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**THE FUTURE OF STATISTICAL DATA COLLECTION? CHALLENGES
AND OPPORTUNITIES**

Contributed Paper

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I. Introduction

1. In the 20th century, surveys have been the major method to get information about whatever subject one was interested in, both with regard to social and economic issues. Now, we have entered the 21st century, and the constellation for conducting surveys has changed dramatically. Surveys are facing many challenges. In the information society the demand for timely information is increasing, while it is harder to collect the data using surveys. The relationship between a survey organisation and its respondents has changed. Motivating people and businesses to respond to surveys is harder than before and needs new approaches. Response rates are declining for both telephone and self-administered surveys. Coverage is becoming a larger problem in telephone surveys as fewer people have listed telephone numbers. Enterprises have reduced the size of their organisations and are more and more reluctant to spend time on surveys, especially in times of economic crisis. Response burden is an issue. And because of globalization of the economy, businesses no longer stick to national borders. In the information market also new players can be identified, using the huge numbers of data that are available on the internet. All this calls for a review of the survey as a method to collect data, as well as the design of surveys.
2. In response to these challenges National Statistical Institutes (NSIs) have implemented data collection strategies (i.e. at least the three NSIs involved in this paper, among others). These strategies demand investigations into alternative sources before introducing new surveys. The surveys conducted are also more often combined with data capture methods from secondary sources. And as for the survey design, this is tailored to the respondent's conditions, e.g. by using

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mixed-mode designs and different communication modes in the struggle to get response. Also, innovation programs have been set-up to investigate the usability of new technological opportunities in order to produce statistics.

3. Both from a methodological and a management point of view the implementation of these strategies bring about new challenges. Generally speaking one may say that methodologists focus on the effects of new sources and alternative designs on data quality aspects, while data collection managers focus on cost-efficiency and on how the data collection process is organized efficiently and monitored. In the Netherlands and Norway e.g., “stove pipe” production lines are changed into standardised procedures for each step in the data collection process, while at the same time integrating the processes for social and business surveys (Snijkers, Göttgens & Hermans, 2011).
4. This paper gives an overview of the challenges and opportunities seen from the perspective of methodologists and data collection managers in Statistics Sweden, Norway and the Netherlands. In the first part of this paper we will discuss three long-term challenges we see. These challenges are the drivers for data collection strategies, which will be discussed next. As a consequence of these strategies short-term challenges can be identified. In the second part of this paper, we will discuss these short-term challenges from a management as well as a methodological point of view. The key question we will try to answer is: Are we, as NSIs, prepared for the future, from the two viewpoints?

II. Three main challenges

5. We distinguish between three long trend challenges that face the statistical data collection. These are a shift in the balance of power between data collectors and respondents, new competitors that might make the statistics produced by National Statistical Offices questioned or at worst redundant, and the globalisation of both businesses and societies that may make traditional statistical concepts either meaningless or impossible to measure. Even if these trends are interrelated, we will here describe them one by one and discuss how they affect data collection processes and quality.

A. A shift in the balance of power

6. In the last version of his book about Internet and mail survey Don Dillman and his colleagues wrote: “... one of the ironies of modern surveying is that there now exists more means of reaching people and doing so more quickly than before, but there is a greater likelihood of people not allowing certain means of access”... “surveys are now respondent driven, rather than driven primarily by the needs of the survey organization” (Dillman, Smyth & Christian, 2009). What Dillman and his colleagues point out here is a shift in the balance in the power relation between respondents and surveyors which are caused by technological and cultural changes.
7. Traditionally data collectors have been in control and have also been helped by society. If we go some years back it was almost considered as a duty or at least important to society that you participated in surveys if you were asked. There are many signs that this is no longer the case, especially when it comes to surveys of households or persons. The refusal rates and non-contact rates are rising all over the western world. One reason seems to be that people do not consider surveys as important to society as before and therefore neither so important to participate in. This trend is also clearly seen when comparing young and old people: older people still feel that participating is important, while young people don't. Furthermore, people are getting harder to reach by especially telephone, since unregistered phones and presentation of the number of the caller makes it easy for people to avoid being reached by phone unless they want to. With more and more telemarketing and advertising calls, it has also become more and more difficult to “sell” statistical surveys. It also seems that traditional telephone calls more and more are substituted with different kinds of electronic mails, text messages or interaction by social media. In this environment telephone surveys appear old fashioned. In order to get in contact with

survey respondents we need to listen and tailor our surveys to these new communication patterns and communication channels.

