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**A SYSTEMATIC AND STRATEGIC SYSTEM FOR DATA COLLECTION  
MANAGEMENT AT STATISTICS NORWAY**

**Contributed Paper**

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**I. Introduction**

1. This paper present a system for strategic management of data collection used for interviewer administrated data collection at Statistics Norway. The system is a set of plans and tools for management of data collection during the field period with use of process- and quality indicators as well as tools, procedures for active problem identification, strategic implementation of actions and evaluation. The three main goals for introducing such a system, was to 1) identify problems as soon as possible, 2) implement corrections in line with the available resources, and 3) efficient use of available resources in a way that would ensure optimal data quality.
2. The system has been refined over the past two years and has been the key tool to the overall planning of interviewer administrated surveys through the set of action plans that define available resources and actions during the field period for each survey in the portfolio. The philosophy behind the action plans is based on traditional quality management and fits well to the Lean techniques used in Statistics Norway.

Key words: Strategic management, quality indicators, action plan, Lean

**II. Background**

3. For decades there has been an increasing emphasis on quality management, both in private and public sector. Quality management, of course, appears under different names in different sectors like "total quality management", "continuous quality improvement", "six sigma", and so forth.
4. In Statistics Norway, quality work has been employed in various forms and under different labels for well over a decade. Different quality shifts have swept through the organization.

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5. Presently a new method/philosophy is being adapted to our requirements: The Lean. Our administration has expressed a desire for the organisation to develop a culture within which all employees continuously strive to identify any unexploited potential for improvement that may move the organisation forward every day.
6. In a climate where continuous improvement as a method has been considered important and where the development of a tool for achieving our objectives for data collection has been strongly desired, action plans as a tool have been developed. Action plans have been designed within a framework determined by an overall goal in order to achieve the desired quality for our data collection.
7. As outlined by Groves (Groves, 1987), survey research is not itself an academic discipline, with a common language, a common set of principles for evaluating new ideas, and a well-organized professional reference group. In the field, we find a lot of work on different aspects on quality in a wide range of areas regarding the quality of the survey estimates. Ranging from work on how to implement a survey, carry out the data collection to data cleaning, adjustments and dissemination.
8. The quality compromise in survey methodology is the mean square error (the mean value of a variable measured on sample respondents and the mean of the attribute in the entire target population). This concept is similar to the use of validity and reliability in other fields.
9. In the following we will first explain the system for action plans. Thereafter we will give some examples on how action plans have been used in one of our surveys and what their use have had on the quality of this survey. In the last part of the paper, we will be discussing the continued work with our action plans and what we want to achieve with this effort.

### **III. Why Action plans?**

10. There are several reasons why we have introduced the action plan. Firstly, we need a tool to design and manage the data collection within an allocated resource limit. Secondly, we need a tool to see that action leads to better quality given a resource limit. A third objective is the need to document effects – what works and what does not work - in order to recycle measures that have been proven effective when doing new iterations of the same survey, as well as making use of them in other surveys. Here, we think not only of specific measures for a single data collection, but also of indicators that are interesting to follow over time and across different types of surveys. These may be indicators of response rates at different stages of a survey. The most important reason, however, is perhaps in relation to improvement of competence among the people working with the survey. The ability to think systematically and strategically in a world that is often filled with more or less mundane tasks seems to be important for good results. Being able to estimate the timing for sending a remind letter really improves the status of implementation of tasks that otherwise feels repetitive and without a direct effect on the final result.

### **IV. What is an action plan?**

11. An action plan is a key component of our systematic management system. Such a plan describes the processes for planning and implementing a specific data collection and the quality indicators that are appropriate for this data collection. The action plan should also describe the type of actions to take if targets are not met with, how refusals should be treated and how the respondents with low ability for contact should be handled before data collection ended. Because the action plan will be reflected in the resource plans as well as built into staffing schedules for computer assisted telephone interviewing (CATI), it is important that specifications are clear before the data collection starts.

