Improving Questionnaire Design of Establishment Surveys for Field Data Collection

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Improving Questionnaire Design of Establishment Surveys for Field Data Collection

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Abstract

In the recent years, survey researchers around the world are starting to focus their attention on survey methodology of establishment surveys for businesses, farms, and institutions. The effective design of the questionnaire becomes a major consideration for field interviewers to collect data accurately and efficiently. The Nielsen Company collects data for establishment surveys from retailers in 95 countries worldwide. We will demonstrate how improvements of the questionnaire design (specifically on format, layout, instructions, question order, etc.) can maximize data quality and efficiency of field data collection for establishment surveys. We will first discuss the limited research on questionnaire design and data collection methods for establishment surveys; then highlight past challenges of field interviewers for Nielsen's Retail Establishment Survey and share lessons learned of administering the improved questionnaire. These qualitative insights will show that by applying the guidelines of questionnaire design to interviewer administered questionnaires or interview guides for establishment surveys the quality and efficiency of field data collection can be improved and allow survey researchers of establishment surveys to adapt their improvement of the questionnaire design based on our findings.

1.0 Introduction

Throughout the years questionnaire design has been a focus of college courses, text books, and areas of study and the Nielsen Company has often leveraged this knowledge for our self-administered surveys. However, when it comes to interviewer administered questionnaires or interview guides for establishment surveys, there is little research on the importance of the interview guide's questionnaire design, especially regarding Retail Establishment Surveys.

The Nielsen Company's Retail Establishment Survey collects data in 95 countries worldwide. These 95 countries had each developed their interviewer-administered questionnaires independently and alignment on format, layout, instructions, question order, etc. was non-existent. For this pilot, a set of guidelines for questionnaire design was developed. From these Questionnaire Design Guidelines, the Questionnaire Design team at Nielsen (made up of statisticians, research methodologists, and field interviewer management) created and piloted two Retail Establishment Surveys, one in Malaysia and one in China. We found that by following the principles of questionnaire design and applying them to establishment surveys conducted by field interviewers, the efficiency and quality of the data could be improved.

In addition to increasing the efficiency and quality of the data collected, it was the hypothesis of the researchers that using an improved interviewer administered Retail Establishment Survey questionnaire may decrease the perceived response burden from the storeowners. In establishment surveys respondent burden is of critical importance as we are interrupting the work day of the storeowners (Phipps, Butani, and Chun, 1992). Even during an interview, the respondent sees the

questionnaire held and used by the interviewer. In addition, the "perception of burden may be as important as the actual level of burden itself" (Fisher, Bosley, Goldenberg, Mokovak, and Tucker, 2003, p. 681). By redesigning the interviewer administered questionnaire so that it appears shorter and less complicated, this perceived burden could be reduced encouraging the storeowners to participate and engage during the interview.

2.0 Background

According to Willimack, Lyberg, Martin, Japec, and Whitridge (2004) what is needed within the field of questionnaire design is a change of focus from "error correction" to "error prevention". The goal of the pilot was to taking this concept of "error prevention" and apply it to interviewer administered questionnaires.

At project completion the 95 local countries would be able to take the Questionnaire Design Guidelines developed by the Questionnaire Design team as an outcome from the pilot along with examples of re-designed questionnaires to re-design their country's Retail Establishment Survey. Using a similar process mapped out by Goldenberg *et al*. (2002) of

1) developing Questionnaire Design Guidelines
2) drafting the interviewer administered questionnaires
3) expert review of interviewer administered questionnaires
4) pre-testing the interviewer administered questionnaires
5) revise

the Questionnaire Design team would act as the developers of the Questionnaire Design Guidelines and the expert review.

