*

### **Is the technology (company) clear about possible negative consequences or shortcomings of the technology?**

*This question has not been answered yet.*

### **Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.**

The technology should not be just a black box for the company that is going to implement it. They should be made aware of how this works, and how this should be used. This includes proper communication in an instruction manual.

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## Sustainability

Is your technology environmentally sustainable?

*This category is only partial filled.*

### **In what way is the direct and indirect energy use of this technology taken into account?**

We are taking into account the energy costs of different solutions.

### **Do you think alternative materials could have been considered in the technology?**

*This question has not been answered yet.*

### **Do you think the lifespan of the technology is realistic?**

*This question has not been answered yet.*

### **What is the hidden impact of the technology in the whole chain?**

*This question has not been answered yet.*

### **Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.**

The main issue regarding sustainability in regard to this technology is the energy used for inputting and processing the data. By inputting and processing the data in fixed time intervals as opposed to constantly working with the data will help reduce the energy consumption, thus becoming more environmentally sustainable. Since this is technology is data-driven there is no specific lifespan, meaning that as long as there is relevant data the technology can continue working.

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## Future

Did you consider future impact?

*This category is only partial filled.*

### What could possibly happen with this technology in the future?

utopia

The pharmacies should be supported with data from this program. Additionally, an effort should be made to fact-check the system by medical specialists.

distopia

Pharmacists take matters into their own hands and use the algorithm to prescribe medication, while it is not their role.

**Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one utopian scenario.**

*This question has not been answered yet.*

**Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one dystopian scenario.**

*This question has not been answered yet.*

**Would you like to live in one of this scenario's? Why? Why not?**

*This question has not been answered yet.*

**What happens if the technology (which you have thought of as ethically well-considered) is bought or taken over by another party?**

*This question has not been answered yet.*

**Impact Improvement: Now that you have thought hard about the future impact of the technology, what improvements would you like to make? List them below.**

The ideal conditions, perfect predictions for all the fields of interest. This would provide more trust in the technology. We would have a system where our technology would greatly aid the doctors and patients but still be just a second measure to the real thing. In the worst conditions, a technology not very good at predicting the required data but people still trust it. People can be misled to use our technology and give it more value than even a doctor

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or any medical professional. Together with it being unsuccessful at predicting could have serious consequences.