Statistics on bankruptcies in the time of COVID-19, inventions and developments

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Abstract

As the economies turned into alert in March 2020, it emerged that the traditional statistics on bankruptcies were inadequate to measure the actual economic temperature in the enterprises. The demand for faster and more up-to-date indicators was immense – more nowcasting, please.

This paper presents the inventions and developments of the statistics on bankruptcies which took place in the statistical offices in Norway and Denmark to meet the new requirements. Furthermore, we reflect on theories on how public and private inventions and developments take place.

We will do so in five steps:
- *First, we take a short walk down memory lane to establish the context – what happened in the economy, which changes did the enterprises experience, what were the challenges for the decision makers?*
- *Second, we ask if our statistics can answer the many questions about the actual life of the enterprises in an abruptly changing economy.*
- *As the third step, we present the Norwegian and Danish initiatives respectively as well as an evaluation of the degree of success.*
- *In the fourth step, we take a broad view on how innovation and development can be stimulated in public and private organisations.*
- *Finally, we ask about the outcome; what have we learned and can we inspire each other?*

Keywords: Bankruptcies, COVID-19, economic temperature indicator, fast indicator, innovation, web-scraping, experimental statistics

1. Memory lane, winter 2019 – early spring 2020

Far away in the Chinese province Wuhan around Christmas time 2019, stories began to flourish about a new virus – so far away that nobody in Europe bothered about it. Most people didn't even know where to find Wuhan on a map.

During the following two months the gentle breeze from east grew to a full blown worldwide storm, and the COVID-19 pandemic became a reality. As a consequence

of the very rapid development, WHO declared the virus outbreak as an international emergency situation on 30 January.

From an initial calming evaluation from the health authorities in January – "it was very improbable that we would see the virus in Europe" – it became obvious in February that COVID-19 was entering Europe as well as the Nordic countries.

As a reaction, political decision makers and health authorities launched a widespread package of countermeasures that gradually grew from simple guidelines for travelling to more drastic restrictions. Some of the most interesting for the trades and industries were:

- Closing of cultural institutions and sports events
- Closing of restaurants, bars, fitness centres, hairdressers, shopping malls etc.
- Closing of airports, ports and borders
- Restrictions in the retail trade

From mid-March, the lockdown was a reality.

There was of course great awareness of especially the economic consequences of the lockdown. In Denmark, they could affect 880,000 enterprises of which 188,000 had employees or a substantial turnover – see more in box 1 below. In Norway, the business sector comprised around 411,000 active firms[1], of which 81,000 had 5 or more employees.

Many of these enterprises faced a severe drop in turnover and earnings and many jobs disappeared or put on hold as a result of the lockdown. To prevent the health crisis from developing into a deep economic crisis, a wide range of different support schemes were introduced and applied to support the enterprises.

To navigate in the design and implementation of support schemes etc. in this landscape of an abruptly changing economy, fast and accurate indicators on the state and conditions of the enterprises became a necessity for the decision makers. This leads to a rapidly increasing demand for a lot of our statistical products, among others statistics on bankruptcies.

However, the evident challenge for the decision makers was that most of our products suffer from a lack of actuality as they reflect past situations and events. An

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[1] Meaning either positive turnover or having at least one employee

essential question for the statisticians was therefore if we were able to get closer to throw light on 'now' – we were simply pushed to react.

2. Existing indicators on bankruptcies at the beginning of the pandemic

For several years, one of the methods to measure the economic temperature of the enterprises has been the statistic on bankruptcies, which has been assumed to provide a relatively current picture of the economy.

The number of bankruptcies in Norway and Denmark since 2014 is presented in figure 1 below. The Danish figures show bankruptcies in active enterprises (see box 1) and they correspond to approx. 1.3 per cent of the total number of active enterprises each year. In Norway, the bankruptcy rate fell from around 1.2 per cent before the pandemic to 0,95 percent in 2020 and 0,75 percent in 2021.

Fig. 1 Bankruptcies in Denmark and Norway 2014 - 2022
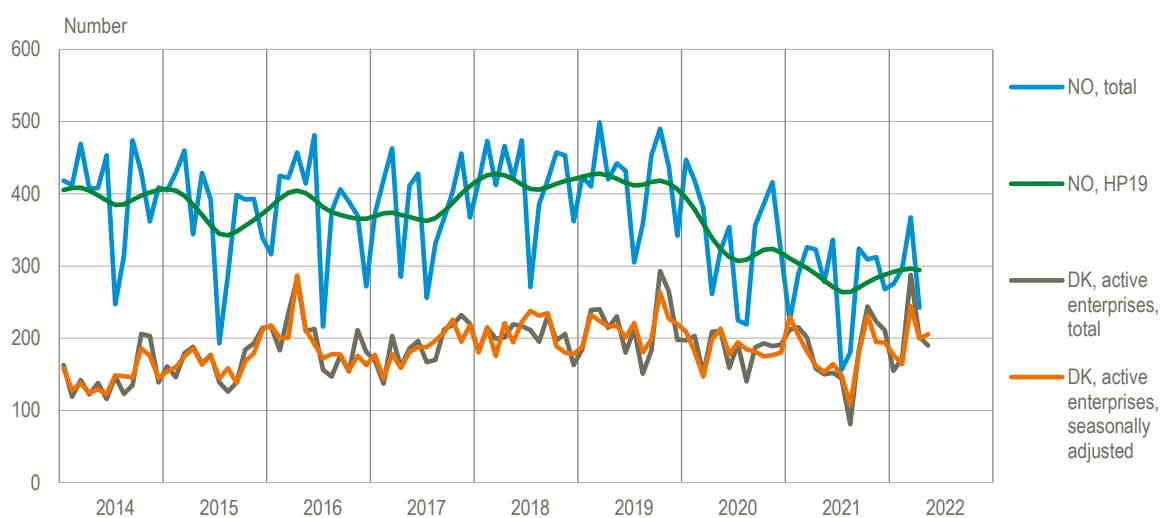
Note: The Hodrick-Prescott (HP) filter removes short-term fluctuations associated with the business cycle and reveals long-term trends.