In order to create the Questionnaire Design Guidelines for the pilot, questionnaire design literature and specifically establishment survey questionnaire design literature was reviewed and compiled. The following questionnaire design guidelines were identified:

Page Layout

- Booklet or two column format is preferred for longer surveys (Dillman, 2000)
- White space will allow the questionnaire to appear short and easy (cf. Dillman, 2000; Morrison, 2007)
- Use white space to separate questions (cf. Dillman, 2000; Lavrakas, 2008; Morrison, Dillman, and Christian, 2010)
- Do not split a question across columns or pages (Fink, 1995)
- Begin asking questions in the upper left quadrant (Dillman, 2000)
- Number questions within the survey consecutively (Dillman, 2000)
- Use headings to separate sections for clarity (cf. Wright & Barnard, 1975; Dillman, Gertseva, and Mahon-Haft, 2005)

Response Options

- Place answer spaces consistently (Dillman, 2000) to the right
- Be consistent with how answer spaces are displayed, using the same answer spaces for the same task (cf. Morrison *et al*., 2010; Morrison, 2007; Dillman *et al*., 2005)
- Answer spaces need to be adequate in size and location (Wright & Barnard, 1975). When designing answer spaces that use different characters and alphabets differing characters and their size need to be taken into consideration

- Response options should align vertically when possible (cf. Dillman, 2000; Morrison *et al*., 2010)
- Use a square check box for mulit-select response options and a circle radio button for single response options (Dillman, 2000)
- Use dark print for questions and light print for answer choices (Dillman, 2000).
- Use delineated response cells to lower the costs of keying forms (cf. Morrison, 2007; Morrison *et al*., 2010)
- Reduce use of tables for collecting data where possible. If tables are necessary reduce the number of items collected in a table (cf. Morrison *et al*., 2010; Morrison, 2007)

Fonts

- Use different text fonts and sizes selectively and consistently (cf. Dillman, 2000; Dillman et al., 2005; Morrison *et al*., 2010)
- Do not use italics (Fink, 1995)

Instructions

- Use arrows to clearly identify the navigational path and reduce error (cf. Dillman et al., 2005; Morrison *et al*., 2010; Christian and Dillman, 2004)
- Place instructions and information directly in the navigational path (cf. Morrison *et al*., 2010; Dillman, 2000; Morrison, 2007)
- Incorporate instructions into the question when possible (cf. Morrison *et al*., 2010; Morrison, 2007)
- Questions and instructions for the interviewer should be visually distinct (Lavrakas, 2008)

Question Wording

- When questions are to be asked verbatim, make them imperative statements, not sentence fragments (cf. Morrison *et al*., 2010; Wright & Barnard, 1975; Morrison, 2007)
- Keep questions short, breaking into multiple questions if needed. (cf. Wright & Barnard, 1975; Morrison *et al.*, 2010; Morrison, 2007)

