Innovation and Its Fallacies.

Expect the improbable. A change from exnovation to innovation.
Updated 2022-01-21 Prologue Serendipity
The Innovation Paradox: Innovation cannot be organized. That needs to be organized. It is all about serendipity.

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Content

Prologue Serendipity

The story of the Three Princess of Serendip has become known in the English-speaking world as the source of the word serendipity, coined by Horace Walpole because of his recollection of the part of the "silly fairy tale" in which the three princess by "accidents and sagacity" discern the nature of the lost camel. In a separate line of descent the story was used by Voltaire in his 1747 Zadig, and through this contributed to both the evolution of detective fiction and the self-understanding of the scientific method, https://en.wikipedia.org .
Reading the story of the lost camel it becomes clear why innovation is related with serendipity. It is about using systematic analyses:"……*they have used small clues to infer cleverly the nature of the camel*". Systematic analyses developed and used in one area, science for example, and use the technique in a totally different area. This is what we call innovation. Innovation is not about invention. Think about Apple and the use of inventions done in different fields. Think of Sherlock Holmes and his use of the analytical approach for Crime Scene Investigation.

1 Summary.

Is it about innovation, imitation, regression to the mean, a disruption, innovation, and the cycle starts again?

Innovation has always been among us. Without innovation a civilisation will disappear (Toynbee). Innovation has been with us for centuries. Is it sustainable? In Europe it was thought innovation to have disappeared with the decline and fall of the Roman empire (Fallows).
Innovation stayed subsided during the Dark Ages. Usually it is assumed innovation to be with us again at the birth of the Renaissance including the sublime Gutenberg Innovation. Depending on the definition of the duration of The Dark Ages, The Dark Ages may have been not that dark after all (Fried).
It appeared all innovators to be entrepreneurs. However, not all entrepreneurs are innovators.

Politicians and government are interested in innovation. Agendas are created called "*The Lisbon Agenda*". The agenda being outdated and disappeared in the violence of the balance sheet recession in Europe (2008-2013).
Social innovation (Schumpeter), however, is something that is always present as a kind of undercurrent. Is the demise of the Roman empire an innovation? If Caesar had not taken office, someone else would have come to the fore and compromised the system of the

republic. Concepts such as revolution and evolution are also emerging. If a society does not innovate, it will go down, but if society does innovate, it can also go down? Or will a society always innovate with small steps and must innovate to survive? What is survival? Adapting to the circumstances or playing an active role yourself, that is the question. An active role can also be nothing but reacting to changing circumstances. "Disruptive" innovation or revolution is always undesirable for a society. Creative destruction is happening in China. Does the same apply to business? This and many other aspects of innovation are discussed.

However, interest from politicians and government in the first half of the first decade of 2000 for innovation was exaggerated. Government and politics can do little to promote innovation. The innovation process and the degree of innovation in a company or organization is determined by the culture of that company. With entrepreneurship as part of the culture, government and politics can do truly little. Only in the conditional sense the government and the politicians can do something. Entrepreneurship can be stimulated by making business to start easily. Making it easier in the event of bankruptcy, which will certainly happen in 9 out of 10 startups, to facilitate the restart.
Will that really help in the Netherlands? Probably not. Is that bad? We may mind, but if entrepreneurship is not second nature of the Dutch person, then the government cannot do anything about it. The government, together with politicians, better focus on improving its own processes. But why would a government do that? That is a question that is not easy to answer, and some attention will be paid to government and improving processes. However, a government will naturally bureaucratize and tend towards growth.
With innovation, we tend to think of technology. However, this is too limited. Social innovation and financial innovation are also part of the focus of politicians and government. The position of banks in the context of the financial safety and health of individuals also requires further consideration. Banks thought they were innovating. At the contrary, they created highly toxic products. I coined this *exnovating*.
Furthermore, innovation also plays an important role in organizations, processes, pricing marketing ideas, logistics and production resources.
An important conclusion is that the government cannot and should not interfere with the innovation of businesses. Government innovation policy is a kind of new speak for industrial policy. May be, an industrial policy is needed in times of war. Think of the Manhattan Project.
The government must innovate itself by staying small and that is a contradiction!
Changes in society can also be understood as innovations. A major example of this is the Renaissance described by Jacob Burckhardt in "*The Renaissance in Italy*". The Enlightenment was also a period of great change, stimulated by individuals. The role of the individual has been decisive. The government, in any form, played no significant role in this process of change. The government played its bureaucratic role: resistance to change.
Modelling of innovation is obvious to make predictions and to understand innovation.

Models must be able to be tested. Unfortunately, that is not feasible. Since, who wants to experiment with his or her company?
Resistance to change plays a major role. Can a biotope be created so that change is possible and meaningful? The following chapters address many aspects of change.
Citing Taleb's "*Antifragility*":
" ....in Ovid, difficulty is what wakes up the genius...The excess energy released from overreaction to setbacks is what innovates! This message from the ancients is vastly deeper than it seems. It contradicts modern methods and ideas of innovation and progress on many levels, as we tend to think that innovation comes from bureaucratic funding, through planning, or putting people through a Harvard Business School class by one Highly Decorated Professor of Innovation and Entrepreneurship (who never innovated anything) or hiring a consultant (who never innovated anything). This is a fallacy.....".
In The Atlantic (Atkinson, R. D., and M. Lind), April 2018, another fallacy is discussed: *the small is beautiful fallacy*. There it is argued not to rely on small or big but rely on a healthy interaction between firms of all sizes.

2 Introduction.

Innovation?
OECD: *"Innovation is new products, new business processes and organic change that create wealth or social welfare"*.
Or: innovation is inventing, test and apply.
Or innovation – incremental innovation – is development? The D in R&D. Well, testing is sometimes lost in oblivion. The last years we experienced this very painfully with a lot of so-called innovative financial products. As a result, the balance recession took some 6 years to overcome.

Modelling for innovation in the industry is described by Christensen in his book "*The Innovators Dilemma*". To what extent this is real modelling based on a hypothesis, is just the question. On closer inspection, it looks more like a case study. The idea that young companies do not compete with established companies applies to those young companies that have been lucky enough to have, by experience, turned the beacons in good time. We do not know anything about the young companies that have not had this good fortune. They are gone. Apple could serve as an example not to compete with Digital and IBM. However, for Jobs, IBM was the "devil", as described by Isaacson in his biography "*Steve Jobs*".
New ideas are stumbled upon. These ideas are difficult to explain to others. Words can only explain what is already known. With hindsight, good ideas are always obvious, and

innovation is analyzed as a casus. Talking about innovation can only be in the past or the completed past tense.

Innovation has always been and always will be there. Disrupting innovations are often not driven by the market but mainly with the feelings and ideas of an entrepreneur.
The explicit demand from the market creates incremental innovation. Demand again depends on the price level. If prices are sufficiently high, demand can often be met with old technologies. Low prices combined with open markets stimulate innovation. The latent demand is the reason for disrupting innovation.
The automotive industry of the past 110 years is a striking example of permanent or incremental innovation. Not only product innovation, but also process innovation, system innovation, innovation in and of the supply chain. The car industry was and is a source of social innovation. Not the least through a major forced reduction, by regulation, of carbon dioxide.
Leisure activities have been permanently affected by the increase in mobility. Consequently, leisure is a driver of innovation.
Also, the film and TV industry is a good example. The huge expansion of television channels intensified competition since prices in the market had to fall to capture a part of the market. The competition ensured that the quality of the television programs offered was improving by leaps and bounds. For example, television series budgets increased to absorb declining revenues. Advanced equipment became cheaper and was therefore also available for the television. The television series became more and more like film. Strong scenarios were and are being made. The living room became a cinema due to the large screen, better sound equipment and sharper image. The television world and the film world became intertwined. Streaming is an additional competitor in the market to say the least.

There is a lot of talk about innovation and one might think that innovation is a problem. Innovation is not the problem, but the resistance to change is. If organizations are to survive and succeed, they must adapt and therefore change. Employees of companies in the Netherlands, who do not want to change and could lose their have a job, can organize a crisis in a company. In Dutch case law, they are also fully facilitated and often vindicated (Noordzij, 1).
In 2020, during the pandemic's companies are supported by the government. Well, that is fine. However, timing is an issue. Too long a financial support creates distortions in the marketplace.

There is no alternative to innovation. Not changing and adapting means stagnation and decline. Innovation means change, and if this change is not hindered, innovation goes without mentioning. Apparently, the call for innovation is strongly linked to the fact that innovation is being hindered too much in our society. This hurdle originates in (too) many rules. Just talking about innovation then leads us nowhere. We need to talk about the

propensity to create rules[1]. If we regulate less, there is also more room for change. We need to become more aware of negative effects of overregulation. Gradually, it seems to happen. This became clearly visible during the discussions on the so-called Innovation Platform in The Netherlands. It is understandable that in all the comments made about the Platform, the call for deregulatory measures is heard. By the way, in 2020 not much is heard of this Platform. I do not think this to reflect a major problem.

Moreover, it is important to understand or acquire insights into how innovations come about. The following reflections will deal with innovation, the company, and the government. Innovations in art, etc. are not discussed, whereas, of course, they are also attractive to discuss. Innovation is the daring to develop and implement new ideas and to adopt a new approach. It is certainly not the case that only the established large company has the advantage to be able to innovate. That is why we will also consider the start-up as an innovator. So, innovation within companies and innovation by a start-up entrepreneur with a new product for a known or unknown market are considered. Again, the innovator's dilemma applies: start an innovation and develop this innovation within an existing company or start a new business?
In Christensen's "*The Innovators Dilemma*", this is given a lot of attention.
In this introduction, I recall it to be well known that 9 out of 10 start-ups are failing. If everyone were to heed Daniel Kahneman's comments about it, "*Thinking fast and slow,*" no one would start a business. The development of society would come to a standstill. How bad that is, is not a point of consideration in this document. It is assumed that there will always be entrepreneurs who want to start something(“*Thinking fast*") even though they know the probability of failure to be 90% ("*Thinking slow*").
One of the pitfalls of innovation is the idea when there are (many) start-ups, there will also be great benefits for society. However, this is only the case if the start-up company continues to grow. The following reflections will focus on why so few start-ups are growing and, if they survive, many continue as self-employed individuals

3 Innovation

3.1 General Principals of Innovation

The most effective way to guide change is to generate change. It is important to distinguish between incremental and disrupting innovations.
Experience shows that you cannot initiate disrupting innovation in traditional organizations. The organization itself needs to initiate change. To this end, things being outdated or no longer successful are declared obsolete in an organized manner. Systematic work is needed to improve all products, services, and processes. Furthermore, we must exploit successes,

[1] I mention here the situation in the Netherlands. Throughout the text it becomes clear whether I discuss innovation on a European level or a global level.

especially unexpected and unplanned successes and systematically innovate. Consequently, change management must be a daily activity. Especially with small teams with a lot of independence and far away from the administrative hustle and bustle. Stimulating creativity: dare to let go of the person/employee and give them more freedom. Innovation is determined by daring to take risks.

Areas where innovations can be expected:

Life sciences, pandemics,
Algorithms for datamining, Artificial intelligence,
Communication, social media,
Energy, the environment and climate change.

Social and economic modelling based on data,
Education,
Business processes,
Consumer products like wearables to support healthcare.

What do successful - in this case incremental - innovations have in common?

1)Innovations are moderate/modest new to the market,
2) Based on tried and tested technology,
3) Saves money,
4) Meets the needs of customers and
5) Supports existing practices/methods/applications and methods.

What do unsuccessful innovations have in common?

1)Untested technology,
2) A me-too approach-imitators- assuming a level playing field[2], and
3) Unclear what problem has been solved.

What approach, method and ideas lead to - in this case also disrupting - innovations? The following list gives some insight:

1)Active search for an answer for a known problem,
2) New ways to use an existing solution,
3) Develop systems and services without a substantial relationship with the market,
4) Random event. Serendipity (In the innovation process encountering something that was

[2] A level playing field. Japan after te second world war. Imitation in combination with an industry policy leads to distorted competition. Culminating in: *The machine that changed the world*, MIT study, 1990.
China, an emerging market of the past, started the imitation game. Combined the imitation game with an industry policy and looks like Xi's new economy (The Economist August 15th 2020). Schumpeter's Creative Destruction at work?

not sought and immediately it was clear that it can be used meaningfully),
5) Market research and
6) Follow a trend.

What is proved most successful in terms of the success/failure ratio in the above list of 6 innovations? Where failing innovations are innovations failed in the market.
The most successful in terms of success/failure ratio is the random event: Serendipity. Serendipity is considered a random event, but you must be open to it. Being open in terms of looking outside your own expertise. The success/failure ratio is 13 for Serendipity. The least successful of the above possible innovations are those without much relation to the "outside world" and trend. Both with a success/failure ratio of one to three. For the first of the list, the ratio is two. For market research the ratio is four and for the second of the list the ratio is seven. Market research and trend tracking are hardly recommended. A legendary comment attributed to Henri Ford about market research: "*if I had done market research, I would have developed an improved carriage!*".

What can there be about innovation in Europe? Europe is a trend follower in terms of innovation. Europe's innovation malaise is the result of several factors:

1) A lousy place to start and grow a business. A simple example is the costs that companies must incur to incorporate the consequences of different privacy laws into company rules in the context of employee privacy. A step-by-step innovation in this area may be the harmonization of regulations. In Europe, in 2020, an important move has been made for privacy regulation (GDPR, General Data Protection Regulation) on European Union level (Noordzij, 2). Alas Brexit is not helpful in this respect.

2) In Europe, there is a tendency to distrust the entrepreneur. This has been the case for decades and is culturally determined because the European has socialist tendencies and quickly calls for a strong state. It will therefore make little sense to appeal to the entrepreneurial spirit in Europe,

3) In 2013, the German Mittelstand is an exception in terms of innovation,

4) Ratio venture capital Eu/US is 6.5/45 (figures 2006),

5) There is a strong relationship between venture capital and innovation. And above all, venture capital that supports patents and to a much lesser extent R&D. Well, patents are becoming less important, but they still are,

6) Innovation and entrepreneurship need not coincide. Someone who opens a café is a successful entrepreneur, but not yet an innovator. It is about the entrepreneur embracing new ideas. These are the people who stimulate creative destruction. An expression coined by Schumpeter. Again, we mention Schumpeter. However, how justified this is talking about innovation is not clear given the important role Schumpeter assigns to the state. For this

reason, I think China has Schumpeter in mind.
There are few entrepreneurs in Europe. You look for a job with incumbents. National champions are usually not disrupting innovators. Start-up entrepreneurs are.

7) In Europe, the government's(taxpayer) money dedicated for higher education leads to ideas. These ideas often remain within universities. There is no other way. We will pay attention to that later.

There is a great deal of attention in Europe for financing higher education. There is much less focus on entrepreneurship to turn ideas into valuable products and services.

In Europe, energy is dedicated to creating so-called valleys, the usual suspects. However, companies compete, valley's do not.

3.2 Business

"He who innovates will have as his enemies all those who are well under the existing order of things, and only lukewarm supporters in those who might be better off under the new",
Machiavelli, *Il Principe*.
A Pareto's rule of sorts.

Change is the key word.
Does innovation get in the way of our critical mind? Criticism kills innovation. We always know a lot of arguments to come up with why something cannot be done. Giving employees a lot of independence will reduce the number of managers and thus the number of policy makers. The latter want – and are appointed to do so – to regulate a lot by unnecessary standardization, control, coordination, and control. Managers, mostly not entrepreneurs, are focused on lowering costs and not on increasing revenue. The lack of innovation is mainly due to the resistance to innovation. This is again linked to the responsibility for failure. And 90% of attempts at innovation fail. Predicting losers during the innovation process in the company is often more important than supporting winners. With 9 times more failures than successes, it is clear where the cost of innovation lie. Quickly deciding on losers in the innovation chain frees up resources to give new ideas a chance or bring the successes to market faster.