Source: DK: www.statistikbanken.dk/konk3, NO: https://www.ssb.no/statbank/table/08551

Denmark: The figures in Denmark are normally published monthly within 5-7 days after the end of the reference period (previous month). Every declared bankruptcy has information on date, turnover, number of employees, industry (most detailed NACE level with national subdivisions) and geographical location in municipalities and regions. The data is published in an aggregated form in a newsletter as well as a

number of tables in www.statistikbanken.dk. More detailed tables are available on request.

**Box 1: Bankruptcies in 'active' enterprises vs. 'zero' enterprises**

An analysis of the Danish bankruptcies from a few years ago showed that it is fruitful to distinguish between so-called 'active' enterprises and 'zero' enterprises as the two categories have different economic importance and seasonality. An active enterprise is defined by a turnover within the last four quarters before bankruptcy >= 1m DKK and/or full time employees > 0. A zero enterprise has less turnover and no employees.

Even though the zero enterprises have accounted for approx. 65 per cent of the bankruptcies in the last six years, they must be considered to be of no economic interest as they account for only 1.5 per cent of the lost turnover and none of the lost jobs.

As they also have quite different seasonality than the seasonality in the active enterprises, it does not make sense to look at the overall seasonality of the total number of bankruptcies. Our focus is therefore on the active enterprises, see figures 1 and 2.

The bankruptcies should also be seen in relation to the total number of enterprises to give an impression of proportionality. In 2021, there were nearly 880,000 enterprises of which approx. 188,000 could be characterized as active, and in relation to the number of bankruptcies, it gives a yearly 'bankruptcy-ratio' for the active enterprises of 1-1.4 per cent for the years 2014-2021. The most vulnerable enterprises have been restaurants with 2.5 per cent on average (3 per cent in 2020 in the lockdown period) and building and construction enterprises with 2.2 per cent.

Fig. 2 Bankruptcies in active enterprises in Denmark, seasonally adjusted, trend and lost full-time jobs, monthly
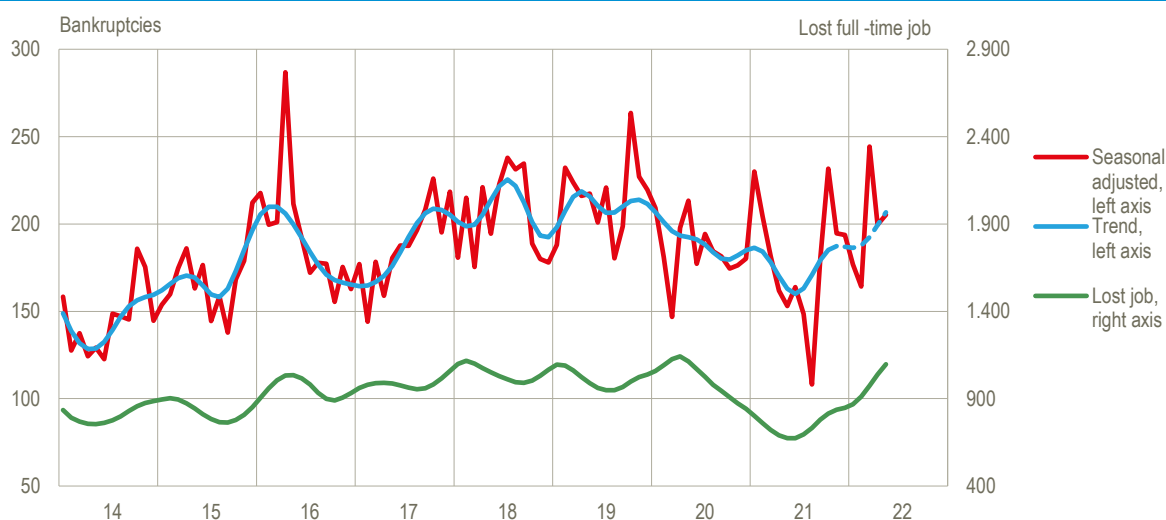
Note: The Hodrick-Prescott (HP) filter removes short-term fluctuations associated with the business cycle and reveals long-term trends.
Source: www.statistikbanken.dk/konk3 and own calculations based on figures in the Danish register on bankruptcies.

However, the most serious problem facing demands for topicality is the nature of a bankruptcy as the terminal point of a preceding declining economic process in an enterprise – a process that may spread over several months or even years and be initiated by historical and not current events. What really happened in the most recent period – week, month – cannot be deduced from the current bankruptcy figures – other indicators are needed.

As an example of the historical perspective, Statistics Norway performed an analysis that was published in their June 2020 publication of bankruptcies figures, see Box 2 below.

Norway: In the beginning of the pandemic when Norway shut down on 12 March, the ordinary bankruptcy statistics in Norway consisted of a monthly update of the statbank tables (https://www.ssb.no/en/statbank/) and a more comprehensive quarterly publication with a short comment article.

Data is delivered from the business register each month on the 17th, containing observations from the 15th in previous month until the 15th in the current month. Similar to the Danish statistics, the Norwegian statistics include information on turnover, number of employees, industry and geographical location in regions (counties), linked from their own register data. In addition, some tables provide information on the majority owner's sex and citizenship.