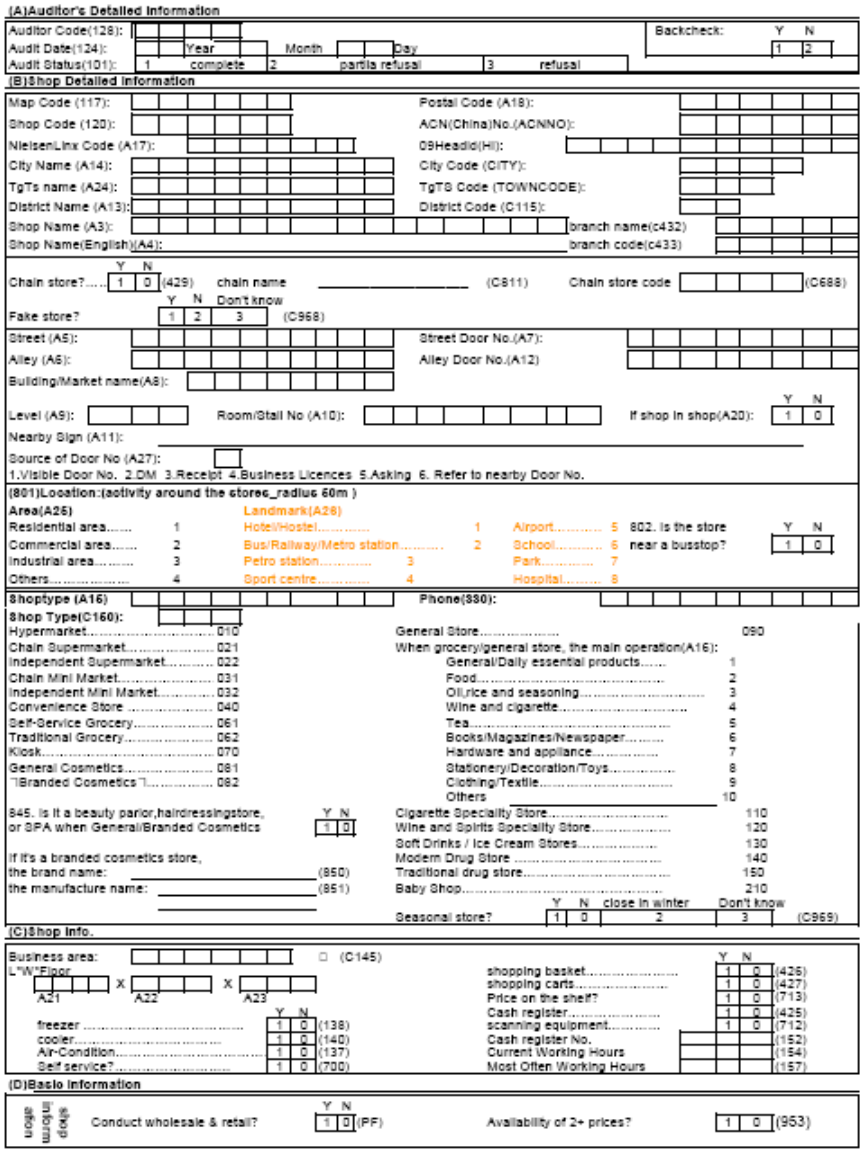
Other

- Questions should be organized into the order that is expected temporally (Wright & Barnard, 1975)
- Reduce the length of questionnaire if possible (Dillman *et al*., 1993). Specifically, remove questions that have not been used for two years
- Reduce the number of sensitive questions (Dillman *et al*., 1993)
- Move sensitive questions to the end in case of break-off (Lavrakas, 2008)
- Reduce perceived respondent burden (Fisher *et al*., 2003). Put all observational questions in one section and all interview questions in another section

After these best practices were identified, the Questionnaire Design Guidelines were created which included examples of how to implement.

Using these guidelines, the Questionnaire Design team then re-designed two questionnaires, one for Malaysia and one for China (Figure 1 & 2).

Figure 1. Original China Retail Establishment Questionnaire pg 1



(A)Auditor's Detailed Information

Auditor Code(128):
Audit Date(124): Year Month Day
Audit Status(101): 1 complete 2 partia refusal 3 refusal
Backcheck: Y 1 N 2

(B)Shop Detailed Information

Map Code (117):
Shop Code (120):
NielsenLinx Code (A17):
City Name (A14):
TgTs name (A24):
District Name (A13):
Shop Name (A3):
Shop Name(English)(A4):
Postal Code (A18):
ACN(China)No.(ACNNO):
09Headid(HI):
City Code (CITY):
TgTS Code (TOWNCODE):
District Code (C115):
branch name(c432)
branch code(c433)

Chain store?..... Y 1 N 0 (429) chain name _____ (C811) Chain store code (C688)
Fake store? Y 1 N 2 Don't know 3 (C968)

Street (A5):
Alley (A6):
Building/Market name(A8):
Street Door No.(A7):
Alley Door No.(A12)
Level (A9):
Room/Stall No (A10):
If shop in shop(A20): Y 1 N 0
Nearby Sign (A11):
Source of Door No (A27):
1.Visible Door No. 2.DM 3.Receipt 4.Business Licences 5.Asking 6. Refer to nearby Door No.

