

Interview with Lars Thygesen

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Lars Thygesen has spent the majority of his professional career at Statistics Denmark where he has served in many areas and positions such as: (current) Director of Sales and Marketing, (1995–2003) Director of User Services, (1987–1995) Director of Persons Statistics, among others (Stiil, 2009). Mr. Thygesen also worked at the OECD as the Division Head for statistical information management and support from 2003 to 2009. Lars has served in various statistical organizations throughout his career and is a prolific author. Before joining Statistics Denmark, Lars earned his Masters degree in Economics from the University of Copenhagen in 1970.

During his tenure at Statistics Denmark, Lars Thygesen has been a key player in designing and implementing a new, innovative method of performing nationwide censuses. He has faced challenges from many different angles – insufficient computational power, social pressures, a reluctant statistical community, and others. Notwithstanding these challenges, Statistics Denmark in 1981, through the relentless work of Mr. Thygesen and his associates, was the first country to

implement a register-based census, which revolutionized Statistics Denmark and much of the international census community.

This brief report summarizes an interview that discusses the development of both Lars Thygesen and Statistics Denmark. It discusses specific challenges that he faced and how those challenges were addressed and overcome.

Interviewer (I): We are pleased that you would take the time to join us. We have a couple of questions for you. I sent them out a couple of days ago. Did you have a chance to look at them?

Lars Thygesen (L): Yes, a second. I had a second.

I: Great. Well, let's go ahead and get started. To begin, can you tell us about your educational background, when and where you were in school, and the political environment during that time?

L: Yes, my education degree is a masters in economics and statistics from the University of Copenhagen. Before that, I went to school in Copenhagen in good social conditions. . . there were no problems there. I was very lucky to have a fantastic teacher in mathematics in the higher grades. I think that changed my life because I got very much engaged in mathematics. Then when I went to the university I got interested in mathematical statistics, probability models, and so on. Early on I was interested in probability models as they relate to games, like when you play dice with your friends. Unfortunately, they were not quite right (laughter). But later on, these models came up in the curriculum of my university and I got very much involved with them. My master's thesis was in economics but it involved a lot of statistics. During the last year of my studies at the university, I was also working in an institute where they were working on problems of measurement and objectivity. They were studying the problem 'Can you really measure intelligence or can't you?' I have to say that my conclusions were that you cannot really objectively compare intelligence levels of different people, according to the model. I worked on this under the

supervision of Professor Georg Rasch. He was my favorite professor.

I: Lars, you said that you were at the University of Copenhagen from 1963 to 1970. I am wondering how you made the transition from your academic career into your professional career?

L: Yes. Before we get to that, you have another question that asks if there was anything inhibiting my career, like marriages, children, and other things. I had children very early on when I was 21, and then I played in a jazz band... that took an extra year or two (laughter).

When I finished my degree in 1970, I had decided that I was very much in love with statistics so I applied to Statistics Denmark and at that time they were very eager to get young people. So I was called, immediately, to the office of the national statistician and he knew every grade that I had been given. After talking to him, I was hired and that was it. It was easy in those days.

I: Well before we move on with that, I need to know which instrument you played in the Jazz band?

L: I played first clarinet and then saxophone.

I: Nice. I just wanted to be sure that we had that detail because that is a pretty significant and fun experience!

L: Yup. Those were great days (laughter) but I had to give it up because I had too many children and I realized that I needed to finish my studies.

I: How many children do you have, Lars?

L: Three; but I had two of them quite early...

Anyway, when I came to Statistics Denmark, at the same time, I started as a part time teacher in Statistics at the University of Copenhagen. I taught theoretical and practical statistics, which gave me the opportunity to further understand the statistical concepts I hadn't fully mastered as a student. You understand much more when you have to teach it.

I: That is true. Transitioning forward, let's talk about the time when you came into Statistics Denmark. In 1970, from my readings [1], there was a revolution of the statistical system and census taking processes there. Can you explain the environment and what was happening within the agency when you first started?

L: Yes, I can try. At that time, Statistics Denmark was rather new and undergoing a lot of development. It had been formed in 1967 along with the appointment of the national statistician. At that time there was also a law that passed [1] saying that we were to use, as much as possible, administrative sources which were just being built at the time. The central population register,

which is basically a cornerstone of the current statistical system, had also just been formed in 1968. They were trying to recruit qualified people... the number of people with academic degrees was quite low at that time... We have grown considerably since.¹

When I started I was allocated to a sample survey study on geographical variation of housing costs. I had a lot of responsibility right from the start. I was totally responsible for the survey that was going to be used as part of a mechanism to diversify wages of civil servants in different parts of the country, it was important. I did this survey in my first year and, of course, I had good bosses who could help me.