Publication takes place around two or three weeks later, i.e., around 38 days after the reference month after some work with data linking and controls. Since the reporting period is calendar month, there is a potential for improved topicality, partly due to the delayed data delivery from the business register (17 days), partly due to the time-consuming work with data linking, controls and other processing in Statistics Norway (21 days).

Box 2: Past economic performance of enterprises that went bankrupt, a Norwegian study of retail industries

Data describing the past economic performance of firms were linked to the firms that went bankrupt in the first 22 weeks of 2022, showing that most of them were in financial distress as early as 4 years before bankruptcy (https://www.ssb.no/virksomheter-foretak-og-regnskap/artikler-og-publikasjoner/koronakrisens-innvirkning-pa-antall-konkurser).

In figure 3, we see that overall, the number of bankruptcies in Norway fell immediately after the lockdown in March 2020, except from retail sale of clothes, which experienced a significant *increase*, compared to the same weeks in 2019. The SSB article points at two possible explanations: First, within this branch they found a higher fraction of firms with poor performance in the past three years default compared to other industries, indicating that persistent problems in the past was a relatively more important cause of default in this branch. This is shown in figure 4 which displays the fraction of firms showing continuous deficits and negative equity in their accounts for the last years before bankruptcy.

Fig. 3. The ratio of bankruptcies in 2020 against 2019. Norway, by week
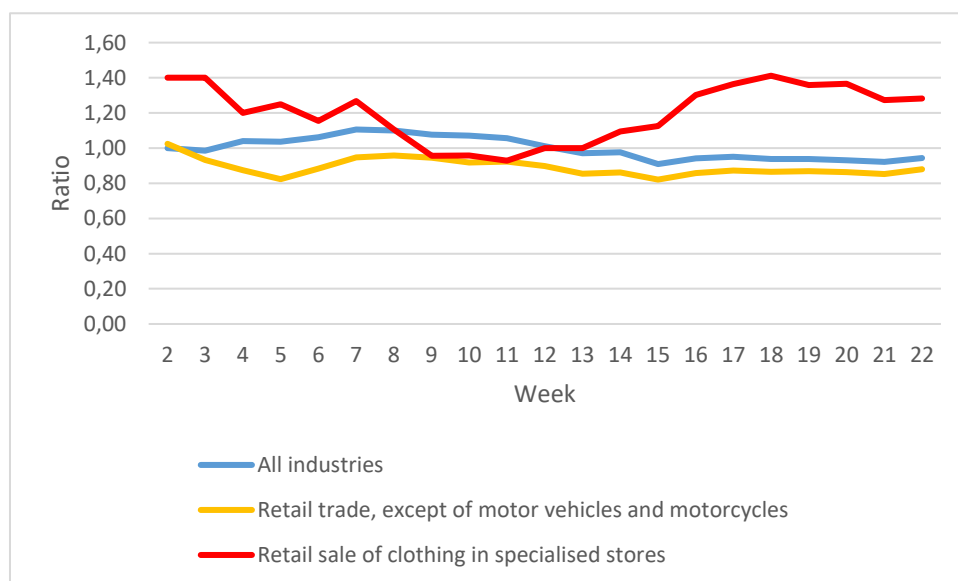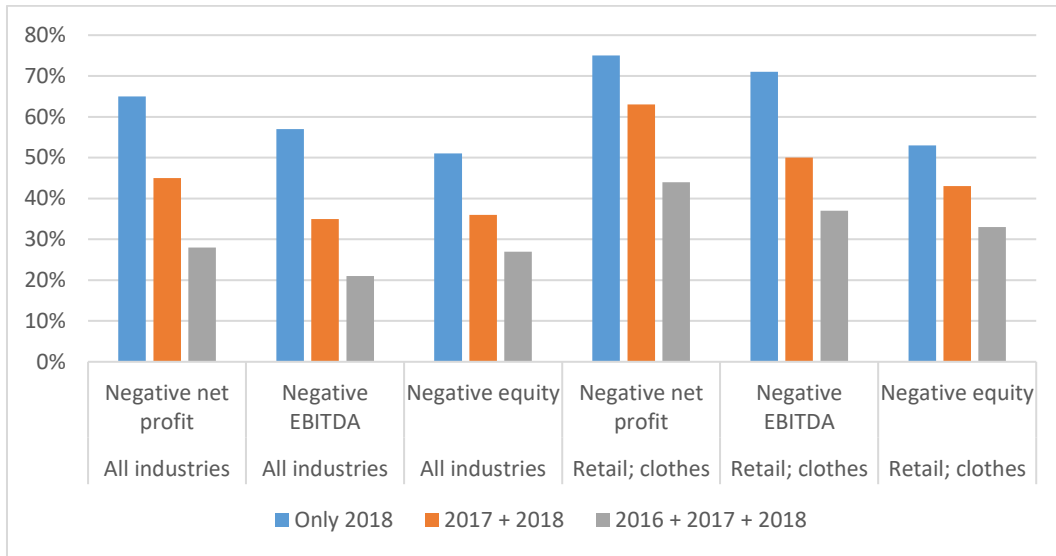

Fig. 4. Share of bankrupt firms with poor economic performance[2] in the near past. Norway, 2020

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[2] Negative profit, negative **e**arnings **b**efore **i**nterest expenses and **t**axes (EBITDA) and negative equity

Second, as opposed to many other retail industries, clothing appeared to be less suitable for internet shopping early in the pandemic and experienced a significant demand drop as shown in figure 5. Apparently, weak firms that were hit by an industry-specific shortfall in demand during the spring 2020 are the most likely explanation behind the eye-catching difference in bankruptcy response as seen in figure 3 above.