(801)Location:(activity around the storec_radius 60m)

Area(A25)
Residential area..... 1
Commercial area..... 2
Industrial area..... 3
Others..... 4

Landmark(A28)
Hotel/Hostel..... 1
Bus/Railway/Metro station..... 2
Petro station..... 3
Sport centre..... 4
Airport..... 5
School..... 6
Park..... 7
Hospital..... 8

802. Is the store near a busstop? Y 1 N 0

Shoptype (A16)
Phone(880):

Shop Type(C160):
Hypermarket..... 010
Chain Supermarket..... 021
Independent Supermarket..... 022
Chain Mini Market..... 031
Independent Mini Market..... 032
Convenience Store..... 040
Self-Service Grocery..... 061
Traditional Grocery..... 062
Kiosk..... 070
General Cosmetics..... 081
Branded Cosmetics..... 082

General Store..... 090
When grocery/general store, the main operation(A16):
General/Daily essential products..... 1
Food..... 2
Oil,rice and seasoning..... 3
Wine and cigarette..... 4
Tea..... 5
Books/Magazines/Newspaper..... 6
Hardware and appliance..... 7
Stationery/Decoration/Toys..... 8
Clothing/Textile..... 9
Others 10

845. Is it a beauty parlor,hairdressingstore, or SPA when General/Branded Cosmetics Y 1 N 0

If it's a branded cosmetics store,
the brand name: _____ (850)
the manufacture name: _____ (851)

Cigarette Specialty Store..... 110
Wine and Spirits Specialty Store..... 120
Soft Drinks / Ice Cream Stores..... 130
Modern Drug Store..... 140
Traditional drug store..... 150
Baby Shop..... 210

Seasonal store? Y 1 N 0 close in winter 2 Don't know 3 (C969)

(C)Shop Info.

Business area: (C145)
L*W*Floor
A21 X A22 X A23

freezer..... Y 1 N 0 (138)
cooler..... 1 0 (140)
Air-Condition..... 1 0 (137)
Self service?..... 1 0 (700)

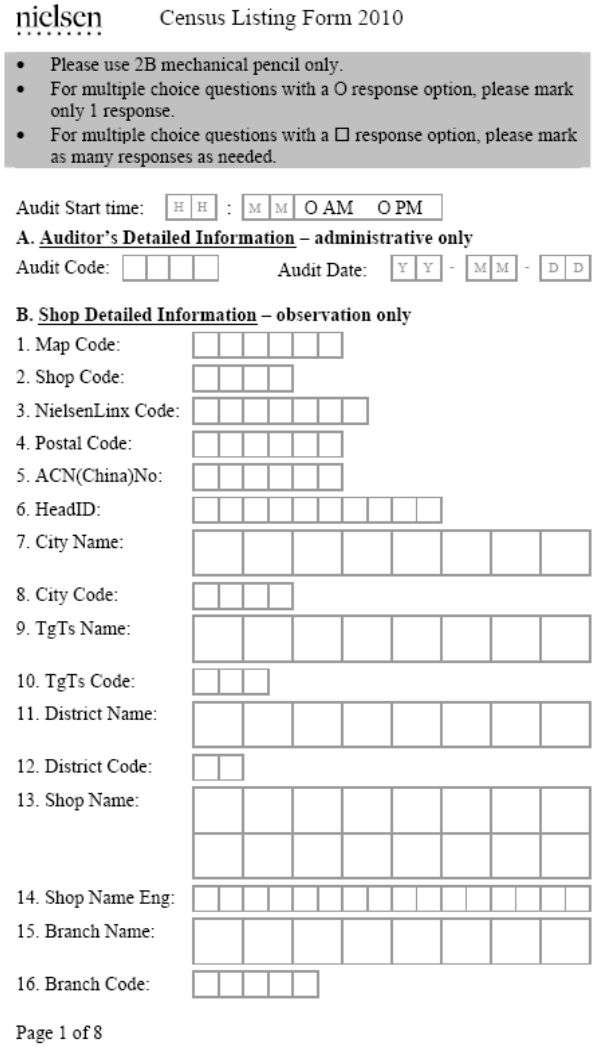
shopping basket..... Y 1 N 0 (426)
shopping carts..... 1 0 (427)
Price on the shelf? 1 0 (713)
Cash register..... 1 0 (425)
scanning equipment..... 1 0 (712)
Cash register No. (152)
Current Working Hours (154)
Most Often Working Hours (157)

