

Overview - Documents and Data Collection Process

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[Folder containing \(rough\) data collection documents](#) - (Only worth reading for those very interested in the details of a specific technology's history, or for sources and reasoning about certain decisions. The documents are quite rough around the edges.)

Purpose

Purpose of this Doc

This document will detail our process for gathering data for our chosen technologies and will also serve as a central hub for all our public documents, with descriptions of their purposes and contents.

Purpose of the Process Itself

This process is used to gather data on the development of our chosen technologies and their associated fields, and factors that may have affected that development year by year, over a period of ~100 years. Outputs of this process are qualitative data (mostly contained within written summaries on each field's development) and quantitative data (contained in the main spreadsheet and used for the analysis). The quantitative data is composed of 30 different "factors" that may influence field development, and 3 "development milestones" for each field.

The Selected Technologies

We chose 10 technologies to gather development data for. We chose these technologies because we wanted to construct a dataset which represented development of important, ambitious technologies (so that our conclusions could possibly be relevant for forecasting, or differential technological development).

The 10 technologies:

1. Artificial Intelligence (to the first winter)
2. Atomically Precise Manufacturing (APM)
3. Clean Meat
4. DNA Nanotechnology
5. Fusion Reactors
6. Genetic Circuits
7. Quantum Computing
8. RNA Vaccines
9. Engineered Negligible Senescence (SENS)
10. Solid State Batteries

Note that we also collected data for Reusable Spaceflight, but decided not to use it because the technology was mostly developed outside of academia and so it wasn't a great fit for this project. Still we include our writing and data collected for Reusable Spaceflight in the documents linked here alongside that of the other 10 technologies.

A complete list of technologies we considered including and the criteria we used to select the technologies is given in this document: [☰ \[Public\] Selection Criteria for Technologies](#)

Data Collected and Process for Collection

For each tech the below outputs were produced (very roughly in this order):

	Output	Brief Description
1	Timeline	A rough timeline of the field's development.
2	Writeup	A ~ 2 page long rough writeup of the history of development.
3	Factor Data	Data on the state of the 30 development factors for each year is entered into the main spreadsheet.
4	Development Milestone Data	The years that various developmental milestones take place is decided, and entered into the main spreadsheet.
5	Summary	A summary of development, focusing on the causes and effects of important events.
6	"Micro Summary"	An opinionated "micro summary" briefly describing the main developments which led to the field becoming self-sustaining.

Timeline

The aim here is to construct a timeline of the most important events in a technology's development, whilst making notes of the relative importance of these events and their causes and effects on development. This forms the basis for the other outputs and creates a convenient structure to store quotes, opinions and sources. This step usually takes around 2 - 4 hours to get to a point where it was possible to move onto other outputs. The timeline also serves as a source bank and a way to organise my notes, so I would often go back to add things as I continued on other sections.

Timelines are located in each technology's "data gathering document", they are quite rough and only worth reading for those who are very interested in the details of a specific technology's history.

Writeup

The writeups mostly served as a way to organise my thoughts and pick out important events, which was helpful for the other outputs.

Writeups are located in each technology's "data gathering document", they are quite rough and only worth reading for those who are very interested in the details of a specific technology's history.

Factor Data

The state of 30 “factors” is recorded in the “Field Development Data” spreadsheet for each technology field and each year. These factors describe possible causes / influences / symptoms of field development, and are represented by binary variables which are “on” when a factor description is satisfied and “off” when it is not. For a full description of factors, as well as their individual definitions see this document:

 [\[Public\] Factor Definitions](#)

The factor data was often filled out alongside the timeline and writeup, as factor statuses became obvious. I also tended to go back to the timeline and writeup when difficult factors led me to find more information. If I had trouble deciding on the status of particular factors, I described my uncertainties and eventual choices in the “Developmental Factors” section of that technology field’s data gathering document.

All factor data is in this spreadsheet:

 [\[Public\] Field Development Data](#)

Development Milestone Data

We would like to be able to use the factors to predict when certain milestones are reached in a field’s development. The main development milestone we track is the “establishment year”, which corresponds to when a young field becomes self-sustaining, becoming less fragile and less likely to suddenly disappear. We also track a few other milestones. A list of all tracked milestones, as well as full definitions and descriptions of these milestones, can be found in this document:

 [\[Public\] Definitions of Field Development Milestones](#)

This section requires the most subjective judgement, and using information from the previous section was often helpful when coming to a decision on what year different milestones had been reached. If I had trouble deciding on the “origin year” or “establishment year”, I described my uncertainties and eventual choices in the “Developmental Measures” section of that technology field’s data gathering document.

Data for the “origin year”, “establishment year”, and “early growth year” is in the spreadsheet:

 [\[Public\] Field Development Data](#)

Summary

The aim of the summaries was to contextualise and condense the timeline and writeup on the history of development. With particular emphasis on how events lead to one another, the historical context of development, and examining the likely causes or motivators of events.

The summaries for each field are in this document:

 [\[Public\] Full Summaries of Field Development for Each Technology](#)

Micro Summary on How The Field Became Self-sustaining

These “micro summaries” provide a short opinionated paragraph describing the main developments which led to the field becoming self-sustaining, with an emphasis on the most likely causes of those main developments. They also include brief explanations of the choice of establishment year for each field.

All micro summaries are located in this document:

 [Public] Micro Summaries on How Each Field Became Self-Sustaining