8. Responding to surveys has never been a business priority, but also in businesses there has been a tendency to respond to official surveys, as long as the surveys were considered to be important to society (by the government; Snijkers et al., 2007). There are signs that this is changing as well. After several economic crises, most businesses that have survived have slimmed their administrations to a minimum, also meaning that there is fewer staff than before that can be assigned to filling in questionnaires. There is also a clear trend that businesses want government authorities to use available data from businesses' administrative systems, and to access it electronically rather than sending surveys. Also, businesses actually encourage authorities to share data in order to avoid sending the same data over and over to different recipients. Politicians have put reduced response burden on their agenda. A plea for more and integrated information is combined with a pressure to reduce the businesses' response burden.
9. To summarise, it is becoming more and more difficult to get both people and businesses to participate in surveys. In order to receive answers, data collectors need to adapt to this change and offer new ways to provide data that are more based on the willingness and the wishes of respondents, rather continuing using the same old methods and techniques as before.

B. New competitors and new statistics

10. While statistical offices struggle with collecting data for their statistics, and meeting the demands to publish relevant and timely statistics (within official statistical systems), new producers of statistics emerge using new sources of information, especially digital transaction data that can be extracted from the internet. We have already seen the "Google price index" and similar products, as well as an emergence of even more advanced and more far-fetched "statistical products" like predictions of the state of the economy based on raw data like consumption patterns and even information flows from the likes of Twitter. Much can be said about the quality of these statistics, but it has at least four strong features compared with traditional business surveys. It is cheap, fast, has an international perspective and is specifically directed towards the needs of (international) companies and investors. According to Groves (2011) we have entered the era of "Organic data", supplementing "designed data": "We're entering a world where data will be the cheapest commodity around, simply because society has created systems that automatically track transactions of all sorts." (ibid. pp. 867-868)
11. The competition from Google and similar firms is important in at least two ways. First there is the direct competition. At some point politicians and other traditional users of official statistics are likely to ask the legitimate question why official statistics, which is getting harder and harder, and thereby also more and more expensive to compile, have a superior quality that is more important than more up-to-date figures from other sources. As clearly stated in Eurostat's quality approach, accuracy is not the only quality criteria (Eurostat 2011a).
12. Then there is a more indirect aspect of this competition. One idea about how response burden could be reduced which has been discussed in many NSIs, is to offer benchmark statistics in return to those who contribute to business surveys. When this idea has been introduced to businesses, however, it has become apparent that the statistics which we can offer perhaps are not as relevant for business decision as we had anticipated. A question worth asking to statistical institutes not only about business statistics, but about their statistics in general, is if its production is too narrowly focused on governmental issues, while taking too lightly on other dissemination possibilities. The previous director general of Statistics Finland Olavi Niitamo (1978-1992) claimed that "Knowledge is power, statistics is democracy" Is it, or is it mainly deliveries tailored to governmental needs and to Eurostat regulations? When official statistics is compared with the statistical products offered by Google it becomes at least quite obvious that the latter more specifically address business needs.

C. Globalisation issues

13. A third challenge for official statistics is that the globalisation process and the internationalisation of businesses and economies are making the traditional units and concepts of, first and foremost, business statistics harder to use and maybe even irrelevant to future statistics. Multinational enterprise groups no longer operate as a set of individual national enterprises held together as a group by an owner, but rather as a set of business operations that can be located and relocated between countries as is called for to ensure an efficient production. Functions are more and more specialised and concentrated to specific enterprises/countries within the group. With this in mind, the concepts that found national statistics and national accounts are more and more difficult to uphold, while the multinational groups perhaps do not even keep track of all cross-border transactions with a level of detail necessary for providing data to statistical offices (data for tax purposes is of course still kept). With administrative offices more and more cantered to one specific place within the group, there might not even be somebody within the country that can be contacted for information or data, and concepts or questionnaires in native languages may not be understandable to those who can actually provide the information. (The international Roundtable on Business Registers studies the effects of globalization on defining and identifying business units: <http://unstats.un.org/unsd/methods/citygroup/wiesbaden.htm>).
14. This trend towards globalization undermines what has traditionally been the main focus in business surveys and official economic statistics. Apart from the possible necessity to adapt concepts and content of statistical surveys, this further underlines the necessity to adapt data collections to the situation and the possibilities of the respondents.