12. The system has proved to be robust enough to handle both anticipated and unexpected challenges. The anticipated challenges are related to design conditions that are known, while the unexpected challenges are related to conditions occurring during the data collection that were not part of the original design. Examples of unforeseen events may be that respondent's availability and/or motivation deviates from our expectations or that access to interviewer resources are not as expected. The system must manage ad hoc reports to meet new requirements during the data collection as they occur. Furthermore, an effective communication process is also required. Problem solutions and decisions must be acknowledged and discussed with all involved so that any change of action is known to all parties involved.
13. Action plans give us documentation of the individual data collection. However, they also constitute a platform for the establishing of a system for accumulation of optimal solutions and sharing of experiences between iterations of the same survey or between different surveys in order to avoid the same type of problems later. It is therefore required that the system must include a description of identified problems, the decisions that were made to correct these, as well as a description of the importance any corrections to key quality objectives of the study. The basic framework of the Action Plan is based on 6 steps; Planning, Communication, Reporting, Correction, Documentation and Evaluation.
14. Action plans have to build on a communication strategy to ensure that the appropriate management level and individuals are informed of decisions and discussions that influence their work. Checkpoint meetings and descriptions of actions - when, how and who – make up the core of the plan. Checkpoints are planned after some days in field, in the middle of the data collection and when we start the last phase; that is early enough to adjust action without having to extend the data collection period. Furthermore, the strategy describes who should be involved when a problem occurs. The strategy should also identify who is responsible for the different objectives of a data collection.
15. Monitoring of data collection is typically done through reports. Reports can be at different levels and for different users. The reports should also be at such a level that they show the development of both contact indicators and recruitment indicators. Contact rate indicators may be gender, education, age and type of telephone (mobile/land line). These are all examples of indicators that say something about accessibility. We can have three levels of reports; standard reports covering the fixed key indicators for all surveys, predefined reports for properties in each survey (on demand), and ad hoc reports that are defined when special needs arise during data collection and which are not covered by the standard reports.
16. The use of action plans demand a reporting plan for each survey. Such a reporting plan must define all variables that are required in the various reports. Standard reports should cover the characteristics of respondents such as gender, age, education level, geography and strata (panel surveys: wave number). Furthermore, standard reports should also contain information about the progress and results of every interviewer working on the specific survey. This can for example be information on gender, age, geography. In addition, we also have reports that provide information about the combinations of characteristics of respondents and interviews: (female, woman), (female, male), (male, female) and (man, man). In the short term, this information can be used to determine optimal monitoring strategy. In the long term, for example such information is used to find indicators for recruitment. The plan must also specify special attributes for each survey (Household Budget Survey: tenant / owner; Labour Force Survey: work status) required to manage data collection in relation to specified goals. It can also be effective to identify the indicators that can be used as benchmark indicators from other studies. How much deviation from the benchmark indicator is acceptable?
17. When a problem occurs and is identified, a decision must be made about the measures to be implemented. In the action plan, we define a strategy on decision-making procedures and implementation. This strategy should include who should be informed, who should be involved with troubleshooting, how communication should be improved. The purpose of this step is to

identify the problem and the cause of the problem. This is often done in when preparing for the check point meetings and is then handled during the meeting.

18. When an anomaly is detected, the action plan gives guidance on how to correct deviation. The project group defines a strategy for both decision-making and implementation procedures in the specific case. The strategy will define who should be involved in the decisions; who should be responsible for the decision, how the communication of the decision should be in relation to other questions; to the remaining data collection and set of planned actions. The decision has to describe how to inform the different parties; both management and other people who might need this type of information. This will also include how the correction(s) should be implemented, etc. The purpose of this step is to decide which actions are initiated to correct the problem and to implement the action.
19. Because the ability to carry out a correction depends on the design of each study, it is essential that the plan for each survey is seen in relation to the entire portfolio of projects. When this is done, it is easier to implement corrections for a single survey in a way that is not harmful to the whole portfolio. If the problem cannot be solved within the existing schedule for the individual data collection we need to solve the problem in another way. This can be to extend the data collection, but also to dig further for more information on the quality of the data already obtained without extending the data collection. The strategy for implementation of corrections should also include procedures to solve such problem.
20. After the correction has been implemented, the project group monitors the process to be able to say whether the decision has given the expected results or not. The project team defines how the evaluation takes place. Is there a need for different reports? Who should be informed? Adjustments in the report may be the use of different benchmark variables, other stratification levels, information on the progress of groups of interviewers, etc. These possibilities should be discussed in the initial plan, as they may influence the distribution characteristics and design of the study.

## **V. Use of action plans: A practical example**

21. Today we have action plans for all surveys conducted by the Division for Interviews. We will limit this presentation to the Travel and Holiday survey (RoF).
22. The RoF is a continuation of Statistics Norway's Omnibus Survey (1992-2004). Data collections are carried out every quarter and the quarterly sample size is 2000 respondents (Pedersen and Wilhelmsen, 2011). The main purpose of this study is to map the travel habits of Norwegians and to acquire data for other official statistics. This means that the RoF also focuses on other issues than travel and vacation. Some themes are repeated every quarter, while others will only be completed once or on an annual basis. This means that both the form and content varies across quarters, but they are fairly stable for respective quarters from year to year.
23. Challenges for RoF are related to both the relatively small quarterly sample size and the length of data collection period. This makes the survey very sensitive to different types of production stops. Furthermore, despite the facts that we have quarterly differences in questionnaire content and length, the survey is presented as a fairly uniform survey. Figures from the survey are published both by the individual quarterly survey and as the total for all quarters annually. This makes it desirable to have little variation between quarters, although the studies vary widely in form and content between the quarters.
24. In planning the RoF we accepted a shorter data collection period than we normally do. At the same time we wanted to make the data collection more predictable and robust in relation to an extension of data collection. Traditionally, a postponement of the data collection period was a key measure to achieve the goal set for the response rate. Although postponement usually does not mean that we use more hours interviewing, but that it often results in complications in the project queue and delivery of the data file to the client. We therefore place emphasis on the initial

action plan to compress the period of data collection and incorporate elements such as non-response follow-up during the planned period of data collection.