After my first year I noticed that IT was starting to grow and become very important, and Statistics Denmark was about to buy a modern computer. Prior to that time we were using punch card technology. The new computer was an IBM S/360 and they wanted people to join this force. I thought it was a great opportunity so I worked as an IT systems planner. I worked there for three years before finally joining the register movement and this was done by the fact that I applied for a job in population statistics where there was a very visionary director who I admired very much. He had a vision of how the statistical system could be in the future when the resources and methods were more developed.

So I joined him and his division. Actually, at that time he was not a director... he was a division head. Anyway, this was in the year 1974 and I stayed in that branch for quite a long time. I didn't stay exactly in that division but I stayed within that branch and was very much involved and responsible for the first register-based statistics during those years. The last traditional census was in 1970 [1] which actually was not completely traditional because it was linked to the Central Population Register [2]. There was some information taken from that register including the person number, which is the unique identifier that every person in Denmark has.

We have a unique ID number, I am sure that you have read about it, that has ten digits, which we use in all contracts with the public administration and also some private agencies. You have to use this number when you go to the dentist, the doctor, school, when you pay taxes, or buy a new home, etc. etc. It is much like your Social Security Number except it is com-

¹There were 11 heads and 39 academic staff near the time Lars started working at Statistics Denmark (Danmarks Statistik, 1969). Now, there are 40 heads and 252 academic staff (Danmarks Statistik, 2014).

pletely universal which means that every administration is using the same number. This is the biggest difference and it has allowed us to use it as one of the cornerstones of the register based system. Other cornerstones are the business identification number, which is also a unique number that is used in all business connections, and finally we have a buildings and dwellings identification number, which is derived from the exact address.

So in those days, before the register-based system, we were struggling to make really solid and reliable estimates of the population and its composition and at the same time, track the movements of the population like emigrations, immigrations, local migrations, births and deaths etc. Once ready, we could model all of this using information from the central population register, data from the health authorities.

These were the first three years I worked in this system and then from there I was given the task of coordinating the future's more comprehensive system which was designed to lead to a full register-based census in 1981. In 1974 we asked user's of censuses all over the country, all kinds of users... local users, central users, private and public users... if it was necessary to have a full census in 1976 or not because the convention was to have it in 1975 or 76. The conclusion was that if we could make a real full census in 1981 based off of registers they were happy, so this is what we did.

In the mean time we worked on income statistics based off of tax registers and social statistics based on social registers, municipalities, etc. All this was connected into one system which made the system coherent and flexible to meet new user needs.

I: Gotcha. Lars, backtracking just a little bit, this obviously was a revolutionary time in the system there. I am wondering if you ever had to deal with 'pushback' both within and externally from Statistics Denmark? I am also hoping that you will expound on your own evolution. Did you ever have a hard time believing in the new system? How did that change?

L: There was some hard opposition both internally and externally. Internally, there were people who had invested their whole lives in 'traditional statistics.' When we were taught in the university in the 60's we were taught about surveys and censuses and that was it. No one ever discussed using real administrative sources for detailed statistics. So it was against the generally accepted curriculum of the day along with the positions that people had made for themselves by doing the same thing for many years and believed that their way was the 'truth.' They believed that truth only

came out of a census or a survey and they would say so in all the occasions where they thought someone was listening.

The leading management in Statistics Denmark believed in the new system and wanted it implemented. The national statistician who was the head of Statistics Denmark was very supportive of what we did. I also had a boss who was very determined and very powerful and they kept on fighting for this and I believe this was decisive and necessary, otherwise I believe it would have failed. Of course it was a strength that the law I mentioned earlier was enacted in 1966. Some people who envisioned it would be possible and extremely useful had designed the law.

In the law there was a strong incentive that we must go forward and we would have had a disappointed parliament or lawmakers if we would not have carried out the vision and ideas which were in the law, especially since in the 'remarks to the law' it was clearly written that the identification numbers and central registers would be formed to be used to generate statistics and hopefully a full census.

We also had discussions about the 'big brother' concerns. They came up frequently in the late seventies. There were a lot of people who thought we were becoming a big brother because we were collecting micro-data on persons and businesses... of course, this was only done to create statistics... names were removed. We were using the rest of the information to create all kinds of statistics. On the other hand, if these detailed data got released, people could find out much about a person and even worse, perhaps, about businesses. There was a strong argument against this at the time.