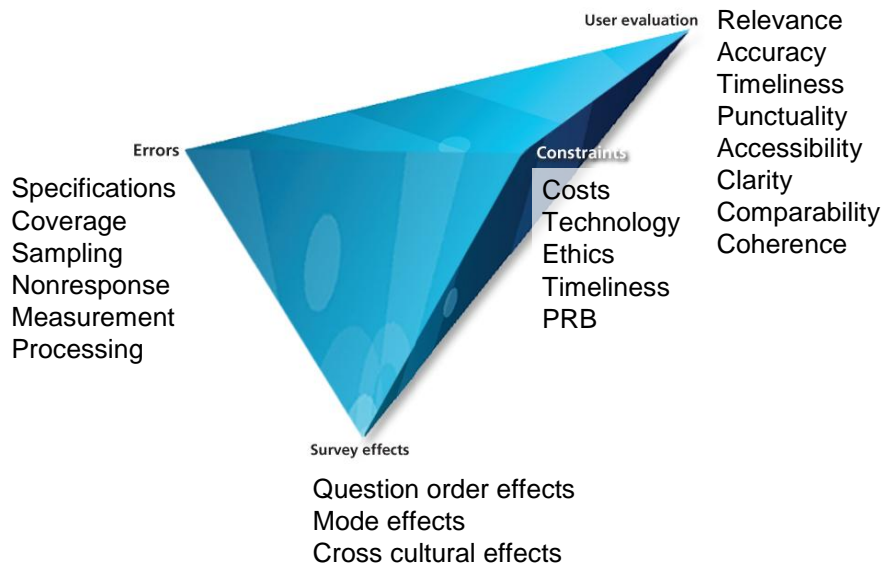
III. Data collection strategy

15. As one answer to some of these challenges, many NSIs have implemented new data collection strategies. In the Netherlands e.g. this strategy is called “Collection and delivery”, indicating that both data collection and statistical output need to be modernized (Hermans, Snijkers & Roos, 2011). The strategy is, however, mainly focussed on data collection. In brief, this strategy consists of three steps (Snijkers, Göttgens & Hermans, 2011):
 - (a) In the first step, the data that are available within SN are investigated, maximizing the re-use of data. This requires the existence of a Data Service Centre (DSC) for data warehousing and data sharing. At SN the Social Statistical Database exists, but needs to be expanded. The SSD is a large database with standardized retrieval procedures in which social data, both from surveys and registers are stored and shared for many social statistics. In Norway, a fully developed DSC exists. In their Altinn system, run by the Brønnøysund Register, data from collected by different institutions are archived and documented in a common metadata system (<https://www.altinn.no/en/>).
 - (b) Secondly, data from registers and other sources are used. This includes the use of secondary sources in the broadest sense: registers, data from private businesses (like e.g. mobile phone providers), information that is available on the internet (using search engines).
 - (c) And finally, if still more data are needed to produce statistics, surveys are conducted. This includes in this order: Electronic Data Interchange using e.g. XBRL (Roos, 2010), web surveys, and finally traditional modes (like paper, CATI and CAPI). New technologies open up new possibilities for these modes, like cell phones, questionnaires via text messages, skype interviews, etc.
16. This data collection strategy seems straightforward and addresses the long-term challenges. In the implementation of this strategy however a number of short term issues need to be addressed. They include data quality, costs and response burden. We will look at those both from the management perspective and the survey methodology perspective.

IV. The quality diamond

17. A model that combines all perspectives of data collection has been presented by Haraldsen (2013), and is based on e.g. Groves's discussions on data quality and costs (Groves, 1989), and a quality model presented by Weisberg, called the survey research triangle (Wiesberg, 2005: p. 28). Like Weisberg, Haraldsen combines data quality issues with survey design constraints like costs, and survey design issues that affect data quality. In addition he adds the user perspective, thus bringing in quality issues as defined by the users of the data. With this fourth aspect the triangle becomes a diamond, as is shown in figure 1 (Haraldsen, 2012):

Figure 1. The Quality Diamond



18. The planning of a data collection process starts with user needs (as is e.g. shown in the General Statistical Business Process Model; Vale, 2009). The possible user needs listed in the model are taken from the European Statistics Code of Practice (Eurostat, 2011b). Priorities will vary with statistics and with different kind of users.
19. What are the most important user criteria affect other considerations depicted in the model: the data quality, costs and survey design. But also the data collection constraints affect quality considerations and survey design. Data collection constraints include the costs, technology (systems and tools used in the data collection), ethics, timeliness of delivery, and perceived response burden (PRB). These constraints are the issues in the data collection process that set the scene and need to be planned ahead and managed during the running of survey (Snijkers, Haraldsen & Jones, 2013; Snijkers & Haraldsen, 2013).
20. The survey design effects include effects generated by the survey design, like mixed-mode effects, effects generated by interviewers, order effects in the questionnaire, and cross-cultural effects. It goes without saying that these effects have an impact on data quality. This final factor refers to the total survey error framework (Biemer & Lyberg, 2003; Groves et al., 2004), and includes sampling and non-sampling errors.