(D)Basic Information

shop inform ation

Conduct wholesale & retail? Y 1 N 0 (PF)
Availability of 2+ prices? 1 0 (953)

Figure 2. Updated China Pilot Questionnaire pg 1



nielsen Census Listing Form 2010

- Please use 2B mechanical pencil only.
- For multiple choice questions with a O response option, please mark only 1 response.
- For multiple choice questions with a ☐ response option, please mark as many responses as needed.

Audit Start time: H H : M M O AM O PM

A. Auditor's Detailed Information – administrative only

Audit Code: Audit Date: Y Y - M M - D D

B. Shop Detailed Information – observation only

1. Map Code:
2. Shop Code:
3. NielsenLinx Code:
4. Postal Code:
5. ACN(China)No:
6. HeadID:
7. City Name:
8. City Code:
9. TgTs Name:
10. TgTs Code:
11. District Name:
12. District Code:
13. Shop Name:
14. Shop Name Eng:
15. Branch Name:
16. Branch Code:

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3.0 Nielsen Retail Establishment Approach

The RES at Nielsen collects information such as store location and proximity to other establishments, shop type, products sold, average total sales for the store, and average product sales for the store. The frequency of survey administration varies by country but is usually completed on an annual basis.

Nielsen decided to conduct the current study for a number of reasons:

1) Item non-response due to complicated skip logic
2) Survey length decreased field interviewer efficiency and increased the likelihood of refusals
3) Data accuracy and quality issues

In both pilot countries the questionnaires were tested across many different types of stores, or channels. Channels included, but were not limited to, hypermarkets, supermarkets, department

stores, convenience stores, gas stations, pharmacies, coffee shops, bars, restaurants, kiosks, and wholesalers.

The new pilot questionnaire design was deployed in China and Malaysia in October 2010. Field interviewers used the questionnaires in 745 stores in China and 590 stores in Malaysia.

After the pilot, debriefing interviews were conducted with five field interviewers and two supervisors in China and four field interviewers and three supervisors in Malaysia. These debriefing interviews were conducted in order to add granularity to the data received from the pilot, to understand what aspects of the new questionnaire worked for the interviewers, and to understand what aspects were more difficult or needed modified.

Finally, the Questionnaire Design Guidelines and the example questionnaires were modified in order to reflect the findings from the pilot.

4.0 Results

The following areas were focused on for the initial analysis of the pilot study:

- Logic Check Error Rate (data quality assessment)
- Refusal Rate
- Total Visit Length
- Debrief Interview Findings

4.1 Logic Check Error Rate (data quality assessment)

The main goal of this pilot is to increase the accuracy of the data within the Retail Establishment Questionnaire. The guidelines established from the literature were meant to increase data accuracy. Not only is the data being collected in each of the countries different based on the needs of that country but also the way the questions and the responses themselves differs by country.

A major issue for the countries was that the current questionnaire formats branching logic was not easy to follow and questions were missed by field interviewers. In addition, in many emerging countries the field interviewers may be part-time and/or temporary employees making training an issue. As a result, the questionnaires needed to be designed so that the branching logic was intuitive for the field interviewers in order to reduce the likelihood of missed data.