Fig. 5. Retail trade, volume index. Norway 2019 and 2020
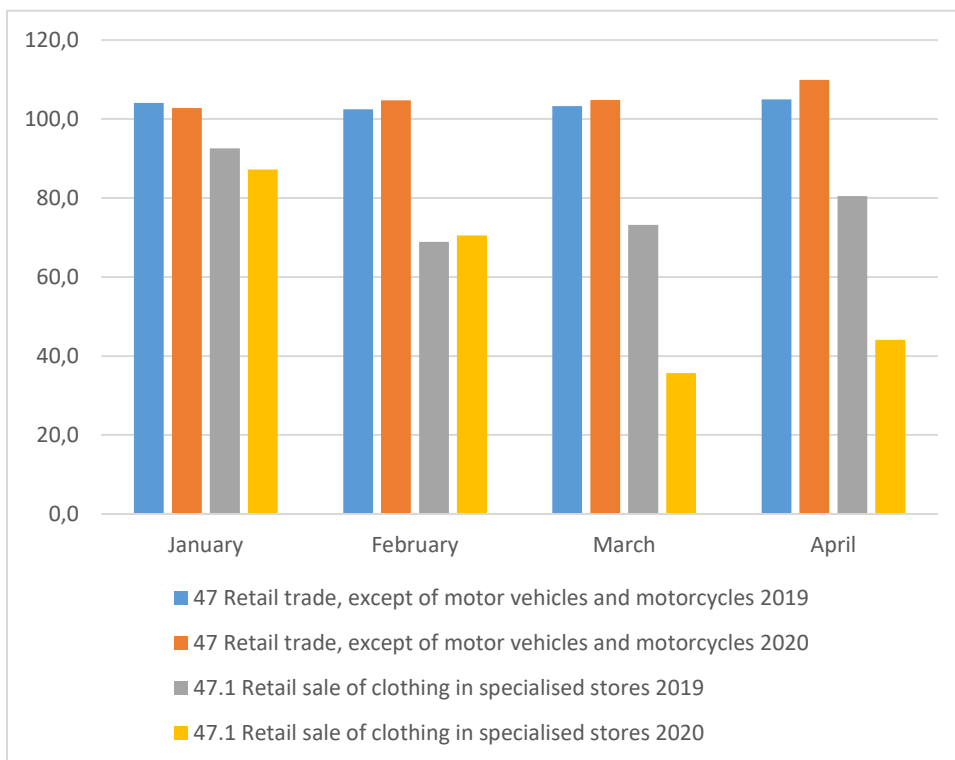
So, from the Norwegian data, it is reasonable to conclude that yes, bankruptcy is indeed the terminal point of a preceding declining economic process in an enterprise. However, differences across

industries can also be reinforced by a combination of sudden negative shocks hitting different industries differently and differences in firms' past economic performance[3].

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3. Inventions and developments

Denmark: The demand for more current figures raised the question in the Danish bankruptcy statistics if we could find other indicators within the bankruptcy framework that measure or indicate effects of more recent events before they evolved into bankruptcies.

The idea was founded in the concept of a 'bankruptcy cycle' – only a few bankruptcies came from nowhere, the majority have a traceable history in other legal events. If we could identify these indicators, we could perhaps be able to predict the number of bankruptcies that may be expected and in addition get closer to 'now' in measuring the consequences of the pandemic. These indicators could perhaps similarly add explanatory historical value to already realised bankruptcies.

The first indicator we investigated was *petitions for liquidation proceedings,* which is one of the legal means an enterprise can use to protect itself in a financially vulnerable situation. Such means can also be used by possible creditors (see box 3.).

Even if the legal protection of the enterprise in question protects its identity (= history in the bankruptcy cycle cannot be traced), a comparison between the petitions and the bankruptcies shows a remarkable correlation that supports the use of the petitions as an early indicator.

Box 3: Petitions for liquidation proceedings in Denmark

In the period 2015:01 – 2022:02, we saw approx. 52,500 petitions and 47,500 bankruptcies, i.e. 90 per cent of the petitions end up in bankruptcy. Furthermore, we can see a correlation coefficient of 0.79 between monthly figures on petitions and bankruptcies when we assume a one month displacement of the bankruptcies.

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[3] One should also bear in mind that a large share of bankruptcies is initiated by the owners themselves, and the pandemic represented a good excuse to throw in the towel for firms already in trouble and pass the bill to creditors.

The number of petitions which is published weekly is therefore a relatively solid indicator of the number of bankruptcies that can be expected within a one-month horizon. Even though this brings us a little bit closer to 'now' there is still a gap between changes in business climate and the measurable consequences.

The second indicator we investigated was *forced liquidations,* which is a legal tool mainly applied by the authorities in situations where enterprises do not fulfil the requirements of the financial statements act when they fail to submit their annual accounts (see box 4.). This situation often occurs as a consequence of previous economic problems in the enterprise as described in the Norwegian study.

Opposite to the petitions mentioned above, we know the identity of the enterprises in question and their history is therefore traceable in our registers.


Box 4: Forced liquidations in Denmark

In the period 2015:01 – 2022:03, we saw approx. 67,800 forced liquidations of which 29,800 ended in bankruptcy, i.e. 44 per cent. Of the total number of forced liquidations, 7,600 were active enterprises of which 54 per cent were finally declared bankrupt, and of the 60,200 forced liquidations in the zero enterprises, 43 per cent went bankrupt.

