RESD 700 Fall Term 2022

Eric Webb

Assignment 700-4

**Exercise 9.2: Production Manager**

A production manager wants to assess the reactions of the blue‐collar workers in his department (including foremen) to the introduction of computer‐integrated manufacturing (CIM) systems. He is particularly interested to know how they perceive the effects of CIM on: [8marks]  
1. Their future jobs.  
2. Additional training that they will have to receive.  
3. Future job advancement.  
Design a questionnaire for the production manager.

CIM QUESTIONNAIRE

What do you know about Computer-Integrated Manufacturing (CIM)?

How do you think CIM will affect the workforce in the future?

How do you feel about having additional training to learn CIM?

Do you think learning CIM could advance your career?

**Exercise 13.1**

A medical inspector wants to estimate the overall average monthly occupancy rates of the cancer wards in 80 different hospitals that are evenly located in the northwestern, southeastern, central, and southern suburbs of New York City.

To find the average monthly occupancy rates of the cancer wards the most relevant population would be the occupancy rate of the 80 hospitals using a Stratified Random Sampling technique of 4 strata suburbs with 20 hospitals each. Because the population is evenly distributed between the 4 suburb strata, a discrete analysis can be done on the sampling in an even manner. This is performed through randomization, where each strata will provide their subsets of 20 chosen at random. In turn this leads to statistical estimates that are more precise. That is why a Stratified Random Sampling technique was chosen.

**Exercise 13.2**

A magazine article suggested that “Consumers aged 35 to 44 will soon be the nation's biggest spenders, so advertisers must learn how to appeal to this over‐the‐thrill crowd.” If this suggestion appeals to an apparel manufacturer, what should the sampling design be to assess the tastes of this group?

This would be a Simple Random Sampling through data provided by the apparel manufacturers because the entire population is the objective of study. Being that the population is 35-44 year old’s, the sampling can use data from the apparel manufacturers to perform an analysis on the Simple Random Sampling of 35- 45 year old shoppers and what items they bought.

**Exercise 13.3**

The McArthur Company produces special vacuum cleaners for conveniently cleaning the inside of cars. About a thousand of these, with stamped serial numbers, are produced every month and stored serially in a stockroom. Once a month an inspector does a quality control check on 50 of these. When he certifies them as to quality, all 1000 units are released from the stockroom for sale. The production and sales managers, however, are not satisfied with the quality control check since, quite often, many of the units sold are returned by customers because of various types of defects. What would be the most useful sampling plan to test the 50 Units?

The most useful sampling plan would be non-probability sampling. Meaning if the pool of data is 1000 units but the sampling can only be 50 units, then a sample would be taken every 20 units. This ensures the units are tested evenly as they are produced and not using random number generation or encapsulation of a specific area of the data set.

**Exercise 13.4**

A consultant had administered a questionnaire to some 285 employees using a simple random sampling procedure. As she looked at the responses, she suspected that two questions might not have been clear to the respondents. She would like to know if her suspicion is well-founded.

Since the consultant wants to know if her suspicion is well-found, she should use a Double Sampling. Doing so can allow her to question the respondents again about their competency of the original questionnaire. From this she can gather if the questions were clear to the respondents based off the second sampling.

**Exercise 13.5**

The executive board of a relatively small university located in Europe wants to determine the attitude of their students toward various aspects of the university. The university, founded in 1928, is a fully accredited government-financed university with 11,000 students. The university specializes in the social sciences and humanities and has five faculties, six service departments, eight research centers, and two graduate schools. The executive board has asked you to come up with a sampling plan. Develop a sampling plan and pay attention to the following aspects: target population, the sampling frame, the sample technique, and the sample size

This Sampling Plan will use a Random Cluster Sampling. Since the target population is 11,000 students, a sampling size of 10% equal to 1,100 will be needed. The individual sampling frame being the individual student. The clusters will be the 5 faculties between the school. Each of the five faculty will get 220 students randomly selected. This will create the Random Cluster Sampling.

**Exercise 13.6**

T-Mobile is a mobile network operator headquartered in Bonn, Germany. The company has enlisted your help as a consultant to develop and test a model on the determinants of subscriber churn in the German mobile telephone market. Develop a sampling plan and pay specific attention to the following aspects. Define the target population. Discuss, in as much detail as possible, the sampling frame and the sampling design that you would use. Give reasons for your choice.

This Sampling design will be Systematic Sampling questioning why the subscriber was churned. The Target population will be people who had numbers ported away from the T-Mobile network over a given period. A good sampling pool would be at least 10% of that. The individual frame would be each phone number ported away from T-Mobile. Over the timeline from the earliest to the latest number to be ported, a systematic sample would be taken every *n*th  phone number. This Systematic Sampling design can help determine why the churn occurs.