An example of our updated branching instructions can be seen in the comparison of Figure 3 and Figure 4. The figures show our question on shop type, a single response question, and the branching logic within that question. As noted in Figure 4, our updated questionnaire uses arrows to draw the field interviewer's attention to the additional branched logic where the 2010 production questionnaire (control group with original questionnaire) does not visually draw the field interviewer through the navigational path.

In Figure 3 the only instruction for the field interviewer indicating an additional set of questions to be answered for self-service grocery, non-self-service grocery, and general stores was the statement "When grocery/general store". In addition, this question was placed in a separate column from the self-service grocery and non-self-service grocery response options. Therefore, it was easy for the field interviewers to miss this question. In Figure 4, this was updated so that the three shop types are all together and they each have an arrow pointing them to the additional question.

Figure 3. Comparison of Branching Logic China Pilot Questionnaire – 2010 Production

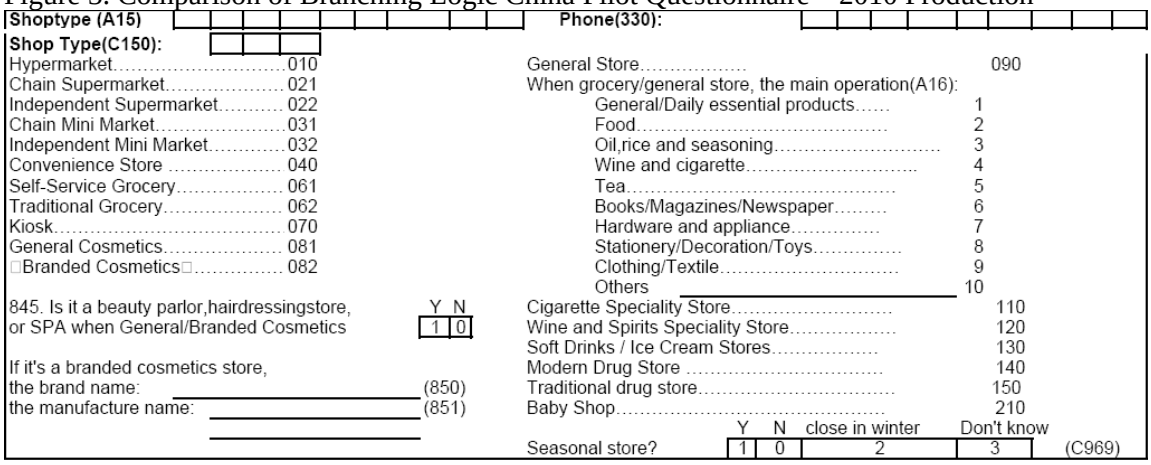

Figure 4. Comparison of Branching Logic China Pilot Questionnaire – Pilot

In order to assess whether field interviewers are following the branching logic a logic check error rate was created. The logic check error rate from the 2010 production is different from the calculation for the pilot as the questionnaire, responses and branching is different between the two questionnaires. Therefore, we looked at the difference between the 2010 production and pilot as a directional difference and did not assess for statistical significance.

In China the logic check error rate was reduced by 19% and in Malaysia by 9%. This reduction shows that the updated branching logic with symbols placed directly in the navigational path and

instructions that are visually distinct from the questions did increase the field interviewers' ability to correctly follow the branching logic.

4.2 Refusal Rate

The refusal rate for this study was refusals divided by complete + incomplete + refusal + temporarily closed. For Malaysia the refusal rate dropped by one percentage point from 5% to 4%. The completion rate for Malaysia also decreased, however, this was due to a higher percentage of temporarily closed stores as the month of the pilot was a fasting month in Malaysia. For China, the refusal rate between the 2010 production group and the pilot showed no difference.