The interesting point is that we could determine the time span from liquidation to bankruptcy to 112 days in average. That means that in the actual bankruptcy figures, we are able to remove or to isolate bankruptcies caused by forced liquidations more than three months earlier – liquidations which themselves are results of even earlier economic problems in the enterprises. The result is that for the mentioned period, we have explained 29,800 of the total number of 48,400 bankruptcies – 62 percent – as the final outcome of events taking place three months earlier or even before that. On the other hand, the figures for the forced liquidations enable us to predict some of the bankruptcies that will occur three months ahead.

On the basis of the number of petitions and forced liquidations, we have recently begun to publish predictions of the expected number of bankruptcies in the coming month in our monthly article. Figure 6 below illustrates the time relations between forced liquidations, petitions and bankruptcies.

![NSM 2022 — Nordic Statistical Meeting logo]

Fig. 6. Forced liquidations, petitions for liquidation proceedings and bankruptcies
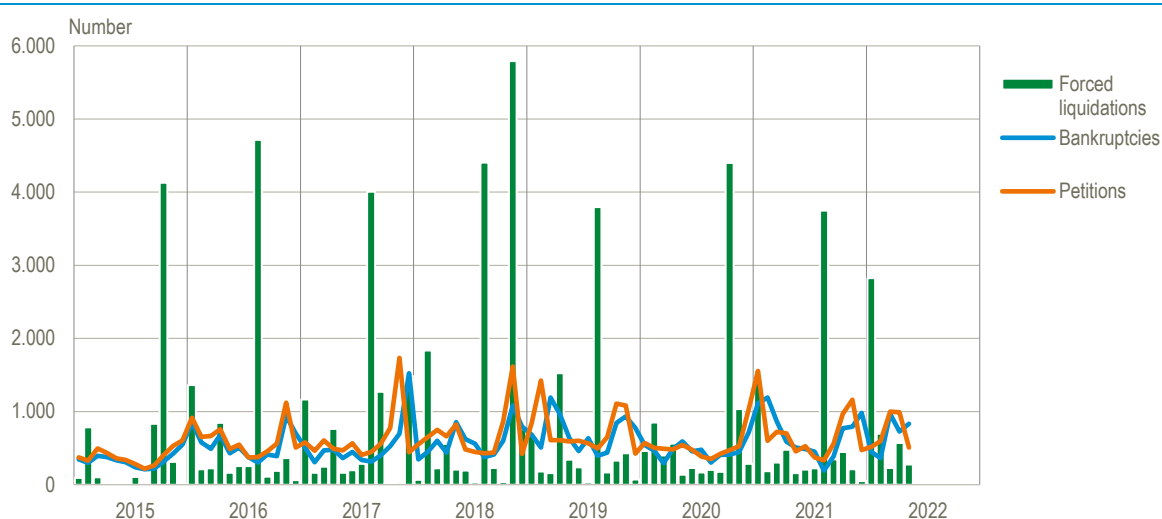
Source: www.statistikbanken.dk/konk11e and special extract from the Danish business register.

Norway: In Statistics Norway, we concentrated on two tasks related to both sources of delay; (1) the time span between registration date of the declared bankruptcies and data delivery (i.e., the delay due to the external business register) and (2) the time span between data delivery and publication date (i.e., the delay due to the data handling etc. within Statistics Norway).

(1) Data delivery: Previously, the business register delivered data for the reference month in the middle of next month. Now, delayed monthly file deliverance from the register is replaced by a "web crawler", a data program (R-script) that every morning at 8:00 examine yesterday's new bankruptcy registrations on the business register's web-page, extracted the firms' organisation ID and registration type and downloaded the data to a server on SSB's premises. The script is available at erik.fjaerli@ssb.no.

(2) Data processing: After data download, another routine continue: a program that automatically shuffled the data through the firewall and into a secure data zone. Then, manual data linking and publication procedures within Statistics Norway are replaced by automatic linking of data such as turnover and number of lost jobs.

Finally, publication take place one hour later, at 9.00, via untraditional tools (Tableau public[4]), with better visualisation options than our own tools.

As a result, monthly publication of monthly bankruptcies, at t+40 days is replaced by daily publication of bankruptcies the previous 7 days (or more).

The informational content of the statistics was also improved by adding new data sources like international trade data, (to measure the impact of current bankruptcies on the balance of trade) and geolocation data (map).

Crucial for the innovation work to take place was the availability of competent human resources and the ability to assemble an almost perfect team for this particular work: One statistician with excellent R skills and eager to do something new, another statistician with good general programming skills (SAS), broad experience from many fields within statistics and a good overview of the production systems, and also an expert from the Communication department with Tableau-skills. Also, good chemistry and good communication with colleagues in the IT architecture department helped us publish the new statistics only two weeks after the request for "nowcasting" from the management was issued to the organisation.

4. Stimulation of innovation and development in public organisations: necessity is the mother of innovation!

The COVID-19 pandemic and the following lockdown spurred new ways of working both in the private and in the public sector. We saw more use of digital communication and digital interaction, partially a result of necessity. As we have seen from the Danish and Norwegian examples presented here, the lockdown also initiated innovation in the public sector.

In retrospect, one may ask why these initiatives did not come earlier – why wait for a pandemic (or other exogenous shocks)?

Lack of innovation is sometimes connected to conventions – we have an established picture of the world (and are hard wired to protect the status quo) – but the question

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[4] Due to rules related to "Universal Design" and for other reasons this is strictly speaking not an approved publication channel in Statistics Norway and is now banned. To cover our back, the Tablau-publication was labelled "experimental statistics". The tableau-presentation still exists, but is not updated anymore.

is if we really know what is worth knowing about bankruptcies and the possibilities an expanded knowledge may bring about?