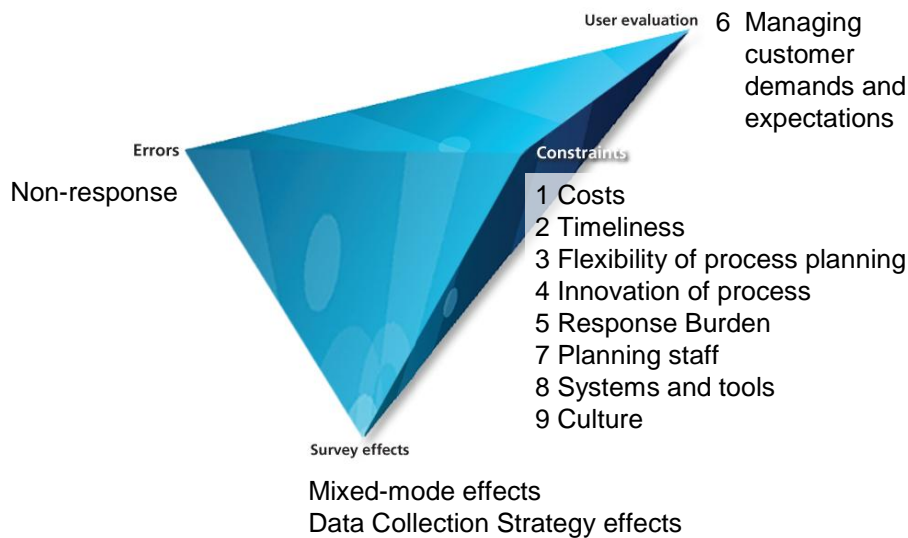
V. Dealing with the long term challenges

21. With the Quality Diamond in mind we analysed the challenges NSI face and how they deal with these challenges in the data collection process. In this analysis we took both a management and a survey methodological standpoint.

A. The management perspective

22. To investigate the challenges in the data collection process we interviewed the directors of the Data Collection Divisions in our three organisations about how they are working and which challenges they see. Next these issues have been prioritised. The resulting issues are shown in figure 2.

Figure 2. The Quality Diamond from a management perspective



23. Figure 2 indicates the issues that have most priority for the management of the Data Collection Divisions. They are numbered 1 to 9. Even if there are differences between the three countries, all are moving towards centralized and more professional data collection units, and many of the priorities and issues that managers talk about is connected to this movement. The issues that are not numbered were also recognised as important but regarded as derivatives from the other factors. It shows that the main focus is on managing the work, i.e. the planning and running the surveys within budget, aimed at a timely delivery of the survey data, according the required response rate level, within the constraints set by the staff, systems and tools, and culture. The management focus is on running the business within constraints, where the non-response rate is *the* most used quality indicator of the process.

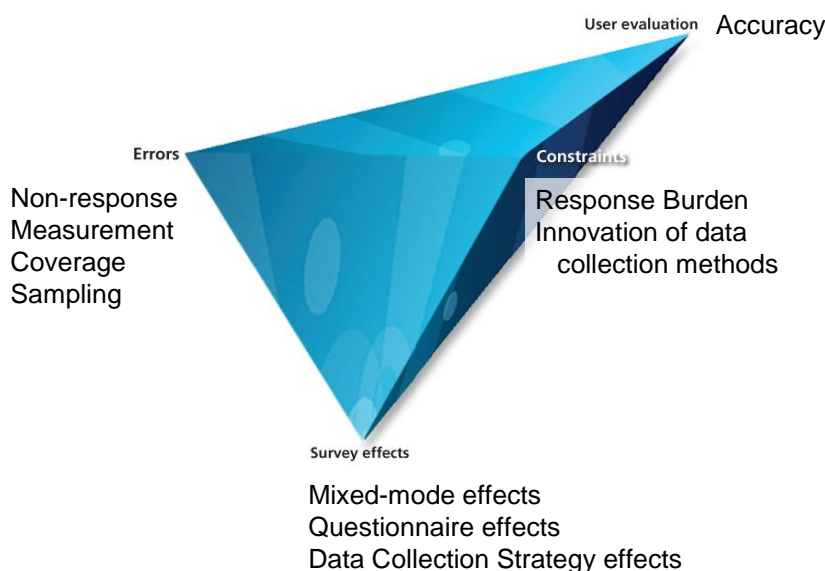
24. Within this planning and running the survey, an issue that has a lot attention is the planning of mixed-mode designs within the Data Collection Strategy. This requires flexible planning procedures, that the survey is planned in such a way that a next wave can be planned independently of the previous wave (see Van Velzen & Hermans, 2012).