A big change in the refusal rates were not expected in this pilot as the questionnaire design did not directly impact the storeowners. There are three ways that the questionnaire design changes may have impacted the storeowners

1) The storeowners may have glimpsed the questionnaires as the field interviewers used them, directly influencing their perception of the complexity of the study
2) The storeowners may have picked up on the confidence (or lack there of) of the field interviewer
3) The grouping of the interview questions in one section may have changed the perceived burden of the interview for the storeowner

While there was no significant changes observable in the refusal rate for this pilot, the directional change in the refusal rate for Malaysia does indicate that further testing on this subject should be conducted.

4.3 Total Visit Length

One of the goals of the questionnaire redesign was to reduce the length of the visits to the stores. By reducing the visit length we were hoping to increase the number of visits a field interviewer could make in a day, increase field interviewer's productivity and efficiency of the data collection effort, and decrease the actual and/or perceived burden on the storeowner.

There were a number of guidelines that we utilized in order to reduce the visit length.

1) Increase the efficiency of the questionnaire in order to eliminate back-tracking and redundancies for the field interviewer during both the observation portion of the visit and the interview portion of the visit. This was done through questionnaire organization. The questions were reorganized temporally. In addition when asking about the presence of specific products or categories in an store (observation question) the products were reorganized in order to be in the most likely order they would be found within the store. At a minimum, even if the store was not organized in the same manner, the questionnaire was organized categorically in order for the field interviewer to quickly and accurately find and record the presence of that product.
2) Remove questions from the questionnaire when the data from the questions had not been reported or used in the past two years.
3) Questions that were not interview questions were shortened to key words for quick recognition.
4) Questions and instructions for the field interviewer were visually distinct, instructions were in the navigational path, and arrows were used for skip logic for quick recognition.
5) Answer spaces were consistently aligned, designated, and delineated for the most efficient recording of answers.

The actual change of the length of the interviews could not be analyzed for this pilot as they were not collected in the original 2010 production group. The only comparisons that we have are between estimated interview length of the production group and actual interview length of the pilot. As the interview questions were spread throughout the survey in the production group, this estimate was not used as a comparison.

The average total data collection time, including interview and observation time, while an estimation like the interview length, is more accurate than the estimation of interview length as field interviewers are able to recall how long an entire visit took more than how long an interview within a visit took (often broken up over the course of a visit). That said, the differences between the total audit time for the 2010 production group and the pilot should be compared with caution as the 2010 production group is an estimated length of time while the pilot is an actual length of time. Because of this difficulty in comparison, we will present the differences in visit length directionally only.

In Malaysia, there was a decrease in the average total data collection time for Modern Trade (typically the large chain stores) and Traditional Trade (typically the "mom and pop" type of independently owned stores) stores but not for on-premise channels (establishments that sell products to be consumed on-premise such as restaurants, bars, coffee shops etc.). The average data collection time for all store types decreased by 22% and the average interview time for the pilot by store type did not exceed 15 minutes.

In China, there was a decrease in the average total data collection time for all store types: Modern Trade, Traditional Trade, and on-premise. The average visit time for all store types decreased by 32%. The average interview time for the pilot by store type did not exceed 6 minutes.

4.4 Debrief Interview Findings

After the completion of the pilot debriefing interviews were conducted with five field interviewers and two supervisors in China and four field interviewers and three supervisors in Malaysia. In China the debriefing interviews were conducted by phone and in Malaysia they were conducted both by phone and face-to-face. The same debrief guide was used to cover the major questions during every debrief. The difference in mode is due to time, cost, and language differences.

Overall, the field interviewers felt that while the changes to the questionnaire may take some adjustments, they were positive changes.

Page Layout

The field interviewers and supervisors interviewed noted that the questions were "presented well" and that the new layout was "good"; however, the pilot version had the questionnaire in a booklet form and the field interviewers found this difficult to use because they use a clipboard when visiting the stores. The suggestion that is being carried out for the next study is to switch from a booklet format to a two-column format.