We need to further understand the nature of bankruptcies by analysing the development in enterprises that have gone bankrupt:

- By creating general pictures of the economic triggers – increasing costs, declining turnover, profit etc.

- By discovering the differences between industries, like different vulnerability and sensitivity to business cycles and other crises

- Creation of time profiles – other events in the life of the enterprises before we have the indicators on forced liquidations, petitions and bankruptcies?

We need to investigate other usable indicators:

- Administrative registers, eventually big data

We need to cooperate with core users about their demands and to present our possibilities:

- Frequent meetings with administrative institutions

- Frequent meetings with industrial and other organisations

Further innovation must be based on the knowledge obtained above, but our ability to innovate is also determined of different barriers, and we need therefore to map out what the barriers of innovation are and what drives innovation.

Since improving the statistics on bankruptcies requires innovative solutions, we will reflect on this "innovation puzzle" in the context of theory and evidence from previous literature on innovation in organisations (both private enterprises and public agencies).

The public sector and its role in innovation

The public sector is fostering innovation in the private sector through the education system and by providing funding to private companies. However, in addition to the public sector's role in stimulating innovation in business enterprises, there is "*an*

urgent need to power innovation within the public sector itself in order to unlock radical productivity improvements and efficiency gains, to foster the creation of more public value and a better response to societal challenges" (European Commission, 2013).

Several factors contribute to the need for public sector innovation; technology is transforming how citizens interact with government, citizens are more informed, and their expectations have increased. So, governments need to be able to respond to the challenge.

Obviously, the next question is how one can achieve innovation ─ which next time accentuate the need to identify innovation drivers and innovation barriers. In this respect, there are similarities as well as differences between business enterprises and public organisations.

OECD[5] points out four "organisational factors" in their framework for analysing public sector innovation:

People: How people are motivated within an organisational setting to explore new ideas and experiment with new approaches.

Knowledge: Knowledge and learning which allows us to consider issues related to the collection, analysis and sharing of information, knowledge development and learning.

Ways of working: The way work is structured within and across organisations may have an impact on innovation in the public sector.

Rules and processes: Rules and processes (including the legal/regulatory framework, budgeting, and approval processes) may offer (or block) opportunities to innovate.

Literature on innovation in business enterprises points out similar factors: Regarding *internal* factors, Johnson (2017) emphasizes the importance of (innovation) teams as effective, creative and agile small units within the organisation. There are enablers as well as barriers for such innovation teams. Among innovation enablers, Johnson

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[5]OECD: A framework for public sector innovation, https://www.oecd.org/gov/innovative-government/a-framework-for-public-sector-innovation.htm

(2017) lists organisational properties like culture, knowledge and education, team properties like diversity and collaboration as well as individual properties like personal initiative and self-efficiency. Among innovation barriers we find insufficient economic resources, time to do innovative work and resistance to change.

However, innovation is not only affected by factors within the organisation. Among the numerous studies of private sector innovation, Taalbi (2017) is very much worth mentioning because this study is a systematic, statistical investigation of innovation drivers over a relatively long period of economic history (1970-2007).

Using a rich material consisting of textual descriptions of around 4,000 innovations, Taalby (2017) finds that (1) the vast majority of innovations in the period were problem-driven, driven by technological opportunities, or both, and (2) these innovations show high variation over time, reflecting changes in the economic and technological environment, such as the oil crisis in the 70ies or the micro-electronics revolution behind factory automation from the 80ies and on.

This is perhaps not surprising, given what we would intuitively expect from private businesses: Innovate or perish![6] Still, this study is highly relevant for understanding the differences between (slow) public sector innovation and (fast) business sector innovation, and it provides one clue for answering our question above: Why did we (Statistics Denmark and Statistics Norway) have to face a pandemic to implement our improvements in short-term business statistics?

Management by objectives and results? Why not just do it?

We believe that the answer to this question may be found in the concept *agility* and its importance as an innovation driver.

Agility is typically associated with terms like "fast decision making", "personal involvement", "easy adoption of technologies" etc. In management theory, most of the research on agility has dealt with private companies. A representative example can be found in Dahmardeh and V. Pourshahabi (2011), which relates "agility to the

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[6] On "creative destruction" and its role for innovation in the business sector, see Reinert and Reinert (2006) and Schumpeter (1942).

ability of companies to respond quickly and effectively to (unexpected) changes in market demand with the aim of meeting varied customer requirements, in terms of price, specification, quality, quantity, and delivery".

In our context, agility is the x-factor that facilitates innovation[7] as a creative response to some sort of stimulus from the outside. As pointed out in by the European Commission (2013), agility is also important for public sector organisations: "A new vision for the public sector is required, whereby public managers become public entrepreneurs. This can only happen through a pervasive change of mindset, with more experimentation, controlled risk taking, and an agile and personalised response to new constituent challenges "(our underling).

Even if the expert group behind the EU (2013) report give explicit recommendations "in order to address barriers to innovation" these are formulated on a superior level and are scarce when it comes to appropriate means and operational solutions to achieve agility. Strikingly, it also appears to be more concerned about innovation *barriers* rather than its facilitation and drivers.

By contrast, in business there are mechanisms that more or less automatically enable and promote agility: Customers' needs, changes in the chain of supply, owners' and owner-managers' demand for profit, the threat from competitors, use of incentives like performance pay and bonuses, etc. In short: Decision making in business is driven by fast and smooth information flows and market incentives.