25. Another challenging issue is dealing with customer demands and expectations. Within an NSI, internal customers have an influence on the design of the surveys and how the process is run. On the other hand, except from timely delivery of the data, customers also expect the Data Collection Division to innovate methods and processes. This puts additional pressure on the Division, since next to running the business, the business needs to be innovated. But it is also a potential source of conflict between well-known procedures and innovations.

26. So far, attention has mostly been given to the internal processes and the customers; the respondent is not yet much involved in this picture. However, especially for business surveys, an additional challenge is to design and run surveys in such a way that the costs for survey compliance, both actual and perceived response burden, are as low as possible. Attention is given to this factor. E.g., in the Netherlands a major project on Reducing Perceived Response Burden is started. Also, actions are taken to involve businesses in the design of surveys. The challenge however is how to achieve this, within the running processes.
27. From our interviews with Data Collection managers, it is clear that they do see the methodological challenges, but that the priorities, at least this far, have been set on making the collection activities more efficient and save money. This focus is caused by budget cuts and re-organisations (like moving from a stove-pipe based data collection process to a process-and-knowledge driven approach in which social and business survey data collection processes are integrated, as is the case The Netherlands (See Snijkers, Göttgens & Hermans, 2011) and Norway.

B. The methodological perspective

Figure 3. The Quality Diamond from the methodological perspective



28. Figure 3 shows the quality diamond from the methodological perspective. This picture is less complicated than the previous one. Basically, this picture shows that methodology is mainly driven by reducing survey errors. Attention to survey constraints is almost missing, except for response burden reduction and innovation of data collection methods (like automatic access to administrative systems at businesses and the use of smart phones), since it is believed that these affect data quality. Attention to user evaluation issues includes only accuracy, which involves the classical data quality indicators validity and reliability.
29. As for survey errors, attention is given to non-response issues (not only getting high response rates, but also a representative response distribution), and to measurement errors (e.g. by pre-testing of questionnaires). Also, coverage errors and sampling errors are addressed, to make sure that according to classical sampling theories accurate statistics can be estimated.
30. Within the Data Collection Strategy, some research is aimed at using secondary data in the production of statistics. This includes quality issues of secondary data (Daas et al., 2010; Bakker

& Daas, 2012; Zhang, 2012), as well as estimation methods in which secondary and primary data are combined.