In a company make use of unexpected success, unexpected events, incongruity between what happens and what was thought to happen and the inadequate use of underlying processes. The market picks things up by surprise and

Outside the company: demographics, change in perception, creation of knowledge. The latter is the riskiest and requires a lot of attention from government development agencies, scientists, CEOs, and venture capital.
The idea large companies to be more innovative is commonly understood, based on the fact that large established companies (almost monopolies) have more extensive research budgets than small competing companies. However, the position of these large companies,

with their (scientific) research departments, in the innovation chain is not so clear. The question is whether large research budgets stimulate innovation. What is certain is that these budgets generate ideas, up to inventions. But that's not innovation! Xerox has done little with all the research at the Palo Alto Research Centre. The results were "given away". Others innovated with the inventions, such as Apple.
Another example is the invention of the transistor by (the former) ATT. ATT did see applications for it but gave the invention away, almost for free. These insights about ATT are presented in: "*The Idea Factory: Bell Labs and the Great Age of American Innovation"* written by Jon Gertner. At the time of the invention and development of the transistor, ATT was a regulated monopolist and was under great pressure from the Ministry of Legal Affairs. In the end, this would lead to the demerger of ATT. ATT's management did not want to give the impression that, as a monopolist with a protected market, it would gain full profit of the commercialization of the transistor. Innovating close to the government can therefore also be a major disadvantage. Especially, when government does not cherish monopolists.

Are large companies more innovative than small businesses? Over the years, the answer to this question has been mixed. See also "*Boulevard of Broken Dreams*" by Josh Lerner. Since there is no clear answer it is essential for governments not to give direction to innovation processes through subsidies. Especially not, because the government unwittingly thinks it will choose winners when the winner is no longer a winner. Subsidies are a form of exnovating and are among the pitfalls. An economy needs businesses large and small. Inventions do not automatically lead to innovations. In Alexandria (ca. 75BC), Heron Alexandrinus invented a radial steam turbine(aeolipile) , and fun toys were made with it, but steam was not used productively(Coleman)[3]. Labor was cheap: driven by slavery. It would take almost 2,000 years for steam to be applied in the industry. Productivity would increase significantly as a result. Inventions do not automatically lead to innovations. Inventing is like opening doors. Innovation is entering new areas through these doors. Innovations lead to productivity growth and create new jobs. This leads to an increase in wealth.

So, inventing something does not mean there is innovation. Innovation however, needs looking “over the fence, i.e., serendipity. Have others done anything that could be used? Open innovation is an expression originating here.

3.3 Government and Labor Unions.

In general, we can think of two types of innovation for Government/Administration.
First there is innovation within the organization of the Administration. For example innovation of internal processes, etc.
In the second place innovation of interfaces with the constituents (government services), aspect of the so-called entrepreneurial state (coined by Mazzucato), etc. For a government,

[3] See also: en.wikipedia.org

trend following, and imitation is not necessarily bad. Think of digitisation of government (The Economist, September 5th ,2020). There is no need for a level playing field.
Special attention should be paid to war-like situations: a deep recession, real war (Manhattan project), a cold war and a pandemic. Then the Administration should come into play.

The labor unions are naturally averse to innovations. In The Economist, "*The view from Liverpool*" makes it clear that the trade unions played a major role in the demise of Liverpool. That is understandable. They have been working for decades to preserve existing jobs. That is what members expect from their union. The resistance to change is such a hurdle that a company is more likely to start a new business than to continuously change the existing business. One might think that the union itself should innovate, but that is squaring of the circle.

A government cannot innovate by its very nature (Noordzij,3), nor can a labor union.
So in continental Europe, where labor unions play a major role in all kinds of consultation bodies, there will always be a time-lag of innovations - and the resulting emergence of new jobs - compared to countries where labor unions do not play such a role. Is the role of the labor unions in Europe no longer relevant? One might think so. For continental European culture, their role is (still) part of the industrial biotope. It would be nice if the labor unions could accept the positive impact of innovation. This means a long-term vision and a reduction in outdated employment and a transition to new employment. The transition will never be smooth and is accompanied by pain. Almost impossible for the continental trade unions as described in The Economist March 14th 2009: *'Rather than trying to resist change or turn back the clock, Union leaders need to present some visionary and forward-looking big ideas- not historically their strong suit'.*
In fact, governments are unsuited for encouraging entrepreneurship. The short cyclical nature of politicians alone is a major cause of unsuitability.

In the Netherlands, the government is being key in the discussion on innovation. Obviously, the business community is also involved. The question is to what extent the government can play a role.
In the Netherlands, we are reasonably well equipped for scientific research and technology development. The extent to which the results of scientific research are translated into products and services for the market are disappointing.
Then, the government comes into play. The technological push was insufficient. So, the government creates top technological institutions to strengthen the push. Alas, pushing leads to creating obstacles. A law of conservation of misery.
Whether these top institutions contribute to innovations is unclear. This is partly due to small and innovative companies hardly being involved in these institutes. These considerations do not give a verdict on the usefulness and necessity of these institutions.

However, it will become clear that they have little or no role to play in innovations. Whether the technological top institutions were useful in the innovation infrastructure was not evaluated. The next step in the push process was taken by creating top sectors. Well, I shall not pay further attention to this push system.
I do not know whether the subject matter has completely disappeared behind the horizon as far as government is concerned. It is history. In 2020, pandemic, Brexit, climate change the future of the European Union.

3.4 Social innovation.

Schumpeter's Utopia, a Joke? Preface to the second edition.

Innovation and changing demography.
It is well known that we must work longer to make our pension systems sustainable. There are various pension systems: Pay as you go, Defined benefit and Defined contribution. Whatever the system, the condition of sustainability asks for a longer employment. Consequently, employers must develop an appropriate work environment.

So-called "frugal innovation" seems to be a social innovation, not a technological innovation. An existing technology is made suitable for the "small fair". But is it just a social innovation? Frugal innovation demonstrates many products to have functions no one needs. Of course, that is okay if the multiple functions do not make the product more expensive and complicated. However, this does not seem to be the case. Often a product becomes more expensive and more complicated and more vulnerable (fragile).

Can politicians, legislation, and administration, play a relevant role? The following paragraphs discuss the role of government, business, and politics. In the following considerations, the usefulness, necessity, and size (% of GDP) of research are considered as a given and not further analyzed. However, some attention is paid to the organization of Dutch research and its usefulness.

An interesting area for innovation is art. The arts: the Milanese period of Da Vinci can certainly be characterized as a period of innovation. Da Vinci had disengaged himself of the practices of the workshops and is moving in his own direction with his research. A disrupting innovation. This is described in an edition of the Scientific biography by Laurenza: "*Leonardo Da Vinci homo universalis*".

4 Government -The Administration

China is shaping their society based on Schumpeter's creative destruction. Not a Utopia, but reality (The Economist August 15th 2020).

This chapter focuses on those parts of government where innovation can create important disruptions. In section 3.3, I mentioned two types of innovation for the Administration Education is such an area.

First I deal with, denominated by Mazzucato:

4.1 The Entrepreneurial State

I dealt with the subject matter in Noordzij(3).
Here I will cite here some parts:

"*In the book Debunking Public vs. Private Sector Myths in Risk and Innovation by Mazzucato , the subjects like DARPA are discussed in more depth. Mazzucato stated the government to be successful in "picking winners". This is explained in more detail by two cases, DARPA, and Apple. As been said by Mazzucato, the government can choose winners. There is no need for giving examples of choosing losers. Others give these examples (a.o., Lerner). In the Netherlands, however, reports on the usefulness of government research funding (Rathenau report, 2007) appear. The Dutch Government Accountability Office (GAO, Auditors) is also examining these matters. We hear little about it. Or there is some political commotion and after that everyone returns to their daily business.*
Mazzucato, who is supportive government control (push, Mazzucato), is so sincere that it puts "risk taking" by the government between quotation marks. Why Mazzucato does that is not clear. Perhaps Mazzucato feels somewhat uncertain. We all know that the government does not take any risks: it spends money from the taxpayer.
The Entrepreneurial State is an oxymoron. Government is not at all entrepreneurial. A lot of taxpayer's money is spent on Research. The taxpayer let it happen, its money is gone any way. In addition, "Picking winners" is defined: if you put a lot of money in something, there will always be something. An example is nanotechnology. Nanotechnology has gradually become a container concept: something for everyone. "Courageous risk-taking, a visionary role of the state". Well?
Government push: Germany and renewable energy.
In any case, the German taxpayer's feel it in their wallet. A disarranged energy system. Push, by nature, always creates stagnation. The government could better handle the "pull" system. Do not push technology but raise taxes on what is endangering sustainability: The Pull System. The role of government is to regulate, no more no less. Regulate a transition into the era of clean energy. To prevent brown outs and blown outs (The Economist February 25th, 2017). If there was reasonable agreement on the subject matter.
The reasoning that the government can pick up winners is illustrated by Mazzucato on

DARPA and Apple. DARPA would have stimulated the development of the Internet. Apple could have only made the iPod, iPad, and iPhone through government-funded developments. Mazzucato does not say whether that is good or bad now. But which winner has the government chosen now? Apple? Apple has also made use of all kinds of government grants for SME's: e.g., Bric. Is there something wrong with that? The effect of these subsidies can be found with Lerner.

Now first DARPA.

DARPA has ensured that the DARPA-net was there. In this way, the American Department of Defense could quickly communicate with the affiliated research and development institutes. That has nothing to do with the Internet as we know it. Others than DARPA have made the DARPA-net into Internet. DARPA has just released its net for this purpose. Is that "picking winners"?

Look at Apple (Isaacson, 2011). I can be brief about this. The U.S. government has not developed the iPod, iPhone, and iPad. Apple has done that: disruptive innovation. Apple has done that before with the PC. Jobs was very smart to use the things that remained unused on the shelf of other developers. For example, just think of PARC (XEROX). Who was smart in "picking winners"? The government or Jobs? Apple innovated and not the US government. How efficient the American incentive programs are, can be read again with Lerner. It is not clear what Mazzucato wants to tell us. Has the U.S. government chosen Apple as the winner? That is probably not meant. But then what?

Mazzucato should be happy: Apple cleared the way for the government to "Pick Winners". Or is Mazzucato looking for further implementation of state capitalism. I think the state should be grateful to Apple. Since the high "risk" taking government is saved by Apple after government has spent a lot of taxpayer's money. Again, the government should be grateful that there are entrepreneurs who can make something out of the gambling of the government. When government is throwing around taxpayer's money, an entrepreneur should wait and see. The question that remains: what is the role of parliament/Congress in this respect?

Green energy. The way in which the government bets on green energy does not encourage any entrepreneur to take risks. Taxpayers ' money is still coming to the entrepreneur.

In chapter 1 Mazzucato finally deleted the parenthesis for "risk" taking by the government. Mazzucato makes a "strong" point by means of a vicious argument: Italy and Greece are stagnant not due to their high public debt but more by a public sector which had not made the kind of strategic investment that …….Germany made. Did the public sector make such an investment in Germany? Infrastructure? Transition?

Mazzucato should not be surprised. Quote: "What drives business entry into industries are not existing profits in that sector but projected technological and market opportunities. And such opportunities are linked to the account of state investment in that area". So what?"

Banks are dealt with in the chapter on Business. However, the banks also deserve attention in this chapter. Like the government, banks are active with other people's money. The government does this by collecting taxes and distributing the taxes again to areas designated by politics. The banks are trusted with funds of their customers and these funds are redistributed by a complicated way through loans. In this way, a banker can be compared with a civil servant. Consequently, the political surveillance is needed by the Legislature. It is about the public's financial security. Like the physical safety of citizens, financial security demands the attention of government and the Legislator. In 2010 system bank were defined: 'too big to fail'. These types of banks are saved by the taxpayer. If profits are made, the profit does not go to the taxpayer. An innovation here is needed to balance the system.

The government has innovation still on its agenda. Now, 2020, dealing with greening of energy consumption.
What role does government play in innovation and the innovation process (Noordzij 3)? What role can the government (national, regional, and local) play in innovations? Should the government play a role in innovations? What should the government not do? Can the government play a role in innovation processes at all? The government is struggling when it comes to technology. Which technology to choose? Broadband, wireless, fiber optics, windmills, solar power, rents up, rents down, energy saving, coal, natural gas, nuclear, etc., (Noordzij 4).

The most eye-catching activity of the Dutch government in the recent past, was the Innovation Platform. Through this platform, funds were allocated to a few spearheads. The platform is now (2020) defunct and I do not grieve for it[4].
In addition, institutes such as TNO and the other Technological Institutes (GTI's) are assigned to play a role in innovation. Additional Technological Institutes were created to strengthen science and technology. Top sectors were designated. Resources were made available through so-called regional development companies. In 2011, the idea was that only small businesses are essential to innovation. However, that picture is changing. Small businesses are growing up. Examples include Apple, Facebook, and Google. Because these companies are big now, can't they innovate anymore? Now, in 2020 denominated the new robber barons by politicians[5]?
Government can make the mistake of choosing these big companies: "Picking Winners". Why a mistake? The government can never see it coming these big companies one day being overtaken by companies that were once small. Nokia is a striking example of this. By the way, we see in Germany, a successful Mittelstand. These companies can generally described

[4] Rinnooy Kan reflected on the fading away of this platform in the period 2005-2010. Rinnooy Kan was a member of this platform.
[5] The history of robber barons are briefly summarized in a special report on Companies and the States of The Economist February 22nd 2014. Historically, robber barons were real barons.

being small.
The Economist's story (*Schumpeter,* March 17th, 2012) presented two reasons why the government cannot encourage entrepreneurship.
The first reason is that the government, in focusing on moving goals, now equates the promotion of entrepreneurship with the promotion of small businesses, regional developments and job growth. However, entrepreneurs want to grow and not create large amounts of small businesses. The government must realize for real entrepreneurs' regional developments are not their major concern. The entrepreneur, starting new businesses, does not pay attention to current employment. In fact, the new activities will often reduce existing employment and create new opportunities. It has also been noted before that governments are obsessed with Silicon Valley. This model is not transferable.
The second reason, good luck and chance play a decisive role. It also appears in the Netherlands that the start-up entrepreneur is cherished too much by the regional development companies (Quangos). Incubators at Universities often act as an extension of faculty and muddle through without any growth.
Clusters of valleys arise by chance. The Internet also does not always make it necessary to be close together.
There are areas where the government can stimulate innovation, for example through deregulation but also new regulations:

1.Energy efficiency and emissions regulation[6]. 'Energy internet'. Networks with decentralized energy production. Creating energy/carbon trading in such a way that developments are stimulated. So, not "trading", but "taxing". Stringent energy efficiency and emissions regulation have given businesses an incentive to invest in clean energy. That is why the Prius (Toyota) in California was sold in large numbers. This stimulate investment in clean energy. At the same time satisfying idealism and "greed".

2.Healthcare.

3.Defense and security.

4.Demographic developments. Regulated admission of well-trained emigrants (knowledge workers).

5.Education. Entrepreneurial skills are in your genes. They can hardly be learned. It is more about management skills than entrepreneurial skills. That distinction is important. Education should focus on gaining knowledge. Missing knowledge will never be caught up in later moments of life. Set up the training system in such a way that knowledge workers are

[6] Asking for regulation seems to contradict my wish to reduce the size of The Administration. The point is: meaningful regulation and not regulation related to micromanagement by The Administration.

equipped with the tools to increase productivity. Not only in industry but also in the service sector.

