



Task 8 Research skills 3 :Study Title
Artificial Intelligence-Based Cyberattack
Detection in Critical Networks in the
Comoros: A Population and Sampling
Approach

Field:
Cybersecurity

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Task 8 :Research Skills (3)

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In this presentation, I will present an essential element of the scientific research methodology, namely the definition of the study population and the sample, as well as the methods of selecting this sample.

According to methodological principles, precision in defining the research population is fundamental, as it ensures the validity of the results and their potential for generalization.

This presentation is part of my doctoral project in cybersecurity focused on the detection of cyberattacks using artificial intelligence.



Scientific definition of the population

The research population is defined as the set of individuals, elements, or phenomena to which the study results can be generalized.

In my study, the target population includes:

Network engineers, cybersecurity experts, system administrators, as well as IT managers working in critical infrastructures in the Comoros.

This choice meets the following academic criteria:

- ✓ Clear and precise definition
- ✓ Observable and accessible population
- ✓ Consistency with the research objective

As indicated in the course, the population must be clearly defined in order to allow the selection of a representative sample.

Population characteristics

The studied population has several important characteristics:
It is large and heterogeneous
It shares a common characteristic, which is involvement in cybersecurity
It is difficult to study entirely, which justifies the use of a sample
These characteristics correspond to the scientific criteria mentioned in the course(**Dr. Saniya Sabaa at MidOcean University**)

Definition of the sample

The sample is a part of the population selected to represent the whole.

The use of a sample is justified by:

- ☐ The difficulty of accessing all individuals
- ☐ The high cost of the complete study
- ☐ The gain in time and efficiency

In this study, the sample represents the professionals actually surveyed through a structured questionnaire.

Difference between case study and thesis

In a case study, the researcher analyzes a limited number of individuals or a single organization, which limits generalization. In contrast, in a doctoral thesis, the goal is to produce results that can be generalized to a larger population.

That is why the thesis requires:

- ❖ A more representative sample
- ❖ A rigorous methodology
- ❖ Statistical validation

Type of sampling chosen

According to the course, there are two main types of sampling:

- ☐ Probabilistic samples
- ☐ Non-probabilistic samples

In this research, I chose a purposive (or judgmental) non-probabilistic sampling.

This choice is justified by:

- The absence of a complete list of cybersecurity experts in the Comoros
- The specialized nature of the field
- The necessity to select qualified profiles

This type of sample relies on the researcher's judgment to choose the most relevant participants.

Sample selection conditions

According to scientific criteria, the sample must meet several conditions:

- ✓ Relevance to the subject
- ✓ Availability of participants
- ✓ Objectivity in selection

In my study, the conditions are:

- ☐ Experience in cybersecurity or IT
- ☐ Work in a critical infrastructure
- ☐ Knowledge of detection systems

The sample size depends on several factors:

- ❑ The desired precision
- ❑ The confidence level
- ❑ The resources available In this study:
 - ❖ Estimated population: about 200 professionals
 - ❖ Sample: between 30 and 50 participants

This choice is suitable for an exploratory study.

In conclusion, the definition of the population and the choice of the sample are fundamental steps in any scientific research.

The use of purposive sampling allows for the collection of relevant data in a specific context such as that of the Comoros.

This approach ensures the scientific credibility of the study.

Thank you for your attention ,Wa Billahi Tawfiq.

Reference Frameworks

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- 4) Uma Sekaran, U., & Roger Bougie, R. (2016).
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- 5) Matthew B. Miles, M. B., A. Michael Huberman, A. M., & Johnny Saldaña, J. (2014).
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- 6) Network and IT security training for IUT students by the supervisor ALI MMADI, Head of Network and IT Security at SONELEC



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Thank You