C. Beyond the quality diamond

31. Figure 3 describes priorities taken by survey methodologist within the present survey framework. But a question more and more often asked, is if there also is a need for changes that go beyond this framework.
32. In his keynote address to the 2010 European Quality Conference in Helsinki, Professor Carl-Erik Särndal questioned the validity of statistical sampling when increasing non-response rates lead to net samples which are substantially different from gross samples (Särndal 2010). He did not declare the patient (i.e. the traditional survey framework) dead but prescribed responsive data collection designs and post-survey adjustment methods which would lead to a better balance between the initial probability sample and the final net sample used to produce statistics (Särndal 2011). Discussions on low response rates threatening the representativeness of the sample has been going on for years, especially for social surveys. Solutions that have been discussed are e.g. web panels, and mixed-mode designs (Bethlehem & Stoop, 2007; Snijders, 2009).
33. In this discussion we will remind the readers on that one initial reason for the success of sample surveys, which was that it produced rather accurate statistics for a far lower price than a full census. Today's situation, however, is very different. As Dillman and his colleagues state (Dillman et al., 2009), modern information technology has given surveyors access to an undreamed numbers of respondents at dramatically lower costs than traditional methods. In some countries business questionnaires made available at Internet has already replaced most of the traditional posting of paper questionnaires. Hence the argument against large samples or even censuses is no longer posting or registration costs, but rather data quality and response burden considerations.
34. In Norway, Sweden and the Netherlands, as well as in other countries, there is also a range of extensive registers available for statistical purposes. As an example both the Norwegian and Swedish 2011 censuses were based solely on available registers, as was the Dutch census in 2001. There is no need for sampling from these registers. The main challenge is rather that most registers are established for administrative purposes and need to be adjusted for statistical purposes. Units and variables may need to change place and because registers are made for a different purpose than statistics there may be conceptual validity problems (Zhang 2012). In addition the statistical institutes often have little control with the data collection instruments and survey procedures when the registers are established by other institutions than their own.
35. Some time ago one of the authors of this paper moderated a focus group with youngsters about the Time Use survey. One of the ironies that struck him was that while it is almost impossible to get these young people to fill in a Time Use diary, they daily give away details about their lives on Facebook and other social media. In business statistics data capture from Internet is already used i.e. to collect prices of goods and services. Other options, like analysis Twitter messages have also been tested (Daas, Roos et al., 2011). Hence, Internet is an interesting source of information, both in social and business statistics. Search engines and data mining software can be used to capture this information. There are of course challenges to the reliability and validity of the information that can be extracted from this kind of sources, but the main hindrance is still that a basis for probability sampling is missing. Or to phrase it a little bit different, there is a need for alternative way of achieving representativeness.
36. Not only the future of statistical sampling, but also the future of conventional questionnaires can be questioned. We have already pointed out that self completion questionnaires are no longer sent by post to respondents, but rather being made available on Internet. If we have an e-mail address the survey communication with the respondent can also be run electronically. In the future one can also imagine that dedicated Facebook groups are established for survey communication. What we see this far is that the conventional linear way of addressing respondents, dispatching

questionnaires and reminding those who do not meet the deadline still prevails in most self-administrative surveys. But we think that this is about to change.

37. In the time to come we will also see more and more examples of mixed-mode designs with web questionnaires mixed with interviews. As an example plans for combining web questionnaires with interviewing in the Labour Force Survey exist in several countries. The driving forces behind this trend are both economic worries and worries about lower response rates. There are, however, many ways of combining data collection methods. And even if there is some knowledge about what works well and not so well, there is not yet any clear recommendation of how methods should be combined in order to save money and increase response rates. On the other hand there is concern about instrument effects. Some attention has been paid on measurement errors caused by reading questions versus questions that are read to the respondent, while less has been done to study how different mixed mode designs affect the composition of the net samples. Measurement effects or bias caused by combinations of primary and secondary sources of information is also still a black box.
38. In business surveys the major concern is about response burden. Because questionnaire completion in businesses is a cost, which does not lead to any obvious financial return, time-consuming survey enquiries tend to create irritation and can be downgraded in terms of priorities. If businesses are frequently asked to participate in surveys, and surveys are time-consuming with difficult to understand questions and burdensome answers to provide, there will be an increased risk of low response quality. Different actions are taken to reduce response burdens. The burden of completing questionnaires can be taken away by computer programs which automatically extract data from the businesses' personal and accountancy systems, business survey samples can be reduced or coordinated so that the burden is spread out as evenly as possible and the survey communication and measurement instruments can be improved (Snijkers, 2009; Giesen and Raymond-Blaess, 2010; Haraldsen, Jones, et al., 2013).
39. When asked it seems that one major source of burden is that business surveys often ask about information which is not readily available in business records or documentation systems (Haraldsen 2010). If so, neither downloading from administrative business systems nor well designed questionnaires can solve the problem. One solution that has been suggested is that instead of asking business respondents to adjust their information to our definitions, business data should be collected as they are recorded by the businesses and be combined with surveys that map definitions and other characteristics which are necessary in order adjust the data for statistical purposes. A similar model could be applied when data are downloaded from social media in social surveys. We think that more data will be collected from secondary sources in the future, but that surveys will not disappear, but rather play a different role, and hence also have a different kind of questions, in the data collection designs.