In public agencies, however, the nerves connecting the organisation to the surrounding world are not working that fast - in normal times.

Here, we arrive at *the first of three answers* to our innovation puzzle, namely demands from the surrounding world: The lockdown of the economy in the beginning of the pandemic and fear of an upcoming economic crisis forced our "customer" (the government, represented by the key ministries) to formulate and quickly communicate their needs -and our organisation understood.

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[7] Of course, agility may also be viewed as a goal in itself.

In other words, this can be viewed as a problem-driven innovation driver as described in Taalbi (2017), working through (for once?) agile politicians and ministries, willing to act and willing to prioritise.

In Norway, this happened two work-days after the lockdown. One should bear in mind that our point here is NOT the fact that the governments and central administrations in our two countries communicated their urgent needs (really; this is the least they should do), nor the fact that several Nordic Statistical Offices have published COVID-19 related statistics unusually fast as a response to the crisis.

Our point is that passivity and lack of interest among our users in "normal" times represents, if not a barrier, then at least a lack of a most important innovation driver, namely demand. Getting our users involved must therefore be given high priority to facilitate creativity.

Regarding Statistics Norway, this aspect has been significantly improved with the new Act relating to official statistics and Statistics Norway (The Statistics Act, 2019, applicable from 2020). Among other regulations, the law prescribes that the government shall decide a *National programme for official statistics* over a three-year period and that a broadly composed *Council for official statistics* with different community stakeholders and institutions shall give advice on all important questions (including revisions of the programme). This arrangement will provide some degree of user contact, at least at a high level, and it will help root statistics in the community.

However, regular but not so frequent contact at the top level cannot substitute frequent contact between users and producers "on the shop floor".

When regarded as a service to be provided in the information market, statistics should not only be published with as short delay as possible but must also be relevant. It is questionable if Eurostat regulations or our current everyday working routines in the statistical institutes can achieve that. This points at the importance of having active and agile user groups and similar forums, which can represent a substitute for the business sector's market places.

This brings us to *the second answer* to our innovation puzzle: Besides the need for active and demanding *users*, it is equally important for achieving innovative

institutions that we have <u>agile organisations so signals from the outside environment can reach the producers and where producers can respond</u>. To actualise and improve the statistics is our responsibility too.

Decision-making within public agencies (statistical offices are no exception) tends to be slow and bureaucratic. This is a poor basis for flexible, user-friendly and innovation-oriented operations. When the crisis hit us, these barriers were suspended for a while. There was a clear understanding of crisis and a feel free-vibe in the organisation, tedious standard tasks were dropped (i.e. postponed) and there was more of a "yes, we can do it" approach.

We shall not and will not give recommendations on improvements at this point, as it is beyond the scope of our topic and perhaps outside our field.

Still, we may suggest that facilitating more deliveries of statistics on demand, as a supplement to the regular official statistics, may represent a stimulus, along with autonomous and not too big units, smooth routines for data access and, not least, allowing public agencies and ministries to buy services (for example project specific financing).

We believe more of such market-like governance instruments could stimulate not only new and more relevant statistics, but also provide incentives for finding more efficient ways of production, search for new data sources and so on. It could also provide variation from routine tasks.

However, this would require a public spending reform that may not be realistic; in Norway, the trend goes the other way: More of the funding of Statistics Norway is reallocated from other ministries to the principal agency, which is the Ministry of finance.

On the other hand, we recognise that mandatory national statistics and Eurostat deliveries must persist regulations and quality requirements must be followed, and the independence of statistical institutions must be respected and protected.

The third driver of creativity that we wish to point out is the importance of the individual and the teams, like skills, knowledge and motivation.

To some extent, skills and knowledge are qualities that can be handled through recruitment and continuous learning, but motivation is more complex. Science

concludes that extrinsic motivation like money or other rewards (or punishment) has little effect on creativity compared to intrinsic motivation like passion and interest (Amabile, 1998). However, the hunt for the secret of having motivated co-workers may resemble the hunt for the Holy Grail. This is the beyond the scope of this paper, but providing options for participating in "digital playgrounds", enabling small, autonomous teams etc should indeed be considered. Except that job satisfaction obviously counts, intrinsic motivation will to a high degree also depend on individual suitability and having the right person in the right position. Of course, this is also a question of salaries, to keep the highly skilled employees.

When it comes to skills and knowledge, the Norwegian case was made possible thanks to a team that covered different and complementary areas: The web, the internal IT-systems, communication and economics. There were no outside formulated requests to improvements in the Danish bankruptcy statistics. None the less, in the light of the problems of topicality, we found that it could be a good idea to investigate other solutions. The process has taken place within the existing framework of resources – approx. 25 hours/month – without adding other persons.

5. Learnings and experiences

There are several learnings from the Danish and Norwegian innovation initiatives. Some of them concern the production of short-term statistics, others concern economics. We mention:

We need to understand the nature of bankruptcies by analysing the development in enterprises that have gone bankrupt:

- By creating general pictures of the economic triggers – increasing costs, declining in turnover, profit etc.
- By discovering the differences between industries, like different vulnerability and sensitivity to business cycles and other crises
- Creation of time profiles – other events in the life of the enterprises before we have the indicators on forced liquidations, petitions and bankruptcies?

We need to investigate other usable indicators:

- Administrative registers, possibly big data

We need to cooperate with core users about their demands and to present our possibilities:

- Frequent meetings with administrative institutions
- Frequent meetings with industrial and other organisations

We need inspiration from and sharing of knowledge with our Nordic colleagues:

- Establish a Nordic network
- Exchange of ideas and papers etc.