This caused some of the most extreme difficulties in implementing the new system. There was a lawsuit that was filed by five municipalities that claimed that we were not allowed to ask them for information about social clients with identification numbers. It was a very difficult lawsuit that lasted three years and it ended up in the Supreme Court where we won the case, meaning that in 1981 all municipalities had to realize that they were obliged to give the requested information, which was also stated in the law on Statistics Denmark. Since then there have been no real problems or popular resentment against our activity but at that time it was very hard. Newspapers were full of propaganda stating things like 'big brother is watching you.' I became so inspired that I read Orwell's book, 1984, and really enjoyed it. The book was mentioned in the debate. I was also included in the debate and I often had to defend

myself against very strong accusations of me being a very bad person fighting for such a case.

I: Did you have a primary argument that you could rely upon when they accused you so strongly?

L: First I appealed to the law that was established in the late 1960's that gave us power to do what we were doing. The opposition could not really say that the lawmakers were stupid and couldn't be of aid. I also wrote some articles on the security measures that we had in place, trying to reassure people that we had a strong data management and protection program in place and that everybody who might offend these rules would go to prison. That is still the case.

We also argued the benefits of using the new system. Some people would say 'Yes, but you can get the same statistics without the person numbers.' We replied 'no, the personal identification numbers are necessary to have a comprehensive system' and that was necessary to fulfill the user's needs.

We realized that the users were accustomed to receiving census data every 10 years. They were used to that. But in reality, the users needed, and still need today, the most recent data that they can get. If they projected into the future with data that were 10 years old they were bound to make mistakes.

So the arguments we used were usefulness, data security and protection, and that the lawmakers had decided that this is the way it should be.

I: That sounds like a very exciting and, possibly, stressful time. Did you ever feel stress during the process?

L: No. I wouldn't say so. It was some of the most fun I have had. But I was also young and when you are young everything is new and generally more fun. I also had a lot of international discussions because we were the first country to have this movement. Later on, other countries followed but they were always 10 years behind. Maybe they were waiting to see if the register system would work in our country, maybe they were afraid of their own shadow.

Anyway, I had the opportunity to go to international meetings to defend this. Generally, the audience in those meetings held onto the notion that the whole truth lies in a census or in a survey and any deviations from that was bad. They did not believe in the new method. I had a very good colleague who was the chief statistician of Copenhagen City that said in one of those meetings 'With what evidence can one claim that even one piece of census data was correctly reported?' This was a strong argument for our purposes because the general notion was, if it is not a census, then it must be

bad. They also had an argument, which is valid in many different parts of the world, that different populations would not accept the use of a personal identification number to link data.

Eventually, the atmosphere changed and it became more recognized that this was a very bright way to make statistics and it might be used as an inspiration for other countries. Even lately, the U.S. and the U.K. have asked us a lot of questions about our system and how it works because it is becoming more and more difficult for any country to take a traditional census with high quality. There is a lot of discussion of the future of census-taking in the U.S., Europe, and everywhere really. A few countries have changed along the same lines as us; first the Nordic countries, later Switzerland, the Netherlands, and Austria² [8].

Then in 1995 the European Union made some concession because they agreed to publish a book [5] that we had written on the whole system. Eurostat published it. It was a handbook about how to make such a system and its associated challenges and opportunities. This was a great victory for us that they would publish a book that we had written. Today it seems that the European Union is innovative and very much looking at having developments like this in other countries.

I: So, Lars, in order for all of this to happen, it seems like the perfect storm. You need to have all the right elements aligned – the political and social environments, the computational technology, the administrative data sources, etc. Do these elements have to be in place before the transformation can occur? Which of these is the driving factor?

L: There is a funny story I want to tell. In 1974, when we developed the income statistics based on tax registers, one of my colleagues had made the IT System to handle these huge amounts of data. He made the system and it could do lots of nice things. They tested it and it worked and then they put on the tapes and it went so slowly that it would take 2 years to make statistics for 1 year (laughter). Nowadays, that is not a problem, but back then we had to adapt our new systems to our technology. So for example, we decided to use only a sample of the income statistics that we had at the time, otherwise we couldn't handle it.