VI. Discussion

40. We started this paper by posing the question: Are we prepared for the future? To answer this question, first we discussed three long-term challenges we believe NSIs have to deal with. Next, we discussed the answer to these challenges (i.e. a data collection strategy) and the consequences of this answer for the data collection, both from a management and a methodological point of view. Now, we are about to answer the key question.
41. As it turns out, the two perspectives are different. The data collection management perspective mainly focuses on efficiency within the existing survey framework, meeting the response rate targets and reducing response burden. Issues that one is aware of, but need more attention are data quality issues, and making innovative changes to the data collection process in order to improve efficiency and the quality of the collected data.
42. Looking at the methodology perspective within the survey framework, the attention focuses on reducing survey errors and survey design effects, There is little to no attention for customer evaluation criteria, except for accuracy (which is validity and reliability), and hardly any

attention for data collection constraints, like costs, procedures, systems and tools, and timeliness. Here, most of the attention is given to response burden issues. In addition, research is aimed at innovations in data collection methodology, like the use of new technologies (e.g. smart phones). When it comes to research outside the survey framework, this involves the use of new technologies like internet data, smart phones, GPS data, etc.

43. In order to get ready for the future, it is our firm belief that the Data Collection Division and the Methodology Division could and should collaborate much more. This collaboration should be aimed at making the data collection strategy work, first of all within the survey framework, and secondly the collaboration should be aimed at issues outside this framework.
44. Within this survey framework the main concern of the Data Collection Division is the operations, while the methodologists should develop and test methods that are aimed at improving the survey design (sample, data collection modes, questionnaire, communication strategy, estimation) as well as innovating the data collection process. User issues include e.g. the breaking up of traditional surveys (which still are from the stove pipe era) into new surveys and other data collection methods. Within the Data Collection Strategy, surveys should be well-designed (and if necessary completely redesigned) taking relevant issues of the Quality Diamond into consideration. The tension that exists here is between the quality of the newly developed methods on one side and operational issues and constraints (like costs, procedures, systems and timeliness) as well as user evaluation issues on the other side that would reduce the quality of the methods. This tension coincides exactly with the difference between the management and methodological perspective.
45. More attention is also needed for the implementation of the data collection strategy regarding issues outside the survey framework, especially when it comes to the availability and usage of secondary data. There is a need for the development of Data Service Centres or something like that, which co-ordinates the availability and use of secondary data. This is another area where the breaking up of survey stove pipes is necessary.
46. To be ready for the future, there is a large need to think outside existing boxes, stove pipes and constraints, and to think more about breaking up survey boundaries and collection or capturing data in different combinations of subject matters than today, also combining survey data and register data in new ways. This is a task that we feel we are only partly prepared for today, and one where there is no clear mandate given to the Data Collection Organisations. Also, for the Data Collection Organisations within our Statistical Offices, rationalization of the day-to-day procedures, and thereby freeing of resources, is a prerequisite for investments into research and development of new and improved data collection designs. We question the realism of this strategy. Furthermore, there is little room for more open and obligation-free methodological research which could be necessary to come up with solutions for more general future changes.
47. So, are we prepared? Not fully! Challenges are identified, and an answer defined with a data collection strategy. However, this needs to be followed-up in a systematic and co-ordinated way in which both Data Collection and Methodology have a role to play. To centralize and standardise data collection activities is a necessary, but not a sufficient step towards professional and modern data collection. Data collection managements struggle with organizational and cost-reduction challenges, while at the same time methodological and innovative challenges need to be met, It seems however, that innovations have to wait until resources are freed, and systems, tools and procedures are improved. On the other side, methodological research finds no ground to land on, and implementation is hard to realise. Research both with regard to the long-term and short-term challengers is needed to be ready for the future. Unfortunately, the future is already here.