25. The most important measures in this initial plan was to make sure that all respondents were contacted during the first two weeks, that soft refusal received a refusal letter and were contacted again during the 4<sup>th</sup> week of the data collection, and that we were able to identify the portion of the sample that were hard to get in contact with. In addition, we focus on how to measure the impact of our actions to the study estimates. It is not easy to measure this impact because of all estimates in a survey, but we have picked out some key elements as benchmark variables. We also look at the development of bias for simple demographic variables such as gender, age and region. Although there is no clear relationship between response rate and bias, nor between the bias on simple demographic characteristics and substance variable (Groves, 2008), it provides an indication (Peytcheva, 2009).
26. From table 1 we can see that the response rate rises significantly from 55.3 to 58.4 from 2010 to 2011. The contact rate has not changed significantly over the two years, but the cooperation rate has increased significantly in this period.<sup>3</sup> The R-index (referanse), as a measure on bias, has not changed significantly over the two years. We still do not know if the changes in data collection strategy have had an impact on substance variables.

**Table 1. Key figures for the Travel and Holliday Survey. 2010 and 2011**

	2010	2011
Response rate	0.553	0.584
Contact rate	0.786	0.771
Cooperation rate	0.704	0.758
R-index	0.766	0.74
	[0.745, 0.787]	

27. Other indicators, such as number of weeks in field, number of interviewer hours and hours spent on the monitoring of data collection, is also positive. As planned, the period of data collection was reduced from 7 to 6 weeks on average. The number of interviewer hours is on the same level, 4939 hours in 2010 and 5060 in 2011, and the number of hours of data collection monitoring has decreased.
28. Actions to improve response rate or to reduce bias during an ongoing data collection can be divided into two groups: Sampling monitoring and methods aimed at encouraging respondents. In the first group we find action related to call scheduling (number and timing of calls) and a closer follow up of refusals. In the second group we find actions like survey introduction by mail(?), messages for answering machines, advance letters and incitements.
29. To achieve the results described above, we have systematically revised and developed two specific forms of action from the start in 2010 and until the present day. The initial form of action has been to start following up refusals during the initially planned period for data collection. In our earliest action plan we planned our dispatch of follow-up letters by the end of the data collection period. Today we have two rounds of non-response follow-up during a data collection period of six weeks; a first round after two weeks in the field and then a second round after four weeks. The effect of this effort has been at the same level as before the introduction of action

<sup>3</sup> Response rate, Cooperation rate and Contact rate is based on APPOR definition RR1, COOP1 and CON1.

plans – one out of four refusals is persuaded to participate through this effort. The effect on the whole sample is just above 5 per cent in an average quarter.

30. The second form of action has been to send SMS's (i.e. mobile telephone text messages) to hard-to-reach respondents. In the beginning, we sent SMS's to respondents we had not reached by the end of the data collection period. Later, we have revised this strategy and have started to send SMS's only two weeks into the data collection period. The effect has been significant; particularly to our efforts to reduce the data collection period. In an average quarter, almost 40 per cent of the hard-to-reach respondents end up being interviewed after we sent them an SMS informing about our attempts to get in contact and the reasons for this. The effect on the entire sample is almost 18 per cent in an average quarter and improving.

## **VI. Conclusion**

31. The example presented has shown that our different quality indicators have, to a great extent, evolved in an acceptable direction. However, we still have to look at how different forms of action affect the important objectives of a data collection – the statistics. We have seen several areas where we have a potential for improvement, but also met some new challenges. Perhaps the most important area of improvement is not the various quality indicators, but how people cooperate. The different teams working with planning, communication, reporting, correction, documentation and evaluation together face challenges its other across professions in their struggle for the optimal solutions. One improvement with which we are particularly content is where we over some quarters have formulated a common definition of the data collection analysis file between quarters for this survey. This has made it fare easier to analyse data collection during an ongoing data collection and not only between quarters or years. We foresee even more cooperation between the methodologists, the data collection managers and the IT-people in this area in the future and that they will have even better indicators, forms of action and more easily available process data.
32. Timing of call-backs, other types of contact modes (i.e. SMS) and messages for answering machines are forms of action we will look closer at this year. We have seen that hard-to-reach respondents answer after an SMS, but we do not know whether this is due to a second call-back or the text in the SMS. Another matter for concern is the different types of call screening devices such as answering machines, caller IDs and different kinds of app's that give the respondents more or less truthful information about us when we call. While leaving a message does not appear to affect the respondent's inclination to accept contact with our interviewers, the possession of such devices changes the probability of the respondent accepting contact in a negative way. It follows that this is something we consider a major challenge at the moment.
33. We have also experienced that it is easier to implement a system based on action plans in smaller and less complex surveys. We have, as mentioned earlier, used an action plan-based approach for all our surveys, but we have to admit that it has been more complicated to implement this in more complex surveys like the Labour Force Survey, the EU-SILC and the Household Budget Survey. One experience we have drawn upon is the acknowledgement of the importance of incorporating explicit forms of action into the initial plan. Another one is that we may consider surveys as more or less similar iterative processes that can be analysed systematically and that the findings have relevance to our work with various other surveys. We still have some ground to cover to have different survey teams working well together towards optimal common solutions along the lines of action plan-based thinking.

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