6.Education innovation by individualizing education through E-learning. This will ask for the attention of education organization. In 2020 E-learning is forced upon the organization due to the pandemic. In Christensen's book, "*Disrupting Class*" this subject has been dealt with. Incidentally, reactions can already be heard from the education world along the lines of: Classroom education cannot disappear. Well, that is not the core idea in Christensen's book either.

7.Top university. Attention to basic and fundamental research. If we want to excel, we also need to create top universities in continental Europe. Improving scientific education with emphasis on engineering and mathematics: on the way to top education. By the way, I note again this is not a guarantee for innovation.
Training should reward researchers for patent applications. The government can play a role in this by keeping costs as low as possibleen.

8.Valorization trajects of research are not helpful in stimulating research. "Known roads" will be taken and serendipity will no longer be given a chance.
"*Under normal conditions a research scientist is not an innovator. But a solver of puzzles, and the puzzles upon which he concentrates are just those which he believes can be both stated and solved within the scientific tradition"* (Kuhn),

9.Focus on SMEs. Promoting entrepreneurship through pension rights, income tax, etc. and

10.Encourage industry to outsource research (not contract research) to universities.

Nokia became "Nokia" because it wanted to change itself after the government changed the rules (deregulation). However, they lost track. That's the way things are: Nokia of 2013 needed to reinvent itself to survive. See also the companies mentioned "*In Search for Excellence*". You stay excellent by reinventing yourself repeatedly. Often a board of directors can only accomplish this innovation once.

What should Government-The Administration not do:

1.Micromanagement and detailed regulations. This is obvious within large ministries, interfering with technology development. For example: Subsidies for wind power. This industry is getting lazy and not being competitive. A clear pitfall for innovation: ex novation. Wind power industry is no longer competitive, tax money lost, and the country has become poorer again. In the meantime, other technologies have not been given a chance.

2.Borders, not only open to the movement of people, but above all to offer and maintain a larger market for the start-up company. An important problem in Europe is that start-ups barely grow. Start-ups – innovators – do have enough hurdles. So, when there is still a lot of

time to be spent to have access to the European market, failure is almost obvious. Cultural differences within Europe already provide sufficient obstacles.

3.Underinvestment in infrastructure.

4.Maintaining bad schools.

5.Adopt negative attitudes towards economic immigrants.

6.Policy to promote so-called key-industries. Maintaining existing employment will be a natural preference and

7.Stimulate sectors. However, there is no way to predict where innovations will take place.

8.Industry policy. This will kill innovation at the end of the day. However, in Europe this type of policy is, to some extent, embraced again. Even in America 2020 industry policy is on the agenda. To emulate China in a way. Again, Schumpeter's *Creative Destruction*?
History repeats itself, mostly as a drama and a farce.

Can government be of some help for SMEs? It is one of the pitfalls to think government can play a role. In any case, the result of this thinking has led to additional expenditure by the government with all the known consequences that this entails, such as a sprawling bureaucracy, waste, misallocation of resources, etc. In the Netherlands, this led to a report by the Court of Auditors (2011 and 2012), the Dutch **G**overnment **A**ccountability **O**ffice, reporting the lack of identifiable results due to the additional expenditure (taxpayer's money). That is not a surprise. The government deals with the distribution and redistribution of resources. This is a democratic process and not a business-like process in which the market is the driving force.
In the above list of the not to do's for the government, industry policy is a special beast.
In The Netherlands, the industry policy of the past was about the maritime industry, e.g., shipbuilding. The Administration subsidized this industry after forced mergers, forced by the same Administration. Well, it did not work. In the period of 1980-1985, the maritime industry collapsed completely. After, the Administration and the legislation spent a lot of taxpayer's money. To no avail.
10 years before that, the textile industry collapsed. There was no industry policy for this sector. However, The Administration allowed the textile industry to acquire so-called guest workers(m/w) from southern Europe, Turkey, and Northern Africa. In this way, the textile industry could function for another decade. Then, as mentioned, this industry disappeared. However, the guest workers stayed in The Netherlands. The cultural problems stayed too. The rest is history.
Now, 2020, Europe (and the US), are seriously talking how to copy China to strengthen sectors of the industry. Implementing such a policy, whatever it takes, is a mayor mistake. The examples above illustrated what will happen. Europe should reflect on how China was

able to arrive at the present-day position. For example, being the “Factory of the World” in an interconnected supply chain. Copying China literally means, following China. The ”me-too” situation, imitation, with respect to innovation. Hence, innovation will be strongly hampered in Europe when taking this route.
Labor costs can never be a driving force for an Industry Policy. Costs will always rise. The reason to innovate. Whatever the reason some businesses operates in China, they must comply with the rules of that country. Do not mimic those rules and make up your mind.

4.2 The Administration and its Organization

The government can provide suitable conditions to promote entrepreneurship and thus innovation. The best role for the government is not to be a hurdle. A government that does not want to be a hindrance must be small. Then looking at reality, to be small, government needs to innovate back to their core activities. Is that possible? The call for innovation in government is being put forward by a governmental advisory body AWT[7]. How realistic is this, considering the nature and culture of government?
The government can be considered a large organization. The innovation culture of large organizations is characterized by gradual innovation not disruptive. However, even gradual innovation does not happen in the Administration. This is not due to lack of creativity, but due to risk-averting behavior[8].
Proposals (March 2008) for the government to operate according to the new insights on innovation – for example, open innovation, were not feasible. Open innovation is encountered in small businesses.
(An overview of types of innovation can be found in Davids et al., 2013).
The government is a non-innovative large organization, which looks for external advice on thorny issues[9] and cannot comply with these advices. It goes against the culture of the Administration. Obviously, the Administration can innovate if it were to slim down first. Then there could be a cultural shift towards, for example, open innovation. Open innovation would be ideally suited for a government because a government has overdue maintenance and could therefore quickly learn from other organizations through open innovation. Unfortunately, this is a "*Catch 22*" situation: the government is too big and too unwieldy to learn from others and will therefore not be able to slim down and create the opportunity to learn from others. An opportunity for change is a change in staffing of the Administration. This is a subtle one since you need experienced people to run an organization in a meaningful way.
In addition, the Legislation has by nature a short-term vision. Then, incremental change is

[7] A Dutch governmental advisory council for science and technology.
[8] Institutional inertia.
[9] In this way, decisions can be postponed: buying time.

most of the time “killed in the cradle”.
There is no point in comparing it to business - large versus small businesses. Where in business the successful start-up needs to grow to remain successful (Apple, Google, Facebook, Amazon), the growth of the Administration is not desirable. The impact of government growth is particularly evident in the local/regional area. A mismatch between ambition or wishfullthinking and reality. Growth forecasts or assumptions on, infra structure for businesses, educational innovations with the speed of light, etc. A black swan comes along (Taleb): a financial crisis, a pandemic, a lot of money mis invested. The taxpayer bears the brunt. Voters can force the government to innovate by providing less resources. This is a social or political innovation. As a result, the government will be able to slim down and move into smaller buildings, appoint fewer civil servants. Less policy papers will be produced. Policy papers usually at the cost of the taxpayers and yielding nothing. A policy paper asks for decisions to be made. These decisions are most of the time a bridge too far.
When a policy paper is implemented, it is done in such a hurry with horrible results. A poignant example is the botched IT resources at the (Dutch) IRS. However, it is very questionable whether this was up to the IRS. The politicians caused, by special wishes, impossibly complex software constructions.
It is not just the IRS. The estimate in 2014 of wasted tax euros on ITC projects in the government ranges from €1 billion to €5 billion per year. Moreover, it is surprising not to find a literature reference to Von Mises ('*Bureaucracy*') in the previously mentioned AWT report.

5 Business, Trade, Services, and Industry

The farmers really innovate in the Netherlands
when they start to export manure to the Otherlands

Individuals create the disruption, no government can, under normal circumstances. I exclude war-like situations.
Some 10 years ago, the "VOC"[10] attitude was en vogue, an example of entrepreneurship in The Netherlands. A metaphor or fable? May be, at the start the VOC was innovative! However, after a while it became an instrument of mercantilism. And, if there is something that does not stimulate innovation, it's mercantilism, just as the guild system did not stimulate innovation. The VOC did make use of innovations that originated much earlier. For example, new ships that needed much less crew, as much as 20%, than those of the French or English. These developments arose from the development of "*The Netherlands Distribution Country*" from 1250. This system was used again because the Netherlands (Holland) exploited the advantage of a low wage country. Smith in *The Wealth of Nations*, pages 750-770, described extensively what the effects are of operating a mercantilist system. In addition, to be a monopolist like the VOC results in long lasting disturbances when

[10] The Dutch East Indian Company

the monopoly decline and fall. The Netherlands became a rent seeking nation for more than 100 years. Recovery cost a lot of time and it will come slowly like creating a new blood vain sytem.

Craftsmanship, the Rhineland model, the guilds and "Bildung". With this title an interview with Prof. Hermans (Tue, Eindhoven The Netherlands) in de Ingenieur, No. 16. 2004, is presented. Prof. Hermans quite rightly observes that the craftsmanship, characteristic of a company, must also be represented in the management of the company. Prof. Hermans, however, is a bit more difficult to understand when discussing relationship between Europe, the Rhineland model, and the guilds. Superficial reasoning, the Rhineland model could apply to the Netherlands and Germany. (And then only applied to the "Mittelstand", the family companies). If we look a little more closely, the Rhineland model is a just a German model. An interconnectedness of banks (often business owners), management and labor unions. A model to pursue?

Germany is in Europe, but to implement the Rhineland model Europe broadly, let us at least leave England out of the implementation (2020 Brexit). Also, the Rhineland model does not apply to southern Europe (including Belgium). The Rhineland model may well have originated in the guilds. From about 1400 onwards, economic life in the cities of the Low Countries and Germany was intertwined with the guild ("*The Republic 1477-1806*, Jonathan I. Israel). The historian Jonathan Israel considered the influence of the guilds on economic life as a stranglehold. Also, in Johannes Fried's "*The Middle Ages*" the guilds are mentioned: "*On the other hand it cannot be denied that guild regulations held back competition and innovation in many trades*".

The guilds were abolished in the Netherlands in 1818. The main function of the guilds was to limit the exercise of a craft or other economic activity to members of the guilds. Outsiders were excluded in favor of children of members of the guilds. Competition was limited and production regulated. Truly, no stimulating environment for innovation!

At the end of the 16th century, the early Golden Age, economic growth arose through the relaxation of the restrictions imposed by the guilds. They had to. The pressure from the influx of immigrants from the southern countries became too great. This gave innovation the opportunity and the so-called Rich Trade (Israel) arose.

At the beginning of the 17th century, around 1610, the guilds regained power. This was the moment where the end of the Golden Age was initiated? Lethargy in the Netherlands in the 18th^{e} century may have been strongly supported by the presence of the guilds. The Netherlands became a country of rent seekers.

As mentioned before, in October 1818, the guilds were abolished by King William I. (Simon Schama: *Patriots and liberators*). It was not until around 1850 that the effect of this became noticeable in Dutch society. We should not wish the guilds back. When the guilds represent the Rhineland model then, better no Rhineland model. This is state capitalism[11] light, the disadvantages of protection and corruption included (The Economist, January 21st, 2012).

[11] Schumpeter has this model in mind?

Obviously, we should wish for the system of apprenticeship- the training as we know it from German. The best form of knowledge transfer and an incentive for innovation.
Fortunately, in The Netherlands, changes are initiated, since the business community is convinced the present vocational training needs improvement. Will there be an apprentice system, sort of? We had such a system. However, it disappeared some 50 years ago. Breaking something down is easy, rebuilding something like an apprenticeship certainly is not.

What can companies do now in 2020, keep innovating? Are financial institutions like banks also companies? It is not so easy. The government – with taxpayers' money – keeps industries going, just as in the past with various financial crises (Carmen M. Reinhart & Kenneth S. Rogoff, "*This time is different, eight centuries of financial folly"*) , the balance crises (2008-2012) keeping banks alive, and now, 2020, during the pandemic. Still, banks cannot be considered real companies. Where government, at least in the west (Angel-Saxon and European continental economies), has become much more reticent about keeping faltering industries going, the government cannot be reticent about keeping banks going. That is why in this story about innovation, banks can easily be placed in the Government organization (chapter 3). However, in this study I still place banks in business.

Innovation and customers are inextricably linked. The entrepreneur has a dream and wants to realize it. Employees know this dream. The customer, too?

Which innovation problems are encountered by business? Well, it is about to innovate or not to innovate. If there is innovation, the innovative culture could be improved, but the culture of change is there.
If there is no innovation, what to do? Can innovation be learned? Are there entrepreneurs who wish so, cries for help: "I want to change but I don't know how"?
A mature industry, for example the pharmaceutical industry, is best innovating through partnerships and joint ventures. Also, acquiring successful start-ups is a way to success. In this way, the learning curve is entered.
Furthermore, start-ups are in trouble due to a lack of finance. Often it can only be financed if the innovative idea has already almost proven itself. That is too late, since the time from "germ to cash" takes years.

To dos. Get new ideas and let breakthrough (disruption) happen. This leaves open where what is happening. Here, open innovation and closed innovation cultures play a role. It helps when a company is open to ideas of universities, suppliers, and outsider inventors. For companies that use open and network innovation, it is not so important where ideas arise. Managers need to create value from ideas wherever they arise.

The business paradox for innovation: becoming more creative as the call for control grows. Is innovation a process that can be managed?

Google[12]: Innovation is chaos.
General Electric[13] (in the recent past): the opposite is true. It is about operational excellence.
Who is right? The question is whether both are talking about the same thing. To innovate, you must allow chaos. This involves generating ideas. However, if that is a goal, innovation will lead to nothing. The idea needs to be implemented. Get the product to market.
You need operational excellence. In Eric Ries' "*The Lean Startup*" this is clearly illustrated with case studies.

Chaos is more likely to be allowed in SME. However, when that company does not grow to operational excellence, that small business will disappear again. Growth is essential.

Innovation is chaos: the first 20% of the innovation process. The process of ideas generation. Operational excellence is the other 80%: the other part of the innovation process. Develop ideas into products and/or services. The first 20% is, again, essential.
So, it is not just creativity or just execution. There is no contradiction between Google and General Electric. However, the cultural differences between the two companies are made clear by the above-mentioned statements.
It is about the filtering process and the speed to get from the creative phase into the operational phase. Avoid dying in beauty. So, innovation is a game of losers: most initiatives fail. But what innovation should you stop? Listen and respond to the needs of your customers. This is not easy, by the way. Which customers do you choose for that? It is best to choose the low and medium segment of the market and customers who are dissatisfied (Von Hippel: *Democratizing Innovation*).
As formulated by Christensen, author of "*The Innovator's Dilemma*", uncritically listening to the best customers is quite dangerous. It is often only a handful of customers and the product being developed is expensive. Consequently, it is about gradual innovations. These best customers can and will pay for it. The product remains out of reach of most customers. In addition, these best customers are often called "launching customer". However, the process of gradual innovation is disrupted by subsidies. As soon as the government's subsidy is eliminated, the launching customer loses interest.
The lower segment of the market is much easier to get into. Start-ups in this segment easily step in and eventually forces the company that did listen to the best customer out of the market. Is it helpful listening to customers? It is more likely that they are not competitive customers. Christensen discusses this subject extensively in his book "*The Innovator's Dilemma*". Apple is cited as an example in this book. We will come back to that.