Of course, technology is a pre-condition but I would say the most important pre-condition is the political will. In the sixties we had a very visionary prime min-

²The number of countries who have implemented register-based systems has grown outside of Europe as well, including, Malaysia, Philippines, and others.

ister, Viggo Kampmann. Unfortunately, he had to step down as the prime minister but he was a very bright man and very interested in statistics. He became the chairman of the committee that made the law which was quite exceptional for those times, not to mention that all the legislators in parliament voted for this. This is evidence that there was a strong political force that facilitated the development of this new system.

I also think that we had very good management and people. They were very keen and kept their focus always and never allowed anything to slip.

I: Thank you for that. Can you talk a little about the applications of this new system? What benefits does this system have as opposed to traditional systems? Perhaps you could discuss your paper, Occupational Cancer in Denmark [6], to highlight the benefits?

L: Yes, I can do that. I would start by saying that today we have the whole system made up of all the registers that form one coherent mass of data; although, they are kept in separate departments and nobody is allowed to access everything unless there is a situation where they need to link the data. Today, we cannot do all the analysis that is possible with these data because they lend themselves to longitudinal studies and numerous phenomena.

I worked on this project [6] together with a brilliant researcher working on behalf of the cancer registry in Denmark. What we did with this study is link the population's information about occupation and economic activity in 1970 with the information about what happened after that time. Did anybody die or emigrate? Who was diagnosed with specific kinds of cancer? If they died, did they die of cancer or something else? They had the specific cancer diagnosis of each death that was linked to the cancer registry. . . this was absolutely new at the time. We had an agreement with the cancer registry for their data, which were a listing of all individuals diagnosed with cancer independent of if they had died or not, from all the hospitals and doctors in Denmark. So we could link these together. We had the population at one time with knowledge about economic activity, occupation, where they lived, and then followed the population day-by-day in a period of ten years. Then we calculated incidence rates, taking into account people who had moved and were no longer at risk of being diagnosed or dying of cancer. In this way we could find out which kinds of people were at risk of one or another kind of cancer, and of course, this was published in a statistical journal. It was very much focused in the news media, as well.

This type of analysis now takes place in a large number of cases. We are not involved directly, but we have

established a research service center that allows researchers to. . . Well, first of all they have to specify their projects and we have to assess whether or not it is in the limits of decent research, which it almost always is. Then we can create the datasets they need, de-identify them and make them available for the researchers under certain conditions. Administrative and security arrangements are also made to make sure that researchers don't try to use the information to identify individuals. If they do this, then they will be expelled from the service, and in severe cases, be incarcerated. Nonetheless, it has been functioning very well and we currently have 1,400 active researchers. Each of them is running a project that they have defined in their research communities. Many of these projects are longitudinal studies, similar to the one I just mentioned. They can also be in various fields, such as epidemiology, labor markets, analysis of certain drugs, etc.

This is a huge center. I wouldn't say it is a business because we are not allowed to make a profit nor do we want to make one. We just want to put the users in a good position to make good use of the data and find new knowledge that is useful in society.

I: Right. Obviously, the benefits to this system are very clear. Chatting with you, it is inspirational to talk about. I wonder what direction you see Statistics Denmark to take now? Are there new innovations that it can take or has it reached its capacity?

L: I think there are always a lot of new things to take up. I would mention two. The first is the matter of documentation/metadata [9]. This is something I am very much involved in. We are working to develop metadata in such a way that users, or potential users, can find out which data are available and if they are worth anything. If they have an idea that they would like to research, we would like to develop the system to tell them which data are available in Statistics Denmark or other places that could be brought in and made into analysis. This is an area where we are working very hard. We are trying to get good enough descriptions of the data on a lot of levels. There is a lot to be done in this respect. I think no country in the world has solved this in a satisfactory way, and neither have we. Hence, we can see a lot of things that we can do to become better.

I would also say that when we work on new ideas we always look internationally. We always try to 'steal' ideas from others; and, luckily, others like it. There is a very good cooperative spirit in the international statistical world. We are happy if someone copies our ideas and very often they are happy if we copy their ideas. So we are looking at the best practices around the world to

give us ideas. The other thing I would like to mention is that we are now in a similar situation that we had in 1970 where a lot of new data sources are appearing, which have great potential if we could make use of it. Back then, it was sacrilege to ask for all of these data with person numbers. Before that time, it was not done and people wondered if you could really do it. Also, the amounts of data were bigger than what our technology could handle.

Now we have the big data fever which is running all over the world. We are also part of that fever, although we are mostly looking to see what people with more resources are doing. I am talking about the data that could be used to make new statistics or improve existing statistics that are all very much in demand from users. I am talking about things like mobile phone activity, GPS information linked to mobile phones, road data from control points where cars pass, and data from the Internet that could be used to search for prices. We are only doing a little bit in this area; some other countries are doing more.