We need to improve our ability to innovate:

- Education, knowledge and qualification of staff
- Management
- Rules and processes, how to speed up change
- Internal cooperation with producers of related statistics

We need to improve our dissemination:

- Documentation – how to understand the statistics
- Newsletters
- Contextualisation: Join publication with more indicators/business cycle overviews

References:

Amabile, T. M. "How to Kill Creativity." Harvard Business Review 76, no. 5 (September–October 1998): 76–87.

https://www.hbs.edu/faculty/Pages/item.aspx?num=7420

Dahmardeh, N., Pourshahabi, V. (2011). 'AGILITY EVALUATION IN PUBLIC SECTOR USING FUZZY LOGIC', Iranian Journal of Fuzzy Systems, 8(3), pp. 95-111. doi: 10.22111/ijfs.2011.289 https://ijfs.usb.ac.ir/article_289.html

European Commission (2013) : Powering European Public Sector Innovation: Towards A New Architecture. https://ec.europa.eu/futurium/en/system/files/ged/42-public_sector_innovation_-_towards_a_new_architecture.pdf

Report of the Expert Group on Public Sector Innovation

https://ec.europa.eu/futurium/en/system/files/ged/42-public_sector_innovation_-_towards_a_new_architecture.pdf

Johnson, M. (2017): Innovation Enablers for Innovation Teams – A Review. Journal of Innovation Management, 3 (2017) 75-121 http://hdl.handle.net/10216/107952 SM:
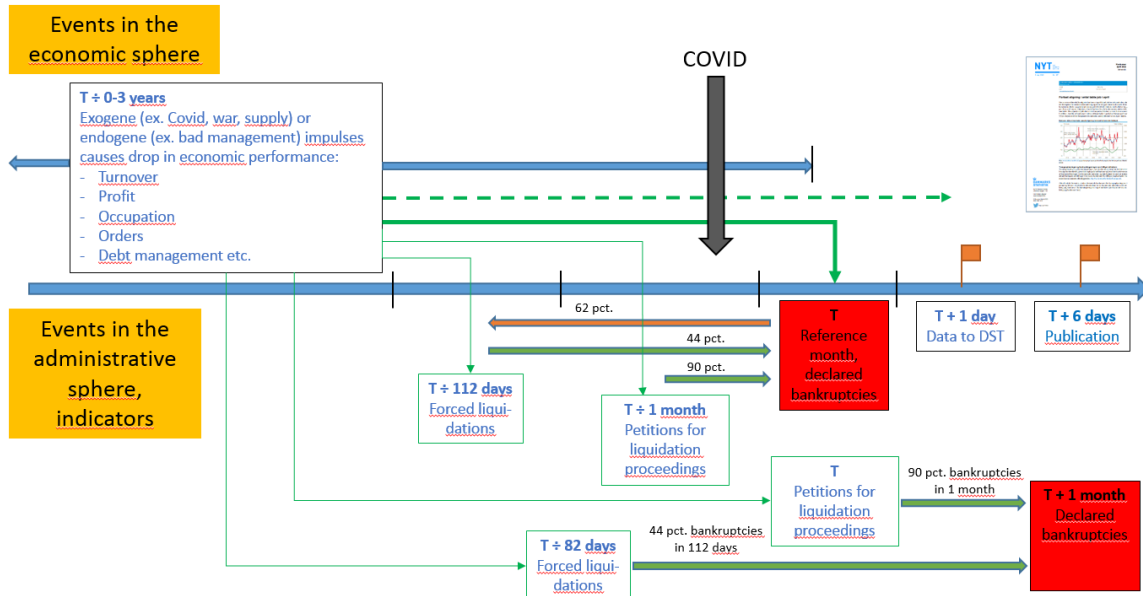
Reinert, Hugo; Reinert, Erik S. (2006). "Creative Destruction in Economics: Nietzsche, Sombart, Schumpeter". Friedrich Nietzsche (1844–1900). The European Heritage in Economics and the Social Sciences. Vol. 3. pp. 55–85. doi:10.1007/978-0-387-32980-2_4. ISBN 978-0-387-32979-6.

Schumpeter, Joseph A. (1942): Capitalism, Socialism and Democracy (New York: Harper, 1975) [orig. pub. 1942]

Taalbi, Josef (2017): "What drives innovation? Evidence from economic history". Research Policy 46 (2017), 1437-1453.

Appendix (slides)

The nature of bankruptcies in Denmark

From Really Slow to Really Fast in Norway

Standard procedure		Experimental procedure	
17th every month:	Business register delivers a file to Statistics Norway with firm ID for last month´s bankruptcies	Every morning at 8 am	R-script automatically examines the business register´s announcement web-page. New bankruptcies are identified (among other types of announcements) and firm´s IDs are downloaded and shuffled through the firewall and into the secure production zone
Approx. 3 weeks later:	• Publication of monthly statistics with some firm characteristics connected (lost jobs, turnover etc) • Involves one employee (part time) in stat. Norway)	One hour later:	• The same firm characteristics as the standard procedure are connected • + balance-of-trade effect + geolocation data • Publication takes place via Tableau public. • Automatic; no manpower involved

Untraditional publication channels – new opportunities

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- [Tableau public](#)   (not updated any more)

Innovation Drivers and Innovation Barriers: Learnings from an exceptional situation

- Taalbi (2017): Most innovations are driven by discrete events, history-spesific problems and new tecnological opportunities
- «Neccessity is the mother of innovation»
  - But agile users are needed -as well as agile producers
  - Communication and cooperation
- The importance of skilled and motivated coworkers