Are customers willing to pay for innovations? Does the company have no experience with innovation? Then a trial running with a customer helps. Anything new creates problems, which is why the company needs an advocate. Internal: the CEO; external: the customer. If

[12] Google, some years ago. The Economist, *Alphabet, Google grows up, Briefing*, 1st Augustus, 2020.
[13] GE, some years ago. The Economist, *A GE whodunnit, Schumpeter*, 1st Augustus, 2020.

innovation is difficult but the will is there, then it is the art of moving towards the cultural shift: "failure must be possible". This means that the CEO must focus on innovation. The CEO must have a strong commitment to innovation, or the process will be stifled by procedures. However, the CFO should not be sidelined. Innovation must create value. The CFO is the financial sparring partner. It also prevents precise financial models from being applied for the further development of the projects. A great accuracy has no meaning. The CEO should adopt the projects. In the Netherlands we see this happen with founders/owners of companies.
In large companies, often listed on the stock exchange, the governance model is focused on consensus and consultation, and that inhibits innovation. In any case, the process of innovation for management is to make choices. Cultural aspects in the decision-making process play an interesting role. Here, too, the role of the CEO's involvement is important. The CEO forces the choice. At least in the U.S. This will be much less so in Europe. In Europe, consensus plays a major role in decision-making. When the CEO is not directly involved in the innovation process and if the decision-making goes, as usual, through the appropriate hierarchical lines. Hence, when the proposal comes on the CEO's table, the original proposal is watered down and the proposal reflects the culture “that's how we do things here now". Creativity is smothered in control.
This is not exclusively characteristic for a large company. Some directors-owners of a small business will also be affected. What is characteristic is that the consequences are felt much more quickly in a small company than in a large company. The involvement of the CEO gives the employees at least the feeling that they are important and that they can exert influence. The CEO's involvement can also help create changes in the field of patents. Is there a need for patents? What to do with existing patents? How many are used? It is not just that unused patents can make money by selling them directly. Money is also indirectly earned by others starting new developments with the patents sold or donated, of which the "donor" of the patents has commercial advantage. Again, ATT can be cited. And the important role of individuals: Kelly the CEO of the Bell Labs stimulated applied research and what we now call basic research. He found both types of research the same side of the coin. The same was true of Casimir as president of Philips NatLab. Between 1950 and 1960 many researchers visited the Bell labs and information was freely exchanged. Open Innovation “avant la lettre”.
An almost extreme example of engagement as CEO is Jobs. The founder and CEO of Apple. Involvement in product development and market development and especially the interaction between the two (“*Steve Jobs*", Walter Isaacson).
Innovation is strongly determined by the executives. In this way, innovation in a company can also be negatively affected. There are also examples of this at Bell Labs. Jack Morton (vice president of device development, Bell Labs) did not allow the development of the chip[14](integrated circuit) because he felt too many failures would result. So, the

[14] The basic principles of the transistor were invented at Bell Labs.

development took place elsewhere, at Fairchield and Texas Instruments, by people who thought that the manufacturing errors would be fixed. Chance and luck continue to play a big part. (Taleb, Nassim N. *"Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets*"). Can innovation also be quantified? Given the importance of serendipity, as mentioned in the introduction, it is better not to make attempts at quantifying innovation, like productivity is quantified.

Companies that outperform their competitors are making many innovations in their business model. Open innovation is an example of this.
What is crucial in the company? At Walmart, it is the flow of goods as part of the business process. Another example is an importer importing products from China. The producers in China want to put their own goods in the European market, for example. The importer can respond to this. The producers from China want their own sales offices and assembly lines. A good opportunity for the importer to innovate, for example through a joint venture.

Out of the box thinking courses do not help. Innovation is part of the company's culture: the will to survive. Every time: know what the customer's preference is. Sometimes simple improvements and sometimes breakthrough/disruptive technologies. Moreover, listening to customers should not be used as an absolute condition. Or another variation on Henry Ford's famous statement: "*If I had listened to customers, I would have bred a better horse and developed a better carriage*". Watching the customer is doing is better than listening to the customer!

Innovation drives research, not the other way around. There are great opportunities for universities when the business community is confident to outsource research to universities. Moreover, this approach is the basis for open innovation. Open innovation is promoted by Cherbourgh (de Ingenieur, *Open Innovation*). He indicates strong focus on R&D not to be enough to innovate. What matters most is that the R&D is open to what is happening elsewhere in a company and outside the company.

How fast should you be able to start a new business (within an existing business)? Quick start in a way that does not suit a culture later causes problems. How does entrepreneurship become attractive? Can education play a role? As mentioned before, I do not think so. How do you show the process of innovation in vocational training when the customer plays a decisive role?

In any case, small business are most of the time better suited for innovation, and disruptive innovation. Obviously, the contact interface with the environment is greater for smaller companies than for large companies. For example, if a large company is cut into small businesses, the "surface of contact", interface with the outside world (customers, universities, government and competitors) is twice as large as the large company is divided into 8 smaller companies. Can large companies split into small businesses? Outsourcing non-

core activities, is a tool and helps in the process of shrinking the organization. Moreover, we note what are now called core activities, changes tomorrow into non-core business. An overview of the developments of outsourcing and offshoring can be read in The Economist of 19 January 2013.
So "smaller is beautiful", but still not popular. Do entrepreneurship only thrive on small scale? In any case, top management must manage the innovation projects hands-on. This indicates small scale. With the acceleration of innovation (through openness) it is to be expected that a company that is unable to renew 10% of its revenue annually will price itself out of the market in about 5 years.
In 2020, we see the incumbents renewing itself by gobbling up promising startup companies. Well, at the end of the day this will destroy competition. Since there is no longer competition, why innovate? Is Apple still innovative, is Facebook? These incumbents are busy with their lawyers in a reactive way to deal with, e.g., the Eu on taxation and privacy problems.

A prerequisite for innovation and disruptive technologies is that the companies are "slim" and included in networks. Hierarchical organization will disappear. Subsidies have kept these companies going for too long, so-called zombie companies.
Create new jobs and try not to keep old ones in place. This is a message from business to politics.

Small changes through (incremental) innovation suit large companies. Large companies are interested in retaining their existing customers. (Christensen: *The Innovators Dilemma*).
Small businesses are better able to manage disruptive technologies and are less affected by vested interests. Small businesses are better able to think in terms of a new business model; so, the money can also be earned in another way. Also, a small company suffers less from the "not invented here syndrome" and" this is the way we are doing business here". In the Discussion about the contrast between large companies versus small companies, it will be clear that the contrasts are a bit more nuanced. About that later.
There are also many ideas on the shelf for SMEs. Here, a catalyst is likely to be needed to launch an additional innovation process. A knowledge/patent broker trusted by the SMEs can play this role as a catalyst.
Partnerships also help. The step must be made to enter cooperation. If that step is made, and trust is there, the process will run smoothly. The result is open innovation. Then the step to find cooperation with a University can be made. The relationship with a University must be meaningful in terms of content. Students must be able to graduate and/or obtain a PhD. This is about long-term partnership. In the Netherlands at the University of Eindhoven such the partnership Devlab (www.devlab.nl) operates.
SMEs should act as co-organizers of such partnerships. Open innovation takes shape in this way. It is about the participants trusting each other. An independent mediator can play a role in building up trust. All kinds of cooperation are often better than growing through

acquisitions. It is often overlooked that the acquired company is a competitor. The associated culture does not just disappear from the newly formed organization. This is negative innovation (ex-novation).
It is also understood that there is too little knowledge of the innovation process among SMEs. Well, may be. However, it is useful to learn to implement a good selection system for the innovation projects as soon as possible. It is about learning by doing. The director/owner of the SME company plays a key role in this. There are no laws for stopping the less promising projects. Knowledge of the market/customers and knowledge into one's own ability are the driving factors.

Patents can also play a role in innovation. Little research has been done on the role of patents in the innovation process. What is now known gives a mixed picture of the influence of patents on the innovation process. A well-known example of the negative influence of innovation is the role of James Watt in the development of the steam engine. The influence was clear: the efficiency of the steam engine could be improved after the patent of James Watt had expired. The question that can be asked here is: Were the improvement of the steam engine around 1800 just "in the air"? What is known is that the development and application of patents varies from industry to industry.

Banks have reached the limits of their innovation capabilities in the early years of the 21st century. Banks need to learn almost from scratch what it means to serve customers and innovate for customers. Their financial products need to be reinvented. Test procedures as usual in the industry for product safety should still be invented for financial products. In doing so, banks can learn a thing or two from the pharmaceutical industry.
"*Financial innovations offer the possibility to share and spread risks. This is good for both growth and stability. Only misuse is harmful*." The last line of Prof. Prast's column "Exchange" in the Financieele Dagblad of 3 July 2009. How prescient.
Two aspects of financial innovations are mentioned: risk diversification through innovation and misuse of innovation.
First, risk diversification through innovations. Has risk diversification done the job? Mortgages were cut into pieces and repackaged with other financial products and sold again. This went wrong and in the first place with subprime mortgages (junk mortgages).
In the past, it was recalled that these subprime mortgages could cause a problem (W.D. Cohan, *House of Cards*).
On the other hand, it was thought to be easy since subprime mortgages represented just a small percentage of the total mortgage portfolio. Since these subprime mortgages were incorporated into all kinds of structured products, it seemed the risk to be sufficiently spread. Unfortunately, it was not. Literally, it can be argued that these subprime mortgages have thoroughly infected the financial system like a virus.
What next? The word 'infection' imposes an approach. (Compare the spread of risk in the financial system with the spread of a virus among the population). It is about the procedure

used in the introduction of new drugs. Trust plays a major role in both the financial industry and healthcare. New drugs need to be thoroughly tested and meet many requirements before the health regulator (FDA) allows these medications. New financial products should be tested in a similar way. As a result, it may take some time for such a product to enter the market. It may also be that such a product is not permitted. That is okay. Our financial system has existed for centuries and is based on trust. Careful testing of these products will restore confidence.

It will also give rise to more innovations. A new challenge is emerging for well-educated people. Economists, mathematicians, physicists, and psychologists will develop new test procedures and use new simulations, scenarios, and economic models.

A lot of data on what can go wrong and had gone wrong is available. So, there is a lot of experimental data on false positives and false negatives. Data mining, the use of AI, expert systems, etc., can be applied (Noordzij, 2). As a result, the financial industry may be less distinguished with respect to other business sectors by new products. That is okay. The financial industry, and banks, will have to learn to distinguish themselves by knowledge of the market (customers) and knowledge of tested products. As a result, the financial industry is regaining insight into new products tested. However, unfortunately, tested innovations (including medicines) will continue to be misused.

CEOs tend to listen to consultants/gurus. Often, they know for themselves that it is better not to do so anyway, but it still happens again and again. Gurus deliver the message such as: stick to your core activities or reinvent yourself. ‘Stick to your core activities’. Oh, then what? What about innovation? Or is it meant that you must innovate only the core activities? Disruptive innovations are certainly not one of them. Disruptive innovations take place at the edge of the core activities. These innovations require special attention and a separate organization. Disruptive innovations is not the same as reinventing the company. The latter applies to the whole company, while disruptive innovations take place at the periphery without the whole company being involved.

A variant of "stick to the core activities" is "keep it simple”. This advice is obvious, actually a kind of conservation law, since organizations become more complex as they grow. Complexity is a major obstacle to disruptive innovations. However, by focusing on simplicity, there is no need for disruptive innovations in the leadership. It is understandable that simplicity of organizations is a lesser obstacle to major changes than complexity. Simplicity is certainly a prerequisite for giving disruptive innovations a chance. However, it is not sufficient.

6 Politicians.

What role can a political party, as a member of the Legislation, play in innovation? What general resources are already being used that are thought to contribute to innovation? Politicians plays an important role in ensuring the physical safety of citizens. An important innovation is when politicians would also be concerned with the financial security of citizens.

In the latter area there are many opportunities for innovation. Financially secure are those products that are simple and therefore understood by the citizen. It is also safe for the citizen if he/she does indeed have property instead of debt. Her/his property must therefore exceed the debt. That is certainly not the case in the Netherlands. In our country there is extreme debt formation rather than possession formation. The Dutch citizen has a mortgage debt which as a percentage of GDP is the largest in the world. There can be no financial security here. Are improvements possible? Are innovations possible?
In the Netherlands, the political players have each other in a kind of hold regarding the tax advantage of the mortgage interest deduction. Maintain it or not? 'There are many roads leading to Rome'. It is important to determine which way is the most optimal. Who has the greatest tax benefit of the mortgage interest deduction within the precondition of financial security? That is the starter in the housing market. The mortgage product should be safer and more understandable. Example: The starter can only get a mortgage with a linear repayment schedule or a base of annuities and 10% equity. Then, property creation is taking place and the citizen is not burdened with excessive debts. Debts that become dangerous when house prices fall. Advantage for politicians: the interest deduction is no longer an issue.

Are we talking about innovation in the public space or innovation in the private space? This makes quite a difference. Innovation in the public sphere is about improvement in processes used and/or governed by government and politicians (local, regional, and national). The government will hardly be able to play a direct role in innovation in the private sector.

Innovation takes place when the market demands it, latent or explicit. What do the customers want, in this case the constituency? What can a political party do? In infrastructural projects, politics can certainly play a role by streamlining processes, such as participation procedures. To absorb new technologies, basic forms of infrastructure are provided as a condition.

Politicians can play a role where it can exert influence, for example R&D subsidies. However, 75% of successful innovation depends on social innovation (Business: flexible organization and management with a long-term vision). Only 25% is accounted for by R&D. In fact, innovation drives R&D. As a result, the call for a larger R&D budget leads to nothing and it is up to the politicians to communicate this and not use general resources for R&D.

In the public or semi-public space there is fertile ground for innovation. Is it going to happen? Not necessarily. Renovation of homes from the 1950s and 1960s and the use of advanced energy savings creates fertile ground for innovation. Everyone is talking to everyone, a lot of desk, lots of rules, a lot of commissions, a lot of consultants, etc.

High levels of taxes and social security contributions generate negative incentives for entrepreneurship. Potential employees are subsidized into inactivity. Consequently,

subsidized into oblivion. The larger the public sector, the more the population depends on the transfer of public funds and the smaller the proportion (of the population) that is open to competition. This creates a negative impact on the growth of the economy. Why do so many people choose a job in governmental organization?

The employee, at least in the Netherlands, may have more leisure time, but they are forced to be active in the unofficial economy. Consequently, the level of taxation is too high in the official economy. It would be wiser to devote more time to be active in lifetime learning. In this way, an employee remains attractive for an employer. This will benefit economic growth. Painting your house can be outsourced with all the related positive effects.

A topic for innovation is "No Borders". Do we have a real European Economic Union with uniform standards to support technology development and application? Each Member State introduces its own electronic health data system. The wheel is invented many times. Waste of innovative power. This also applies to traffic control and toll systems. Venture capital neglects such a fragmented market.

Because of our compulsive tendency towards consensus, there is also a huge regulatory drive. This puts a high pressure on the labor market due to a high demand for knowledge workers(m/w) for the government. Politicians need to have the will to reverse this. How? If we leave this to the civil servants themselves, the politicians will be overwhelmed by arguments to increase the civil service because they are doing a good job (Noordzij). However annoying, the politicians must dare to decide to reduce the ministries. This provides a strong leverage effect: knowledge workers are released for the market and leading to productivity increases and, as a bonus, taxes can be reduced. Voters will have to show that they are tired of national politics dealing with details without looking at the consequences.