References

- Bakker, B., and P. Daas (2012). Methodological Challenges in Register-based Research. *Statistica Neerlandica* 66(1): 2-7.
- Bethlehem, J., and I. Stoop (2007) Online Panels – A Paradigm Theft? In: The Challenges of a Changing World, Trotman, M. (ed.), ASC, Berkeley, UK.
- Biemer, P.P., and Lyberg, L.E. (2003). Introduction to Survey Quality. Wiley, Hoboken.
- Daas, P., S. Ossen, and M. Tennekes (2010). The determination of administrative data quality: recent results and new developments. Paper presented at the European Conference on Quality in Official Statistics 2010, Helsinki, Finland.
- Daas, P., M. Roos, et al. (2011). New data sources for statistics: Experiences at Statistics Netherlands. European NTTS Conference. Brussels, Belgium.
- Dillman, D.A., J.D. Smyth, and L.M. Christian (2009). Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method (third edition). Wiley, Hoboken.
- Eurostat (2011a). ESS Handbook for Quality Reports. Eurostat, Luxembourg.
- Eurostat (2011b). European Statistics Code of Practice, Adopted by the European Statistical System Committee, 28th September 2011. Eurostat, Luxembourg (<http://ec.europa.eu/eurostat/quality>)
- Giesen, D. and V. Raymond-Blaess, Eds. (2010). Inventory of published research: Response burden measurement and reduction in official business statistics. A literature review of national statistical institutes' practices and experiences. Conference on Administrative Simplification in Official Statistics (SIMPLY). Ghent, Belgium.
- Groves, R.M. (2011). Three eras of Survey Research. *Public Opinion Quarterly*, Vol. 75, pp. 861-871.
- Groves, R.M., Fowler, F.J., Couper, M.P., Lepkowski, J.M., Singer, E., and Tourangeau, R. (2004). *Survey Methodology*, Wiley, Hoboken.
- Haraldsen, G. (2010). Reflections about the Impact Business Questionnaires have on the Perceived Response Burden and the Survey Quality. Conference on Administrative Simplification in Official Statistics (SIMPLY). Ghent, Belgium.
- Haraldsen, G. (2012). An Integrated Quality Framework for Business Survey Evaluations. Presented at the 4th International Conference on Establishment Surveys, 11-14 June 2012, Montreal, Canada.
- Haraldsen, G. (2013, forthcoming). Quality Issues in Business Surveys. Chapter 3 in: Snijkers, G., H. Haraldsen, J. Jones & D. Willimack: *Designing and Conducting Business Surveys*. Wiley, Hoboken.
- Haraldsen, G., J. Jones, D. Giesen, and L.C. Zhang (2013, forthcoming). Understanding and Coping with Response Burden. Chapter 5 in: Snijkers, G., H. Haraldsen, J. Jones & D. Willimack: *Designing and Conducting Business Surveys*. Wiley, Hoboken.
- Hermans, H., G. Snijkers, and M. Roos (2011). CBS Data Collection Strategy, version 2011: "Collection and delivery" (in Dutch: CBS-brede waarneemstrategie, versie 2011: "Halen en brengen"). Report Statistics Netherlands, Heerlen/The Hague.
- Roos, M. (2010). Using XBRL in a Statistical Context. The Case of the Dutch Taxonomy Project, *Journal of Official Statistics*, Vol. 26, No. 3, pp. 559–575.

Särndal, C. E. (2010). The probability sampling tradition in a period of crisis. European Conference on Quality in Official Statistics, Helsinki, Finland.

Särndal, C. E. (2011). "The 2010 Morris Hansen Lecture Dealing with Survey Nonresponse in Data Collection, in Estimation." Journal of Official Statistics **27**(1): 1-21.

Snijkers, G. (2009). Getting Data for (Business) Statistics: What's new? What's next? Paper presented at the 2009 NTTS Conference (New Techniques and Technologies for Statistics). Brussels, Belgium.

Snijkers, G., B. Berkenbosch, and M. Luppens (2007), Understanding the Decision to participate in a Business Survey, Proceedings of the 3rd International Conference on Establishment Surveys (ICES-III), ASA, 1048-1059.

Snijkers, G., R. Göttgens, and H. Hermans (2011), Data collection and data sharing at Statistics Netherlands: yesterday, today, tomorrow. Paper presented at the 59th plenary session of the Conference of European Statisticians, 14-16 June 2011, Geneva, Switzerland.

Snijkers, G., and H. Haraldsen (2013, forthcoming). Managing the Data Collection. Chapter 10 in: Snijkers, G., H. Haraldsen, J. Jones & D. Willimack: Designing and Conducting Business Surveys. Wiley, Hoboken.

Snijkers, G., H. Haraldsen, and J. Jones (2013, forthcoming). Planning the survey. Chapter 4 in: Snijkers, G., H. Haraldsen, J. Jones & D. Willimack: Designing and Conducting Business Surveys. Wiley, Hoboken.

Vale, S. (2009), Generic Statistical Business Process Model. UNECE, Geneva (www1.unece.org/stat/platform/display/metis/Papers+about+the+GSBPM)

Van Velzen, J., and H. Hermans (2012). Organizational challenges using mixed modes. Paper presented at the UNECE Symposium on New Frontiers for Statistical Data Collection, 31 October – 2 November 2012, Geneva, Switzerland.

Zhang, L. C. (2012). Topics of statistical theory for register-based statistics and data integration. *Statistica Neerlandica* **66**(1): 41-63.