I: Yeah, that may be difficult to implement in the US. I don't know what the social situation is like in Denmark but here I think it would be tough. People here like their privacy.

L: It is also tough for some other reasons, which are resources and expertise. It would take a lot of resources and expertise which, perhaps, maybe we don't have and would be difficult to get.

However, we are doing something in this arena. We started using credit card information that we get from banks and some cash register data we get from supermarkets and we are using this for different types of statistics. This is only a small start.

The other things some countries are doing with mobile phones and GPS devices would be extremely interesting and would be a fantastic addition to the statistical system but I am a little in doubt and I am sure that it would not happen in my time.

I: Right. It must be exciting to see all of these changes in Statistics Denmark. I am wondering if you could comment on why you think other countries such as the US and Canada might be holding back on the register-based system? The benefits seem clear, why do you think other countries might be holding back?

L: I think there is one thing in society that is very beneficial in Denmark as opposed to some other countries. In Denmark, Finland, and Sweden there is a general trust in public administration and civil service. In a Eurobarometer survey we can see that we are number one, together with Sweden, with 74% of our popu-

lation trusting that our statistics were good and objective. In the United Kingdom it was half of this number, so around 38%. In Denmark, for some reason, there is a relatively high degree of trust that the government wants to do something good for you. Of course we do not succeed in everything. We too, like everybody else, are criticized but generally speaking I think that we have trust in our country that other countries do not have.

I also believe that we have an advantage because we are a small country. It is easier to manage. We are about 5.5 million people. . . we almost know each other. We have a very well organized public sector and have a nearly homogeneous society. The inequalities are smaller than in many other countries and the people have some common view of society. So it is maybe easier in these ways. Maybe because of this trust, people in Denmark have accepted that public resources can have these registers and use them. We tend to believe that they are doing it in a fair way.

I think also, it is a matter of leadership. If someone powerful would say, 'yes, we want this' things could be done.

I: I am so glad to hear you say all these things because I am frequently asked 'What is it about Danes that enabled them to do all this?' It seems that you really confirmed for me, without putting words into your mouth, that when things are just right, when technology and the political, social, and organizational environments are aligned then all it takes is the spark of some innovative leaders who are willing to take the risk to carry the torch for this new system.

L: Absolutely. I agree.

I: I am wondering if you have tried to promote these ideas to other leaders and what do you tell them? Do leaders want to implement these new systems or is it something that they just don't think is possible?

L: I have been invited to the United Kingdom several times to speak to audiences of statisticians and statistics users. I was in Washington a couple years ago to speak about the same topic there. This was the first time I really got to know Fritz because he was one of the organizers of the conference. I go to anybody who asks and my colleagues do the same. We do a lot of international advising. I go and talk to the statistical service centers of countries about analyzing what they already have and try to advise them of how they can increase their coherence and use of administrative sources.

When I do this I get to discuss the benefits I have seen in Denmark and what the users think about it. For

instance, my former boss and I were invited to speak with the deputy prime minister in a country because the statisticians there wanted to put a similar system in place. This was a great opportunity to influence someone very close to the power. This had a great effect. Not everything was changed over night but there were more positive feelings in the government when the national statistician came and said ‘I would like to get access to these data and use them in this way.’

I: Well, Lars this has been quite a comprehensive interview. We have gone over quite a bit. I want to thank you for your time and ask if you think there is anything we have missed?

L: No not really, I have enjoyed talking about it.

Through his dedicated and consistent service and professional expertise, Mr. Lars Thygesen has dramatically helped to improve and revolutionize the statistical processes at Statistics Denmark and other statistical organizations around the world. Most notably, he and his associates have transformed and modernized census-taking procedures through the register-based system. He has faced internal and external opposition with confidence. His dedication to this system both in Denmark and internationally has been exemplary. It will be fascinating to see what other countries will follow his lead and what Statistics Denmark will do as time marches on.

It was a pleasure interviewing Mr. Lars Thygesen. He certainly has demonstrated courage in his statistical career.

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About the Interviewers

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Nils Nelson is a STAFF analyst in the Quantitative Economics and Statistics (QUEST) group of Ernst & Young LLP. His major roles include statistical sampling and estimation, policy analysis, and survey design and implementation for various advisory services. Nils holds a Bachelors of Science Degree in Mathematics from Utah State University with minors in Portuguese and Statistics.