Politicians can provide the means together with employers: education. These are long-term issues. Alas, politicians are too busy with details like merging or demerging of schools. Without considering the consequences. The least they could do is to consult people with at least 25 years of experience with education.

Politicians cannot do anything about cultural change in a company. However, it can ensure more flexible industrial relations so that new challenges are more easily addressed. Because disruptive innovations are more likely to occur in smaller companies than in large companies, politics can focus more on SMEs. It is obvious, too. In large companies there is still often an attitude of 'this is not how we do this here'. Subsidies for large companies are therefore simply pointless. A large company will not change track by being subsidized.
The best to do is, I repeat myself, to reduce regulations.

In continental Europe there is a risk-avoiding culture. The cake is divided rather than enlarged. Furthermore, a chronic lack of knowledge of the customers also affects the success of entrepreneurship. It is strange that the fear of failure is so great while the risks are so small given the social security system.

Politicians can facilitate business by:

1 Reduce income tax,
2 Abolish rules and especially rules creating hurdles for SMEs,
3 Managing, in the Netherlands, knowledge institutes (GTI's) differently. Politics can be coercive here. However, the Administration do little. All ministries have their own "Love Baby". The political parties must ask themselves what use an organization like the NOW (NSF, sort of) has: it should come as no surprise that this type of organization leads to groupthink. Research proposals which do not fit into what is generally accepted are ignored, resulting in scientific fraud (2011). The Universities are designed in such a way that organizations such as NWO are redundant. The quality of the Universities is of paramount importance to politics/government. It is a mystery how quality can be realized if the same politician/government takes € 100 million from the universities (anno 2008) and this money is pumped around again via NWO. Such a bureaucratic attitude costs at least 20% of € 100 million,
4 Education is certainly an issue that should be high on the agenda of the political parties. Making choices and reducing fragmentation,

5 Simplify the tax system

6 Homogeneous European market for products, services, and labor. The knowledge worker is hardly mobile. That is weird. A knowledge worker attaches to her/his specialism. That environment is being sought.
7 Show political courage and abolish subsidies. How high should subsidies be so that the incentive to innovate persists and does not discourage innovation? Why be competitive on costs when subsidies are being given and why should we innovate at the same time? The Economist Sept. 13th, 2008: "*Grants lead to the hiring of lobbyists and not to the hiring of scientists"*.
Subsidies ensure that start-up entrepreneurs are over-pampered. In such a way that the starter does not feel the need to grow. Furthermore, a subsidy is politically sensitive. On the other hand, politicians will protest the high cost of these subsidies. This in turn leads to great uncertainty in the industry. The result is that there is no in-depth investment. As a law of nature, government is not qualified to determine the content of innovation programs. As a result of the abolition of subsidies there is room to reduce company tax further, for example. There is also room to better finance education programs for vocational training. The additional advantage is that

the risk of fraud is reduced. In addition, a lot of capacity is released on the labor market. All kinds of lobbyists and consultants return to a real job.

8 It helps for politicians to think about what they mean by "Knowledge economics" and "Competence economics". This kind of newspeak you should not want. Nowadays, an installer is very competent in explaining why he cannot do the job and in delivering the mobile number of the Polish craftsman.

9 Pensions. Politicians can play an important role in encouraging innovations in the pension fund ABP (The Netherlands) for civil servants. As a supervisor, politicians can ensure that the investment experts at the ABP are indeed experts. It cannot be a large pension fund to be dependent on, for example, JP Morgan (Financieele Dagblad 2011-12-09). The ABP can find out how the investment products are composed and the related risk profile. The ABP could and should have known what has stimulated the creation of subprime mortgages: politics in the USA. Already under presidency of Clinton, banks were forced to issue mortgages for people who could certainly not meet their obligations as early as 2008. (See *House of Cards - How Wallstreet's gamblers broke capitalism* by W. D. Cohan).

7 Discussion, In Search for the Holy Grail

Education and, above all, top education is a precondition for innovation at world level and to make something of the, now (2020) obsolete, Lisbon agenda come true. However, this condition is unfeasible in the Netherlands and continental Europe. In continental Europe, no university is in the world's top ten universities[15]. We, in the Netherlands, could do something about this. But we cannot and will not do anything about it since the fulfilment of the condition for top education is not feasible in the Netherlands. The Dutch political system would directly mitigate a development towards top education, and that makes sense. Education is mainly paid for by the government from general resources (taxes), so politicians are inclined to distribute these resources evenly. For top education and top research, the qualified student or PhD student will leave for the United States[16] (or France now) and we just accept that. Despite all the wishes for top education, we should not want this in the Netherlands. We cannot organize it, and let us not talk about it anymore. The advantage of this is that we can end all kinds of initiatives for top institutions. The funds that are earmarked for these institutions should be returned to the providers: the taxpayer.

In *"Thinking fast and slow", Kahneman* shows that risk aversion at loss is much greater than taking risk with probability of profit. The reference point "what I have is good or can be

[15] It is improving. The University of Paris-Saclay "…*stormed into the Shanghai world university ranking, grabbing 14th place overall …..*", The Economist, *French higher education, Section Europe*, August 29th, 2020.
[16] At least in the pre-Trump era.

better" plays an important role. How can you use these insights to stimulate innovation? This question can also be raised about Lehrer's research, *“Imagine: How Creativity Works*”. So, how to use neuroscience research to gain insights about ability for innovation? Does it make sense to use this knowledge to vet an organization so that insight is gained in being an innovative person.
Developing a predictive model of the innovation attitude will be difficult. Every employee is unique. What might a research proposal look like? Invite consultants to test the staff including the management with the fMRI and EGD? In any case, you can assume that 10% of the staff is creative. Give them room to maneuver. If "*Innovation is not organizable and you have to organize that"*, is the research on the innovation potential of an organization only analyzing and is synthesis by definition or by nature impossible?
Subsidizing "innovations" leads to waste of taxpayers' money. Especially if it goes hand in hand with stimulus policy. A poignant example of this is the subsidy granted the solar energy sector in the former East Germany. Grants stimulate organizations to become lazy. If there is some competition, for example from China, the subsidized organization will be finished quickly. Is a separate innovation budget in an organization a tool? Or just take care of meaningful conditions (Lehrer) to stimulate innovation?

A recurring topic in innovation is: teamwork or no teamwork? Is a team more innovative than the individual or is the individual more creative? (See: *The Idea Factory*, *Imagine: How creativity Works* and *Quiet: The power of Introverts*). A team or an individual seems to be a contradiction, but the contradiction is only apparent. However, when forced to work in a team, there is a tendency to create mediocre solutions. When people can seek cooperation themselves, there is a much greater chance of disruptive solutions. This search for cooperation arises naturally when working on complex problems. However, parts of these complex problems will again be addressed by individuals/specialists. The leadership will have to stay in the background as much as possible. Forcing cooperation will not produce a good result. Not everyone is happy in a team.
For example, what does this mean for education organized in the structure of projects? There is always with this form of education the free riding problem. And that is even worse than the “regression to the mean" problem of teamwork.

7.1 Government/Politicians

In section 3.3, I mentioned two types of innovation for Government/Administration.
First there is innovation within the organization of the Administration. For example innovation of internal processes, etc.
In the second place innovation of interfaces with the constituents (government services), aspect of the so-called entrepreneurial state (coined by Mazzucato), etc.

An important point of discussion is: the government itself must innovate(the first type mentioned above) and that will not happen. Unfortunately!
To what extent could creativity blossom within the Administration? At least, creativity damages the hierarchy. Can that happen? Can the government innovate? Creative ideas are vulnerable. Many will not lead to results. If that is not acceptable, the government does not allow itself to worry about creativity within its own organization. However, the government can indirectly stimulate innovation by slimming down. For example, many highly trained people/knowledge workers become available for the labor market. The knife cuts both ways: taxes down and productivity up.
Will this process ever get underway? This has been mentioned many times in this story and we keep repeating it: the government needs to slim down! The voter/citizen can enforce this. The customer/citizen/voter will be able to take more responsibility for health care centers, housing associations, nurseries, and education. These organizations can be structured in the form of co-operations in which the user plays a major role.
Politics no longer needs to deal with this in the form of micromanagement. That type of management is leading nowhere. Here slimming presents itself once more starting with politicians. Since politicians can no longer be engaged in micromanagement, they are superfluous. The House of Representatives (De Tweede Kamer, The Netherlands) can be reduced with 50%. Resulting a huge reduction in questions, related with micromanagement, to be answered by the Administration. This again means that no more questions are being analyzed by the policy staff of the Administration. Consequently, these employees can look for new challenges in the market; the Administration can be slimmed down. Taxes can be reduced. The taxpayer can repay its much too high mortgage or spend the free money elsewhere in the economy. Perhaps saving for difficult times such as reduced pensions. One way or the other: a positive feedback.

It could all get worse and it could be negative innovation in government. For example, in 2012, it appeared the government to be as one of the worst debtors. There is a proposal to fine the government in the case of overdue payment by the government. A cigar from the taxpayer's box. Again, the responsible civil servant and/or politician does not feel the pain since he/she is busy with other people's money. A real breakthrough innovation is when the fine is paid by the salary reduction of the official concerned.

Politicians and the government can ensure suitable framework conditions for education. Wanting to regulate as little as possible is one of those preconditions. You can achieve that, we say it again, through a reduced Administration: few people can make fewer mistakes. The few people who staff the ministry of Education should only be employed with at least 25 years of experience in education and research. Pay these people well, too. Let the Education organization take care of everything. In this way, even more top-notch training may still emerge despite the above observations on top-training.
There is a parallel with a distant past: the Senate of the Roman Empire functioned only well

when it was staffed by senators with experience in the areas that ensured the continuity of the state. When this link was released, and the Senate began to outsource its core task – security – the demise of the Roman empire was ushered in.

Secondly, can the government play a stimulating role in innovations?
The best role of the government is not to stand in the way. Subsidies are pointless and abolishing them will make many organizations healthy. However, there is no political will there. Playing with the money of the taxpayer is the prerogative of the politician.
Subsidies of innovations are pointless. Whether it are products, processes, or creative business models. Government subsidies create innovation laziness: ex novation. Not only innovation laziness, also innovation rigidity. Because the politician/government cannot or dare not make choices, consensus is sought, and SMEs are forced to cooperate with large companies. That does not work. A large company is primarily concerned with continuity[17]. A new development in an SME which jeopardizes that continuity will therefore be thwarted or even hijacked. Why would a large company with all institutionalized interests share its knowledge with SMEs? It is stupid/naïve to think that big companies support initiatives that jeopardize their investments and vested positions.
The politicians/government cannot and will not make choices between large and small companies. It is also easier for the government to work with large companies than with small businesses. Then they do not make mistakes by choosing the incumbents.
An important consideration is to have no subsidies at all. This is, moreover, an important innovation in government policies and beneficial to the taxpayer.
The government can spend taxpayer's money but cannot influence creative thinking. In a conditional sense, something can certainly happen. This includes a flexible labor market, start-up capital, bankruptcy law, etc. Furthermore, the government can facilitate in attracting competing companies. At least for the Netherlands stop with smearing out taxpayer's money among counties. Money is then spread far too thin. Everybody gets something, so actually nothing.
The grant tends to be allocated to the incumbents. As mentioned, the government does not want to take any risk. At the same time, decision-makers in the public sector are always too slow and insufficiently informed.
Whatever the expectations the government has of large technological institutions (GTI's) and other government-sponsored organizations, they play no decisive role in the innovation process. Obviously, these organizations maintain employment, but that is not what innovation is about! It is about creating new jobs.
Sometimes it is the observation that the aim of these GTI's is to increase the innovation capacity of the Netherlands. To increase innovation capacity? Of whom or what? Innovation capability is there or is not there. So, this increase is not going to happen, and it is not to be

[17] Google, Small, Big? Ambiguity: The Economist, *Google How to cope with middle age,* August 1st , 2020.

expected.
In The Netherlands, the government is of the opinion GTI's to play an important role in the innovation policy of the government. Where is this opinion based upon? It is to be expected that some of the employees of GTI's are involved in innovation. This can lead to the fallacy the product of a GTI, a government sponsored technological institute, is innovation. This cannot be. In an organisation as big as all the GTI's together there are statistically always a couple of employees involved in innovation or better, of inventing something. In that case, from a top down point of view, it seems the research program of the GTI's produces innovation. This is bogus. The research program and particularly the details of that program are produced bottom up. So, the employees responsible for producing the research program can implement their projects into the program. As a product of these projects this sometimes results into an invention. This is the reason why GTI's needs to organise so-called innovation markets to find companies which can further develop this invention into a product for possible clients. This is the world turned topsy-turvy. Unfortunately, the Dutch citizen is taxed for this kind of activity. Furthermore, the GTI-employee would be better of working directly for an industrial employer. I did not mention the level playing field for GTI's and the market for commercial research and development.
There is an important role for GTI's by supporting universities in bringing universities' knowledge to the market. In addition, the GTI's can be active in acquiring research budgets for universities. Of course, there is the possibility a GTI really innovates. In that case the best to be done create the opportunity for the involved GTI employee to start a company.

The call for an industrial policy is heard again in 2020, mainly due to China. Related with that, we can also hear the wish for vision of the Administration. Well, I prefer no vision at all. With a vision we will be got in the trap of plan economy (5 year?). This has no relation with serendipity.
Let us say that the Administration had seen the light and made proposals for making the European labor market more flexible. Imagine the Administration deregulate the European market for products and services. A real incentive for new, innovative companies.

If the thinking is the government would know what the research money should be spent on, then the faith in Sesame Street is still alive. Think again of the scene: "The king addresses the chief inventor: 'Invent the toothbrush' "? Or put it another way: targeted research is a contradiction. Philips was working on lasers without anyone immediately realizing that the CD player was emerging? In The Economist Technology Quarterly of 6 Sept. 2003 and in Intelligent Life of Jan. 2012, serendipity is highlighted once again. 70% of the innovations arise by chance/serendipity. But people need to be prepared or be open minded for serendipity. Serendipity cannot be part of a policy.
There would also be a shortage of technicians. Is that true? If so, it could be easily solved by an adequate renumeration. Predictions? According to the forecasts, 20 million people should now (2020) live in the Netherlands. Instead of predicting, we should be more open to

"the black swan" (Taleb).
Assume a shortage of technicians, and the Administration stopped subsidizing GTI's, then 2000 highly trained technicians would suddenly become available for the market. Over the years, billions have been invested in GTI's. This did not result in a "Dutch Nokia", or whatever. However, Nokia drops out of the top of the high-tech communications industry. That will happen all the time. There is nothing to do about these changes in the market. In the Netherlands there is a worldwide operating high tech company: ASML. ASML, a world leader in the semiconductor industry. A spin-off of Philips. No industry policy.
Industry policy leads to disasters: picking winners. With the result government/politicians continue to pump money into incumbents. Just creating zombie companies and monopolies with taxpayer's money.

The government would be wise to sit down regularly with investors in start-ups and to find out what the investor's motives are for taking the risks. From this, the government can also learn what not to do. Since investing in a start-up is an innovation.

But should the government/politician do something? The government should not be concerned with technology. She is always late with choices and always has too little market information and too late. The government should therefore not interfere in the assessment of which technology should be invested. She does not bear responsibility for these choices either. Does a politician or a civil servant go to jail if, say, the investment in fiber was pointless?
Investments must be recouped. What do the customers want? Let the cable operators provide fast connections and ensure better integration of networks. The customer is not really interested in network technology. The business community is taking care of technology and technology improvement. With innovation, the critical person is sometimes a hurdle. This is entirely the case with the government. In ministries/governments, the fear of things that are new and outside frame of reference is remarkably high.