Response Options

The field interviewers and supervisors interviewed thought that in general the response options were "presented well." The one drawback was there were not enough response option boxes provided for the shop name and address as the response option boxes were delineated for each character. The number of character spaces provided for the next study is being increased for the shop name and address.

Fonts
Overall, the field interviewers and the supervisors interviewed noted that the updated font, font size, *etc*. were easier to read.

Instructions
Updating the instructions was a large focus of the redesign guidelines and the redesigned questionnaires. For the most part the field interviewers and supervisors that were interviewed had positive feedback regarding the updated instructions noting that the new instructions will be beneficial for new interviewers and that the new instructions will help ensure full completion of the questionnaire. They noted that by adding arrows to the branching logic the field interviewers could follow the questionnaire flow better. In addition, the field interviewers and supervisors noted that the updated instructions could reduce time for some of the field interviewers.

Question Wording
In the updated questionnaires some of the interview questions were provided as "verbatims" meaning that the interviewers needed to deliver the question as worded in the questionnaire. The field interviewers and supervisors interviewed did not like this change.

Field interviewers and supervisors noted that it is difficult to implement in multi-racial countries like Malaysia where they have many languages and cultures in one area (Malay, Chinese, Indian, *etc*.). Asking questions verbatim does not allow the field interviewer the flexibility they need in order to execute the interviews correctly. In the future, it is suggested to continue to provide interview questions as complete, short, and active sentences, but test not requiring that they be delivered verbatim. It may be most beneficial to give the field interviewer the ability to take the local culture, language, and country into consideration when delivering questions in these diverse emerging countries.

Other
The questionnaire order was an important aspect of the redesign of the questionnaires. The field interviewers and supervisors interviewed liked the changes to questionnaire order for a number of reasons. First, the updated questionnaire order was easier to follow because it went through the visit "step-by-step" or temporally. Second, they liked the grouping of the observation and the interview questions so that they could ask all questions at once and not keep interrupting the storeowner which also saves the storeowners time. Third, within the interview questions they liked the organization of questions moving from least to most sensitive as they felt that they were able to collect more information and complete more interviews this way. Lastly, the field interviewers and supervisors interviewed especially appreciated the reorganization of the observation questions as they were able to check both product categories and brands at the same time; this saved them time during the observation portion of the data collection time.

The field interviewers and supervisors had one main criticism of the observation questions. The updated design did not have "other" response options available to them when they were needed; this should be corrected in the future.

5.0 Conclusions

The field of survey research has a rich history of research on questionnaire design. Leveraging this history and the guidelines of questionnaire design in new ways and modes is the wave of the future, whether those modes involve new technology or the oldest mode available as in this case with field interviews. This pilot gives us the preliminary understanding that by leveraging

questionnaire design principles on interview guides and in-person questionnaires the efficiency and quality of the data can be improved.

The most important finding from the pilot was the quantitative and qualitative findings pointing to increased data quality through a reduction in logic check error rates and a greater understanding of branching instructions. The increase in data quality and a greater understanding of branching instructions alone should encourage us to continue with this practice in the future. In addition, we also found directionally positive results in reducing the total data collection time.

Overall, the redesign was successful; however, there is much that we have learned. First, we need to switch from the booklet to the two-column format for interviews. While this may be the best practice for longer self-administered questionnaires, this adds difficulties for field interviewers when using a clipboard. Second, we need to increase the delineated character spaces for shop name and shop address. The length of these two fields was under-estimated. Third, we need to ensure that the field interviewers have "other" options available to them in order to document all of the responses they receive.

Further testing needs to be done on the use of requiring specific questions to be asked verbatim by the field interviewers. There is a fine line between maintaining consistency and impacting the understanding of the data when questions are heard aurally. Additionally, future testing should take into consideration the homogeneity or heterogeneity of the population surveyed.

Finally, further testing should be completed on the ability to impact accept and refusal rates for field interviewing based on questionnaire redesign. To add granularity refusal reasons should also be included in future testing.

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