More money for education and research is needed. However, there is no clear relationship between the size of these resources and the degree of innovation. Moreover, it requires a detailed observation to distinguish research from innovation. Research, based on a paradigm, means a theory is developed. This theory is tested by experiments. This can lead to adjustment of the paradigm. By using this scheme, innovation can be distinguished from research. Moreover, the accompanying phenomena in paradigm change (destruction, Kuhn) are very similar to the phenomena in disrupting innovations: uncertainty, crisis, etc.
A recurring theme in the discussion is the relationship between education and what is sometimes called the innovative power of the Netherlands. Fortunately, innovation power cannot be defined because it would soon become clear there is at least no direct relationship between training and innovation or innovative power. Innovation goes hand in hand with serendipity. This can be formulated even more strongly: there is no direct

relationship with education at all. Suppose there is such a thing as an education focused on innovative power, then money still must be made by providing products and services for the market. In addition, education leading to innovation solved the problem of finding the holy grail.
In the USA, innovation capacity is felt to be lost because there is too little investment in vocational training (mathematics) and research and development. However, this will have only a small effect on a country's innovation capacity. The important inventions and ideas which highly educated people come up with are easily disappearing abroad. If China spends a lot of money on educating scientists, then China can't stop America from innovating based on the Chinese inventions due to a better business model.
Better vocational training for production staff and managers is preferred above educating even more scientists. There, Dutch politicians played a negative role in systematically breaking down technical vocational training. A drama from the 70s of the last century. The years of the makeable society fueled by the natural gas money, the Dutch Disease. This resulted into gigantic vocational training centers (ROCs) created by politicians with vocational training programs without any relation with the market. In 2013 these ROCs are downsized again. This movement is being welcomed by politicians again. So, these politicians have become redundant. Another argument to halve the House of Representatives (Tweede Kamer) with the result that the Ministry of Education can also be halved (or even more). Voter/citizen take your responsibility!

For some large companies, unless they are not monopolists, innovation is “business as usual". So, what is the point of providing these large companies, say, with €100 million for innovation? The politics of the grand gestures. Useful? Certainly not! Prefer the politics of small gestures so that a few projects can fail and the chances of something new are the greatest. To guarantee this, SMEs need to be involved.
Is the government/politicians capable for distributing money?
If there is a government/politicians which takes on a more extensive task than is strictly necessary, taxpayers’ money will be distributed by the Administration on top of what is strictly necessary. Certainly, results are achieved by the government (*Government and Innovation*, www.leennoordzij.me). Subsidies support the incumbents. Why, allocate the money to the "established order"? Is there's not enough innovation? How much is? Do we establish that macroeconomically as a derivative of GDP growth or productivity growth?

Innovation depends to a large extent on the creativity. Creativity, and consequently innovation, is not a product. The opposite is true. Most innovations arise by "targeted" coincidence: serendipity. Policy does not make much sense, especially if it leads to the distribution of "A pot of money for the established order". The government cannot manage this. Of course, the government will govern, but not govern innovation. The government/politicians as usual, possesses incomplete information from the market and consequently makes wrong decisions. The government/politician are aware of that I

suppose, wants to prevent these wrong decisions, and therefore opts for the established order. The so-called "backing winners". By the way, "backing winners" change into "backing losers". The circle is completed, and the innovation process goes its own evolutionary course.
Can't the government do anything? Of course, the government can. The government should focus on making the labor market more flexible. In this way, creating conditions to make it attractive to start a business. It must be a challenge to be able to hire staff easily for a start-up entrepreneur. If an innovation cannot be developed properly and the company must be terminated, it is also easier for the staff to be contracted by another company. It must be attractive for young and especially old people to enter and move into the labor market. In addition, has the regulator, the Administration, any idea about the costs for a start-up in The Netherlands, when one of the employees fall ill? The end of the start-up. This is where the government can do something.

"*Sunless solar" and the "biofuels bust" (*The Economist November 8th, 2008). Subsidies are popular, but theory and practice teach subsidies do not help very much. Subsidies for clean energy require politicians who make proper decisions about the allocation of subsidies. However, their judgment is probably worse than the market's judgment. Ethanol is an example of sorts. Large amounts of subsidies have led to overinvestments. A sharp fall in oil prices may lead to a "bust", but in the meantime food prices have gone up with painful consequences.
Germany's generous subsidies for solar energy have given rise to many solar cells in a country with little sun. The price of silicon went up sharply, drastically reducing the cost of effectiveness in countries with lots of sun. Additionally, the solar cell industry largely disappeared from Germany and is (2013) in China. So, there is no easy solution to economic and climate problems. However, by combining climate change with the economic problems (credit crunch, recession and pandemic 2020) the right challenge can be found.
For politicians, it is important to realize that public organizations (quango's) are being everyone's organizations. As a result, no one feels responsible for these organizations. The usefulness and necessity of these organizations is hardly assessed. However, these types of organizations are held accountable for many things. So, the public is given the idea that the range of solutions to problems in society is large. The responsibility of the citizen is hardly addressed. From Overhead to Overheid (Government).

Ministries should only be staffed by people with 25 years of practical experience. It is nothing short of nonsense for a recent graduate working for, e.g., the Ministry of Education to write policy papers when this policy officer has not an hour experience in front of the classroom. (Think of the composition of the senate and the demise of the Roman empire, Edward Gibbon).

Politicians should not be involved with purchasing power of their constituents, especially if there is no understanding of the relationship between productivity growth, inflation and collective wage increases. Each time it is argued the wages must rise at least with the rate of inflation. Why? It is also up to politicians to explain that if the tax or premiums are increased, this should not be compensated through collective agreements. By increasing taxes, purchasing power does not decrease. This increase of taxes is used for something else. For example, safety, or health care. Choices are made by people who are democratically elected. These people, the politicians, must explain that. Purchasing power does not decrease where the power of choice is applied

Innovation in healthcare is urgently needed. It is often noted that care becomes unaffordable. That need not be a problem were it not for the fact that citizens also regard health care as an inexhaustible source of services. This is the case with the cost of products covered by insurance. The insurance is ours and therefore for none of us: grab it. Health care is considered a necessity. The same applies for food as well. Then organize health care as such and end all insurance. Or let the insurance be entirely voluntary. The health care insurance does not reimburse the costs of your bike while it is healthy to cycle. Another possibility is to deal with health care insurance as default option.

In the past, advisory committees in the Netherlands where neglected by the Administration. Why? These committees were aware of the high risk involved when accepting the highly uncertain results of financing innovation projects with taxpayer's money. The Administration did not want to deal with the uncertain outcomes of the innovation process. There will be many failures. That is not what politicians are waiting for. When will scientists stop participating in such advisory councils/committees? If they do not come up with any advice that fits The Administration, then the advice is shot down by politicians. That is the logic of politics. The advice should "fit" with The Administration's possibilities. So, why needed a committee anyhow? Obviously, waiting for the advice, The Administration can postpone decisions concerning the subject matter. On the other hand, this is a waste of knowledge of highly educated scientists. Consequently, abandon the committees. This saves taxpayers' money and allows the scientist to do work for which he/she has been educated.

Researchers at Universities and Institutes are struggling to raise funds. Research proposals need to be produced. In the process of evaluating these proposal organizations such as NOW (NSF, sort of) are involved. This process consumes a long time and therefore no or hardly risky proposals will be made. One will not deviate from the appropriate paths because the decision-makers do not dare to make mistakes. NWO necessary? In NWO, highly educated people/scientists are busy in the process of assessing proposals from researchers who have spent months writing these proposals. This takes so much time that the appropriate pathways are chosen with minimal chance of failure. The criteria used are also contradictory: innovation and feasibility. This is nonsensical in the innovation process. Knowledge workers

should not be exposed to such contradictions. NWO and similar organizations cannot draw up research programs. Research is spontaneity growth, degradation, etc. So dare to abolish organizations such as NWO since they absorb a far too large amount on well-trained scientists. These organizations, like NWO also create a false certainty for politicians thinking they make the right decisions which strengthen the economy of the country.

In November 2012 AWT, the advisory council on technology of the Dutch government published its report "Innovating Tenaciously (Vasthoudend Innoveren)". The subject matter of this report is about the organisation of R&D in Germany. The question is: can the Dutch government learn a thing or two of what is going on in Germany? That is a difficult one since there is no experiment going on in Germany doing nothing. Furthermore, and that is interesting, the report is not about innovation in Germany. The report is about education and R&D. Nothing is presented on innovation. That is to be expected. Government does not play a role in innovation. Innovation is about entrepreneurship. However, the AWT report is helpful indeed insofar government takes care of education and an efficient allocation of taxpayer's money for R&D.
In 2013, we in the Netherlands had another telling example of the confusing situation for government. The Gravitational, what is in a name, premiums of the Ministry of Education, Culture and Science for excellent research landed with beta research. Obviously, that cannot be the case. Alpha and gamma research should have had the same amount. So, NWO evaluated the criteria for allocation the Gravitational premiums. The most likely outcome is that the criteria are not right. In our polder model, everyone should get the same amount.
In this section I did not pay attention to war like situations as discussed in *Government and Innovation*, Noordzij (3). Now, war like situations are a.o., Pandemics and the related Economical/Financial situation, Climate Change, Cyber War, Government Debt (The Economist, September 12th 2020) can be added to the examples mentioned in Noordzij(3).

7.2 Business.

Innovation model? To date, all ideas on modelling innovation can be classified as case studies. That is all there is. Gurus and consultants base their advice on hindsight. CEOs tend to accept these advices. Not for lack of knowledge but more often for fear of taking risks. Risks they incur as entrepreneurs. Especially in the case of a sudden, disruptive, change in the competitive playing field. (*Thinking fast and slow*, Daniel Kahneman). Who would have thought that Nokia would decline in 2012? CEOs should better listen to their employees and try to understand the company they are responsible for. Here again I mention the GE story in The Economist. Innovation often takes place on the fringes of core business. These are usually disruptive innovations. Incremental innovations are part of the core business. The employees immediately enjoy that.

In the case of SMEs, ideas are on the shelf of various SMEs. These ideas need to get off that shelf. SMEs are best suited for that kind of initiative. In some cases, advisers such as accountants and tax specialists may play a role. Trust between the SMEs and the advisor is of great importance. Also, a kind of annual market can be helpful in creating information flows. Obviously, branch association can play a role. Unfortunately, once such an association exists for some time, it is more concerned with itself than with its members. An innovation in this regard could be to completely renew the office of the trade(branch) association once every ten years. A better tool for cooperation and reanimate knowledge on the shelf is, for example, an independent organization such as the Achterhoeks Centre for Technology (www.ACT-NU.nl) : an internet forum. Is the website www.NineSigma.com a tool to support innovation? This website can be visited by customer organizations to source innovative ideas, technologies, products and services. The same applies for www.Innocentive.com .This is an on-line marketplace for problem solutions.
Research shows that companies consider their own research as the main source of innovation. However, the conclusion that an innovative company needs its own research is premature. Cause and effect are confused here. It could be in an organization with a research department more people tend to think "out of the box" than in a company without a research organization. However, a research organization also suffers from groupthink.

The commercialization, dissemination and use of an invention is of more value to a company than an initial "spark" (prompting). Marketing, distribution, sales and customer service are more important than the invention. Of course, it is not so one-sided, but it is good to realize that Edison did not invented the light bulb and Ford did not invented the car. However, they emerged with a business model to turn these innovations into profitable products. So, it is not 'whether/or', but 'and/and'. It is about invention *and* execution (production).
Cooperation worldwide is a great advantage. Research expenditure can also be better spent globally than nationally. This in turn points to open innovation. Various sources of talent are then available. A nationalist and consequently protectionist approach does not make sense. (What's good for Intel is not necessarily good for America).

The established industry innovates "in the wake" of its customers. The bottom line is that the products are improved for those customers who ensure the profitability of the industry. Disrupting innovations related to the products of the existing customers are not expected by those customers. However, these customers may get improved products for lower costs. Incremental innovations are more suitable for existing markets.
The established industry, the incumbent needs to develop new markets for disrupting innovations. However, for this activity, there will be little to no attention since the assets are needed for existing customers. These customers/markets demand all the attention. In "*The Innovators Dilemma*" by Christensen, many cases are described. What is the consequence of attention for the existing customers?
The conclusion is, disrupting innovations are initiated by new companies. These start-ups will

introduce innovations in new markets and not in markets of established industries. The new companies will not get the chance to do so either. On these new markets, the start-ups can become successful. The established industries know this, too. But the established industry will not respond until it is too late. An example is the demise of Digital Equipment Corporation. Start-ups do not choose to deliberately avoid competition with established industries. Young companies that have competed and escape the valley of death collected a lot of experience. With luck, they survived the initial phase of their start-up. However, many start-ups disappeared without notice.

A recurring point in innovation is: teamwork or no teamwork? In the literature one also finds the different points of view. (Cain about *Introverts* and Lehrer about C*reative Groups*). There is no law. Ideas often arise in large organizations. In small businesses, ideas can be developed more easily. In large companies, new things often do not fit: "That's not how we do it here". Small businesses can also have more contacts with the outside world. Is this always used?
In large companies there can also be many contacts, some organized in a department or beyond the boundaries of business units. However, this depends on people. If they do this in a natural way, a company is lucky. If it is not part of the company culture, the company will become obsolete. The mantra: you cannot organize innovation and you must organize that (hire the right people) is a recurring issue. What an organization should pay attention to is employees can meet each other. The book by Jonah Lehrer (page 207) looks at the comparison of the big city with the large organization. When the chances of meeting are greater, the creative spark also spreads faster. Do established industries learn from this, can they learn from it? Practice shows that they cannot do it. Consequently, they cannot survive the disruptive innovation, even if the innovation does not start in the markets of established industries.
A start-up company with a disruptive innovation, cannot always successfully bring innovation to the market and grow. Start-ups will go bankrupt due to lack of capital and commercial acumen.
Does chance play an important role in the success of a start-up company? The extent of the role of chance is difficult to determine. What certainly plays a role is a sense of feeling for a new market, even latent ones. Intuition (or sagacity) is the name. The combination of chance and intuition has a nice name: serendipity. Serendipity makes it highly unlikely that established industries will be successful with breakthrough innovation. New companies, many of which will also disappear, play the leading role in disruptive innovations. It is not clear in advance which starters will lose out. That is a natural fact.

The table below, next page, shows in the usual way, the probability of success of the different product/market combinations. As is shown, entering a new market with a new product is the riskiest. That is what a start-up entrepreneur who does not want to compete with the established industry will experience. But this is also generally her/his only chance.

For entering a current/existing market of an established industry is completely a non-starter. However, the table should be read in such a way that, even for the established industry (existing markets), despite of a 50% success of a new product in an existing market, the new product will be an incremental innovation of the existing product. The market/customer plays a leading role for the established industry.

Table of Product/market Combinations

Product Market	Existing Product	New Product
Existing Market	1/1	1/2
New Market	1/4	1/100

A government cannot play any substantive role in breakthrough innovation, given chance and intuition. The established industry, with which the government deliberates on innovation, does not play a role in disruptive innovation. This creates the comical situation that a government, which is of the opinion to do something, agrees with established industry on innovation, whereas for the step-by-step innovation this industry does not need the government at all.
Obviously for the incumbents, it is useful to sit at the table with the government when subsidies are going to be handed out. As a result, these subsidies landed at the wrong place. The start-ups would have benefited more. Is the start-up entrepreneur the panacea for breakthrough innovation and the catalyst for "*creative destruction*"?

A reminder on "*creative destruction*": Here I used the expression for entrepreneurs. However, reading Schumpeter *Capitalism, socialism and democracy*, this expression is related with social innovation[18]. See also Andersen.

In any case, there must be a start-up with an entrepreneur at the helm. However, that is what is wrong in the Netherlands. If we look at the starting companies created under the umbrella of the technical universities, we see a surprisingly large percentage of the start-ups survive. Literally survive. Yet, as a kind of natural law, 90% should go bankrupt. However, this does not happen. Why not and how come? Questions that are hard to answer. However, many start-ups can continue to exist in the financial lee of these universities.

[18] Thinking about social innovation and Schumpeter, Ayn Rand came to my mind. Could it be *Atlas Shrugged*, a work of fiction, to be an exercise in social innovation?

Subsidies from the government and the EU play a major role in this. No risks are taken. Risk-taking and averse to government interference is characteristic of the real entrepreneur. Also, when he/she has started, the real entrepreneur will want to innovate again immediately because he/she has a highly developed sense of what is going to happen in the market and that new markets will also emerge. Entrepreneurs do things where people, who are looking for certainty, will communicate the entrepreneurial attitude is impossible.
After receiving her/his grant, the start-up company at a Dutch university will also exclude external interference. The fact that the market is not being developed is apparently excepted without further consideration. Universities should end their relationship with the start-up much more quickly. And that is not going to happen.
There is also a database of all these start-up companies missing. In this way, the university does not gain knowledge about the thresholds for growth processes. The only complaint that can be heard from the universities is that the companies do not want to grow. Why would they? They, the start-up, can bask in the warmth of the university. The character of these companies is often no more than a kind of external department financed by subsidies with all the extra bureaucracy at stake. They have their back to the market.

What is the productivity of the knowledge worker? How can it be increased? Is there a meaningful "Taylor approach" to be found? An important innovation for business.

Divest poorly performing business units quickly. That is why social flexibility is desirable (social Innovation). An example of a well-functioning industry is European chemistry: high productivity allows high investment. This outweighs producing in low-wage countries. But then you must be able to lead technologists/knowledge workers: "Let them free".
Knowledge workers, the source of innovation, need a new kind of organization. Renewal of the organization of work is desirable to increase competition. Do not try to do everything yourself. Cooperate with the outside world. However, innovation requires a lot of leadership from the top of a company. Managing innovation is more important than managing R&D. Companies can be very innovative without doing R&D: smartly combining existing knowledge where employee input is essential.
A lot of money goes into innovation and many projects fail. It is therefore necessary to decide quickly and at an early stage whether to end these failures and start again or to put the budgets into the well-run projects. Innovation requires the systematic identification of changes that have occurred in an industry in terms of demography, standards and values, technology, and science. Dare to adopt these changes as opportunities and put the past overboard.
Business must learn to master the tools for innovation and take the step of creative destruction from existing to knowledge-based new activities. However, innovation through creative destruction will hardly happen in the established industry.
Innovating in the supply chain is a great opportunity. Look over the shoulders of the customer/customers and let the outside world in. But this step will only be made by new

entrants to the market.
In times of economic downturn, it is obvious to cut costs rigorously within companies. Then, there is an opportunity to start new businesses because established companies are quickly inclined to give up growth opportunities and thus create space in the market. At the beginning of the financial crisis in 2008, American companies responded quickly by cutting costs. Timing matters. Reducing costs too late or late means that the opportunities to achieve countercyclical benefits are lost.
By the way, the question is whether timing is a factor; luck probably plays a bigger role. It would have been useful if innovative and start-up companies had also responded quickly. In this way, they would still have remained interesting for investors. Continental Europe is now lagging the US. "Rule number one is to take immediate measures so you can stay in the game". Recovery happened quickly in the USA after the financial crisis. Europe stumbled on with Euro crisis.

Businesses will also have to realize that "frugal innovation" is not a threat to the more expensive technologies. It is somewhat like 3-D Printing or additive manufacturing. The application of a new technology shifts in the application chain. When it is possible for general practitioners with simple equipment to make an electro-cardiogram, this application shifts from the hospital to the general practitioner. The result is cheaper health care. It will also be the case that if certain utensils are made easier to operate and can be applied equally efficiently, this item will be used. Business, wherever it is, will have to adapt. Cost reduction is also innovation. Health care and construction are the most obvious areas.

The concept of culture has been mentioned a few times. This is about the corporate culture in which there is a clear connection to the national culture. The Dutch corporate culture is focused on consensus like politics. A look at the way how Japan or the United States operates is enlightening but often not helpful. We must live with our national culture. Many start-up entrepreneurs who originate from a competitive culture will not find that culture in the Netherlands or for that matter in Continental Europe.
By mixing different cultures of different nationalities in the innovation process, one might assume that the innovation process can be improved. Well, may be. As mentioned, there is a caveat. We must be realistic in this respect, because this requires a lot of attention from the management.
It is also very questionable whether Europe can ever be as successful as the US[19]. This can already be seen in the difference in training and in addressing problems during training. But we also come across this in all kinds of areas of research. A striking example of this can be found in Schweber's book: "*QED and the man who made it: Dyson, Feynman, Schwinger and Tomonaga*". In this book, a visiting European researcher tells Feynman that he is so impressed by Feynman's approach: "*You Americans are trying out an approach. If it does not*

[19] May be this is changing now due to a nationalistic attitude in the US (2020).

work, you'll try something new."
This cultural difference between Europe and America will not disappear in the foreseeable future. In a story in the Volkskrant, a Dutch newspaper of 13 May 2006, this was expressed as follows: "*The critical mind is a hurdle for us*". A risk-avoiding culture.
Even if it is clear that a company has to enter new markets without the product becoming completely different but, for example, simpler and therefore without "performance oversupply", so-called frugal innovation, the prevailing corporate culture can be so obstructive that it makes no sense to renew with the current organization. If entering a new market with the same product but with a lower margin is also a disrupting innovation (Christensen: *The Innovator's Dilemma)*. The best action to be taken is to create a new business. The existing company can be sold.
"Tribal" culture (The Economist 28th January 2012) is also cited as a catalyst for a business. Whether this culture is also stimulating for disrupting innovations is just another question. This "tribal" culture helps with incremental innovation – that is how we interact – and thus resembles the usual corporate culture: "that's how we do these things here".

As well as corporate culture, there is reference to Jewish/Christian(J/C), as in the USA[20] (Loeffler), culture in Europe. Whether the Jews like their culture being connected to Christian culture is not a subject of consideration in this document. However, it is good to reflect on the J/C culture (a hoax?), and how European bankers have dealt with it. It is clear the bankers missed something. They should at least know the story/fable of Joseph and the King of Egypt. To refresh the memory, Joseph explained to the King of Egypt two dreams (Flavius Josephus: *The ancient history of the Jews).* These dreams were about the cycle of 7 lean and seven fat years. If the king were to deal with this cycle in the following way, that is to save in the fat years, then the king would get through the lean years.
Even if economists such as Jeffrey Frankel (Financieele Dagblad 28 January 2012), "*Seven fat years for emerging markets come to an end this year*" will be able to incorporate such anti-cyclical policies into their models and opinions, then politicians with their short-term view will not be able to do anything with it. Nevertheless, politicians should be able to explain to the public that you repair the roof when the sun is shining; to summon the metaphor of the weather once again (Noordzij, 1).

Modeling collaboration can be a tool for approaching optimal collaboration. However, the goal of working together is also evolving again. The Economist of 21st April 2012 discusses the aspect of cooperation in the special *'The Third revolution in Manufacturing'*. We work in clusters and that raises the question of whether this cooperation is a result of an evolutionary process. It must be, because the top-down approach in which the government is engaged by subsidies often fails. This failure usually coincides with the end of government subsidies. Research will also flourish when cooperation occurs. However, in the organization

[20] *The Problem With the "Judeo-Cristian Tradition*', Section Ideas, The Atlantic, Loeffler.

of cooperation avoiding 'regression to the mean' is key. Literature: Kahneman (*Thinking Fast and Slow*), Gertner (*The Idea factory: Bell Labs and the Great Age of American Innovation*), Lehrer (*Imagination: How creativity Works*) and Cain (*Quiet: The Power of Introverts in a World That Can't Stop Talking*).
Modeling collaboration can be a tool for approaching optimal collaboration. However, the goal of cooperation should be incorporated in the modelling. That is a difficult one.

Innovation and banking. The 2008 crash. What if young scientists, instead of working on mathematical models for financial products, had chosen a career in technology, what breakthroughs could this have achieved? (The Economist October 11th- 17th 2008).

It could also make sense to involve labor unions in innovation. However, innovation is about change and that is the last thing the unions naturally want and therefore cannot do. They are concerned with maintaining job security. So, that does not stimulate innovation. Furthermore, disrupting innovations take place with in small and start-up companies. This is not the focus of the labor unions either. Under the headline "*TNO presents twenty ideas to market*", a GTI tries to get SMEs to innovate (Technical Weekly, 24 March 2012). Is this the way the government could do something about innovation? Of course, it may be that by chance, serendipity, a match takes place. Let us hope so. Above all, let us hope that there will be a match with an SME where innovation belongs to the culture of the company and that the SMEs can use the TNO idea. If SMEs are not the innovator, it is a waste of time.

Innovation and financial options: is a comparison obvious? Innovations can lead to disruptions completely changing a company. Can this be discounted in the option model? In financial options, disruption is also considered. In any case, there are options of innovative companies, even if the innovation is done gradually. (Tidd, et al., page 218 et al. Risk and risk diversification plays an important role in this. However, should not you be rethinking risk diversification? If risk spread is compared to the spread of a virus, it is quickly clear that risk spread is a cause for risk increase. The question is whether this comparison applies. This comparison applies when it is not clear what the risks are. In that case the virus model is a helpful metaphor. Another metaphor is to compare innovation with evolution. There you will find incremental and disruptive changes, i.e., mutations. I do not know whether this metaphor is really helpful. It could create complacency, since there could be a tendency to consider innovation as fate.

Now, 2020, did one learn something or better, unlearn something? I am afraid not. You will still find articles in leading magazines on: "*How to organize innovation*?". It is like one never heard anything about serendipity. People think that inventing/innovating in one area leads to innovation in another. It is by coincidence this will occur. Even innovation-managers, an oxymoron, are among us. This manager is supposed to write reports on innovation. On the

one hand to learn (what?) and on the other to involve other employees in the innovation process. Well, a lot of luck is needed to find the other employees to be innovative.

7.3 Business and the Administration.

In this section I will pay attention to the relation between government and business.
To this end I cite parts of the special report of The Economist: "*Companies and the State"*, (2014). To summarize this report:" The *relationship between business and government is becoming increasingly antagonistic, (Cogan). But the two sides should not overdo it: they need each other."* Written in 2014. In 2021, nothing new under the sun.
The report payed attention to employment, taxis and level playing field. I will pay attention to the Technology part of this special report. As mentioned there, the relationship between government and the tech sector is complicated and still is. The role of government is underestimated shown by Mazzucato in "*The Entrepreneurial State; Debunking Public vs. Private sector Myths in Risk and Innovation*".
Well, in *Government and Innovation* (Noordzij, 3) I mentioned not to overestimate the role of government in pushing forward technological progress. When government is showering money on various technological areas, I expect an entrepreneur will sit on her hands. Just wait and see. Especially in warlike situations. Think of the Manhattan Project and the spin offs. Furthermore, when the government is showering huge amounts of taxpayer's money some inventions will be made. However, that is not the same thing as initiating an (disrupting) innovation. Again, in times of war the government needs to do something. A Manhattan like project will not be started by entrepreneurs.
So, the question raised several times: whether the government can play a meaningful role for innovation through subsidies. No! Subsidies create laziness. Not only laziness, but also causes a disruption of the market. The informal investor can play a much better role as an investor in start-ups. They are also more exacting. The central government knows there is little or no contact between them and the start-up company. The start-ups responsible for disruptive innovations are unknown to the government. Nevertheless, the government wants to do something and sends its subsidies through regional investment and development companies of the government. But also, these companies, government agencies spending other people's money, do consequently not feel the pain. No skin in the game.
So these regional development companies do not feel the pain when something threatens to go wrong. They will also continue to invest in unsuccessful companies for too long. Private investors, who do feel the pain of losing their own money, must oversee the investment process whenever the government wants to support a start-up. What the government can certainly do is to put as little way in the way of starting and developing these companies.

In times of economic downturn, the government can also take counter-cyclical (Keynesian) measures. Renewable energy is often suggested as the subject matter for the government to play a stimulating role for the economy. Boosting green energy is also an opportunity at a

time of economic downturn (as of Nov. 2008). If the government wants to make resources available to limit the downturn, there is an opportunity here to strengthen the industry. Energy savings and green energy go hand in hand. It would be useful that more research would be done on anti-cyclical measures by the government. Sometimes it seems just to be a faith. Well, it is not easy either. A description of the complexity can be found in Wapshott's book: *Keynes Hayek: The Clash that Defined Modern Economics.*

8 Conclusions

Innovation: can we do something about it? Or is it like the weather: we talk about it; we do some predictions and hope for the best. Incidentally, better, and better models are being developed for weather forecasting. This is hardly the issue for innovation. You innovate in a natural way or you do not. There are many case studies of innovation. This only leads to the observation where things are going well and where things are not going well. There are, however, several rules that can be inferred from this. Modelling is lacking. There is no theoretical model that can be tested. A model will never be there? We hardly know how the human brain functions. So, how to model? Artificial Intelligence is all artificial and hardly intelligence. It is about datamining and regression analysis.

8.1 Business.

"An example of one of the laws of social change: change does not happen when things are at their worst, but when they are looking up",
C.P. Snow

General recommendations are hardly to be given to make a company more innovative. It looks like a catch 22 situation. If management concludes that the company needs to be more innovative, the staff will not understand. The first thing the staff will think: we always do and did it right, don't we? What are we doing wrong now? Management may want to change culture. Casting can be a tool to acquire staff. This method is used to choose actors for a movie. But it is important to know which new staff to be recruited. Innovative people will often be people who are very individual. That can be tricky. Whether that solves the innovators dilemma is very much the question. Management should be able to fulfill two roles: cannibalizing the profitable markets and encouraging disrupting innovation. As Christensen writes in his "*Innovators Dilemma*", it is wise to start new activities in a separate organization in the event of a culture change.
To innovate successfully, management needs the skills of the polymath. Or management ensure that such generalists are present. That is not easy. The polymath not versus but together with the specialist. In addition, the polymath is a human being from the past, the specialist prevails. If there is still a polymath, he or she is barred from the specialist's field of activity. Problem: how will the specialist's work ever be implemented without a generalist?

Innovation is created where the boundaries of one's “own yard” are neglected. This requires cooperation between specialists and that is a contradiction. If this contradiction was not there, there were no specialists. Brainstorming with specialists hardly leads to innovation. (Lehrer). Brainstorming without a critical attitude leads you nowhere.
Big companies versus small businesses. The management of a large company is so difficult and complex that there will automatically become a tendency to downsizing, resulting in a greater opportunity for innovation.
Remark: will that happen to Amazon, Google, Facebook and some other tech-giants?
Imitation or innovation? *How Chinese companies conquer world rankings.* Source: Financieele Dagblad 1 October 2011. It is an article by Prof. W. Nie. Professor of Operations and Service management IMD/Lausanne. Prof. Nie teaches how to conceive of winning innovations. This Prof. must have become incredibly rich. He found the holy grail.
This story is a clear demonstration of why innovation cannot be organized in the old-fashioned way. A company has the will to innovate or not. The professor's examples are certainly interesting, but what can you do with them? They describe situations in which companies find solutions to survive and/or grow. Historically it is interesting to capture this, but you cannot do anything else with it. Just case studies.
What to do? It depends on the biotope in which companies operate. Let it be, e.g., for two companies operating under the same circumstances. One company can respond to changing circumstances as a me-too innovator and will not survive. The other one anticipated the forebodes of change and innovates. You cannot learn this. It is in the company's genes or it is not!
For example, in China, the private companies can innovate despite all the obstacles. Not thanks to it, but despite the influence of the Chinese government. Just think of the difficult financing of these private companies (Lardy). Well, this was about 2014. In 2020? Is China now chasing their ‘Sputnik’ moment (Anderson)?
Under the title: "*How to make a megaflop*" the Economist of March 31st, 2012, describes a company paralyzed by the fear of a flop. The company can be sure of flopping. IBM survived by sacrificing the sacred cow of the hardware to survive and escape a megaflop.
Research in businesses of the conditions under which creativity can be productive, is an opportunity for business to understand what a company should do to be innovative. Research, for example, on risk-averting behavior or behavior where people want to look for new things. The first thing to do is to find out about this behavior. The next step to change, if necessary, is a different ball game. Since, as explained above, this research is just a kind of study history.
The innovation paradox. The big company has the means to innovate. Of the 10 projects that are started, 1 will reach the market with a product. The other nine do not survive. SMEs can never afford anything like this. Nevertheless, SMEs are supposed to be the innovation engine. Is that because of the ten starters, only one with a breakthrough innovation is visible and grows and the other 9 that do not survive or do not grow and are invisible?

It also seems that disrupting innovations are often successful outside large organizations. However, the ideas often stems from a large company[21] or a university. The idea large companies to be less innovative than small businesses is a simple and one-dimensional point of view. Whether a company, large or small is innovative depends on individuals with the decision, CEO, power who support ideas. Examples include Bell Labs, and Kelly, Philips NatLab, and Casimir, etc.

Big companies versus small businesses: As an example, ATT (old style) is often chosen as a large company that invented the transistor and did nothing with this invention. However, this was not that simple. ATT did grant licenses on the patents. ATT was a regulated monopolist and had to be careful not to use their inventions to push other companies out of the market. They were closely monitored by the Department of Justice. ATT certainly did not "give away" knowledge out of laziness. They did this to keep the justice system out of the way.

In "*The Innovators Dilemma*", Christensen describes that Apple has not competed with IBM and has released the Apple PC in the so-called non-competitive market (non-professional market). The biography of Steve Jobs by Walter Isaacson does not make it clear whether the choice for a market was a deliberate choice or purely coincidental. In any case, Steve Jobs has stated that IBM was some a kind of "big devil." Has this served as a guide? Or has Jobs' preference for a perfect machine been the deciding factor for a market? Chance and luck have certainly played a big part.

Research "follows" innovations. In a company, innovations arise in the workplace. If research and innovation go hand in hand, it is not convenient to move production to a place where production is cheap due to low labor costs and not moving the research with it. Since this is felt by the industry, there is now again "reshoring" taking place. (The Economist of 19th January 2013).

Labor unions cannot and will not be expected to do much in the field of innovation. A trade union will always focus on the so-called acquired rights. New ideas that give rise to new activity and growth cannot stop a trade union. Obviously, a trade union thwarts these new developments when this is the cause of "creative destruction", by the way, not meant in the sense of Schumpeter[22].

A choice needs to be made between disappearing activities and new activities. In the polder landscape of Dutch industry, a compromise is found by supporting half-dead labor union activity and preferably through subsidizing by the taxpayer. Here is specifically mentioned The Netherlands, but the American UAW is another example of a misfunctioning labor union with all the adverse consequences for the American taxpayer.

"*The daily work of the trade unions consists precisely in effecting compromises between the conflicts of interests*". Von Mises: *An Economic and Sociological Analysis.*

[21] Think of Apple and the ideas of Xerox

[22] *Capitalism, Socialism and Democracy.*

8.2 Government and Politics.

"An example of one of the laws of social change: change does not happen when things are at their worst, but when they are looking up",
C.P. Snow.

After the credit crunch (2008), it cannot be top management of a bank does not know which products are sold and to whom. They need to know everything about risk. A risk manager only makes sense when top management of a bank knows something about risks. The risk manager should be a function at board level. The effect of the presence of a risk manager, who is not functioning at the right level, is likely an invitation to take greater risks. Think of the introduction of the seat belt in traffic.
Also, the "packaging" of risks is not a guarantee of reduction of risks. Compare it to the spread of a virus. The virus must be very diluted when being used as a prose remedy against infection.
The government and or politicians must be aware that business will make use of all the opportunities to reduce costs. So, there will be a lot of lobbying through the trade associations to maintain all kinds of budgets and deductions that have anything to do with innovation. On the other hand, for politicians and government, it is important to understand that the business community will not let its decisions on research and development be influenced by taxpayers 'money (government).
Innovation and the Dutch government, a quagmire. According to the Government Accountability Office (Auditors), it is completely unclear where the billions of euros earmarked for innovation have remained and/or have been spent meaningfully. The same applies to other subsidies.
Subsidies lead to lazy entrepreneurs. The costs do longer not matter. The margin is made with the subsidy. Until a new entrant comes who has grown big and strong by producing at low cost. In April 2012 there is another example. Under the headline: "*Heavily subsidized German solar industry is faltering"* in Het Financieele Dagblad of 13 April 2012 the demise of this German industry branch is described. The Chinese have wiped the Germans off the market. However, the German suppliers to this industry survive. They were and are used to competing and exporting in a global market. The German government continues to justify the subsidy.
The Innovation Platform in The Netherlands is hardly dead or there is the Top Sectors policy. Another new subsidy which is of course embraced by those involved. It seems a government is always looking for a sort of assurance regarding innovation. Examples of that approach can be found in De Ingenieur (July 2015). There you can read a story of a professor of innovation sciences. What is in a name. Reading carefully, you will conclude that this science no more than presenting case studies. There is no theory, no paradigm. Is that a problem? Depends. The professor received a budget of €1.5 million to use for research on disruptive innovation. Without a theoretical model, cases will be produced. A nice historical survey. No more no

less. No lessons can be drawn. Caveat: correlation does not mean causation. Will the taxpayer be happy?!
The government must refrain from subsidizing technology. Before the decision-making is complete, the technology is already obsolete. With subsidies of technologies too much attention is paid to a single technology. Example: Carbon Capture & Storage (CCS). The cost of CCS will therefore become high. If the government wants to achieve anything in terms of reducing carbon dioxide emissions, it must tax these emissions. New technologies will emerge.
Innovation: without luck, no one sails.
The government cannot and will not innovate. We do not see the government slimming down. It would be nice if the government were to occupy smaller buildings and thereby must slim down. Many policy officials would be given a new challenge. A striking example in 2011/2012 is the land policy of municipalities to create opportunities for growth. If we consider the land purchases of all the municipalities, this corresponds to an economic growth per municipality far exceeding the national growth. Innovation would be when municipalities admitted to having a total lack of macro and micro economic insight. It is also surprising that in the AWT's[23] report: "*Let more happen. Innovation policy for the public sector*", the literature list of this report did not mention Von Mises. Von Mises has said not insignificant things in his book "*Bureaucracy*" (1944) about innovation in government. A somewhat modernized quote: *"No one can be a correct bureaucrat and an innovator at the same time. Progress (innovation) is exactly what the rules of bureaucracy do not provide. It is necessarily out of the field of bureaucracy".*
The voter/citizen will have to force the government and politicians to stop subsidies and reduce the size of the house of representatives (Tweede Kamer) and the ministries. The electorate must then claim responsibility for health care, together with the business community for education, childcare, together denominated subsidiarity. Politics can and must deal with the broad outlines.

The digital influence on our society is undeniable. Especially in times of viruses (The Economist, September 5th, 2020). A kind of permanent innovation or sustainable innovation. The tendency to attach the label evolution to innovation is understandable. Whether it is clarifying to some extend is the question. Mutations – disrupting innovation – create changes not necessarily to be recognized as positive. Evolution has no direction. In nature there is mutation, but when this does not fit in the environment this mutation disappears again. Incremental innovations take place, but also disrupting innovations. So, the evolution model can be used as a metaphor. To what extent the comparison with the process of evolution is a metaphor requires further analysis. But it is important that the environment, the biotope, stimulates the innovation process. This is evident in innovation by users. If innovation were to be inventing only, the metaphor would not apply. Innovation is not an

[23] A governmental advisory council for science and technology.

invention.
In large cities, creativity appears to be more effective than in small towns. The chaos in the big city is greater than in a small town. This is even more evident in the comparison city – countryside. Unless the Guilds regulate everything!

Affordable health care is highly desirable for a sustainable society. There is a lot to do in this respect. Technology and especially affordable technology is an important tool. However, the market and therefore the customer will have to develop feeling for affordability and desirability of treatments. If this feeling and insight is permanently lacking, we have a major social problem. Frugal innovation can also help in the short term. In the long term, however, costs will run awry.
Examples of innovations in healthcare are: "self-tracking" (Economist Technology Quarterly March 3rd, 2012) and Telehealth. However, this type of development will only increase demand and an increase of the costs. The ageing population will certainly contribute to the increasing costs. Here too, the essential innovation is the awareness of the finiteness of life. Better prevention, early diagnosis and adjustment of treatment will provide marginal improvement in the fight against diseases. What is certain is the increase in the number of elderly people with dementia. Prevention also means identifying problems early. For sure, this results in escalating costs.

Tertiary Education: Do we solve a problem in the Netherlands by merging the 3 Technological Universities (TU's)? To reach a meaningful merger, the merger should provide a strategic reinforcement. Such a merger can lead to some reduction in costs. A common strategy is needed. Is the merger a missed opportunity? If the funding of universities does not change essentially, the merger will only give rise to a larger 'state-owned company' whose bureaucracy is strengthened. Whether this reinforcement also promotes quality is seriously questionable (Noordzij 5).
The problem of the TUs, as we know, is in the financing. This financing is still largely funded by tax revenues, public funds. This form of financing imposes restrictions. The allocation of public funds is and remains a political matter. The effect of this is well known: supply control. Politicians want to have something to say, with all the consequences that entails. Most of the time translated in an increase of bureaucracy.
The TU's and the other universities will have to get rid of political funding. This can be agreed upon with the government. Tuition fees must go up. A system of loans can support this increase[24]. Not all courses require a nominal duration of 5 years. Variation in study time is a means by which universities can distinguish themselves. Admission requirements must also play a role. This is possible when the political influence is optimal.
Specialization should be introduced either in education or in research. It is therefore a pity that the HBO, tertiary vocational training, courses want to profile themselves more and

[24] In the Netherlands, the system of loans will be abolished again (2020).

more as a university. This leads to further levelling and loss of quality (academic drift). Unfortunately, in this way, an important option for vocational training is in danger of disappearing. A varied range of courses also includes a coordination of these courses.
In the 1980s, politics was committed to improving education by merging schools. Of course, it was not about improving education, but about ordinary cost savings. As is so often the case with the ill-conceived decisions of politicians, this so-called cost-cutting has led to a serious decline in the quality of education. Bureaucracy has increased considerably and the boards of these colleges (civil servants) have allowed themselves a massive increase of remuneration.
An innovation in education could be these above mentioned mergers to be reversed. The boards of these dismantled institutions can only form a new board of directors, if necessary, when they know a thing or two about education. The now functioning boards know nothing about education, with resulting in institutions like Inholland, an institute for tertiary vocational training, etc. These institutionalized monstrosities have been created by ill-considered actions of politicians, who have not been able to imagine that when you merge governmental institutions, bureaucracy can only increase. For example: 3 institutes merge. The three original institutions retain a principal. The merged institute will have a three-headed management with several staff positions and other support staff not being teaching staff. Direct increase in costs: € 2 million. Indirect increase in costs: a further € 2 million. Distance between the board of directors and the people responsible for the execution of the training program is so large, fraud and corruption are easily given a chance in the organization.
An example: The mergers into large ROCs , Institutes for secondary vocational training, was the solution of the curricular problems. Mergers heartily stimulated by politics. In 2013, the same politicians stimulate the partition of ROCs. Money from the taxpayer who are awning and listening in great despair to our politicians.
Similar actions, like merging, were also taken with healthcare and housing associations. The results were dramatic.

The government knows nothing about innovation and that is understandable. The environment of the government does not force to adapt; citizens are more often forced to adapt and are therefore able to innovate. With sometimes extremely negative consequences: circumventing rules, taking justice into your own hands, ... We are told that the government talks a lot about innovation, meets and subsidizes it. But if we listen carefully, it is not about innovation but about R&D. We should realize R&D does not lead to innovation. Obviously, spending a lot of taxpayer's money, "something" is obtained. In doing so, this "something" will usually be not an innovation.
Finally:
Innovation is of all times just like breathing. If you stop breathing, it is over. So, innovations, change, will always be there? No, the comparison with breathing is a metaphor and no more

than that. Resistance to change is present in all organizations. The innovative force generates opposing forces, like the defense response of the human body. The market will be decisive at the end of the day.

Innovation:
The only inexhaustible resource available in the world is human ingenuity. USE IT. The business community does not need much stimulation. Unless companies are protected and develop into monopolies. The government must ensure relevant preconditions and not be a hurdle. The latter can only be achieved if the voter/citizen forces the politicians and therefore the government to slim down.
Route 128 (DigitEquipCorp, USA) declined and the San Jose Valley became Silicon Valley. Will Silicon Valley decline also because of Regression to the Mean? At what time scale? Or is that scale always different and therefore irrelevant? Modelling innovation receives (still) attention at universities and colleges. How meaningful is that? In the long run, regression to the mean takes place. If the mean did not change, we might as well sit on our hands and not move. However, the mean will shift in the long run. Several causes have been mentioned for the decline of companies come and go. Why is there a shift from Route 128 to Silicon Valley? Because Digital Equipment Corporation became complacent? Large companies are no longer open to the environment under these circumstances. However, large companies may know now that you must remain open to the environment. Is that enough for continuity?

Regression to the mean is not a law of Meden and Persians (*Against the Gods: the remarkable story of risk* by Peter L. Bernstein and *Thinking fast and slow* by Kahneman). If that is the way it is, then this is an additional argument against modelling of innovation. To use the metaphor of weather: We can talk about innovation, but we cannot influence innovation. If we try that - and usually top-down - we dig a trap and we are exnovated.

Mantras and incantation formulas such as: Energy Valley, Food Valley, Health Valley, X – Valley, etc., do not help. By pronouncing these formulas/mantras one does not get there. Silicon Valley did not become Silicon Valley by calling it Silicon Valley. The concept of Poldermodel in the Netherlands arose after we had polders for several centuries.

Innovation cannot be studied formulating a hypothesis, develop a theoretical model, test this model in an experiment and learn how to innovate. Innovation can be analysed with help of cases. When people are telling they are studying innovation, they are studying history, no more no less.

As a closure I like to pay some attention to Schumpeter's '*Creative Destruction*'. In The Economist 15th August 2020, a briefing is presented on China: *China's hybrid capitalism.* By reacting to America's policy, 2020, China had found a way "*to select its true priorities".* The agenda of the communist party is there. Reactive? Well, could it be considered the process of capitalism's creative destruction?

Or is it: innovation, imitation, regression to the mean, a disruption, innovation, and the cycle starts again?

We cannot stimulate innovation. We can only obstruct it.

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