



A Decision Support System for Decongesting Prison in Edo State

Oise Godfrey PERFECTSON^{a*}

^aDepartment of Computer Science, Faculty of Physical Science, University of Benin, Edo State, Nigeria

*Corresponding author: godfrey.oise@yahoo.com

Abstract

Three prisons in Edo state-Okho, Ozalla Farm, and Ubiaja-are used as case studies in this study, which focuses on the challenges of decongesting the country's jail system. The study's objective was to develop a decision support system (DSS) to aid in ranking and recommending inmates based on an acquittal likelihood factor who should be fast-tracked for a speedy trial, bail, or relocation/recommendation for other correctional techniques or facilities within the Nigerian legal system; aside from the prison. The paper presents a model for a decision support system that incorporates three multi-criteria decision-making systems, SAW, TOPSIS, and AHP, as well as six factors: those who are awaiting trial, detained, sentenced to life, condemned inmates, long-term offenders, and those who have received only a light sentence. While assigning weights to rank the prisoners, consider their dependency, age, gender, health status, and percentage of their sentence served. Experts, including two magistrates, ten prison wardens, five attorneys, ten convicts, six pastors, and nine NGO employees, engaged in a questionnaire poll to predetermine weights. The DSS offers the decision maker two different levels of guidance, namely (a) a beginner mode and (b) an expert mode. The beginner mode is intended for decision-makers who are not familiar with the multi-criteria process. The advanced mode is employed when the decision-maker is conversant with the MA method and can choose a particular method using the predefined weights.

Keywords: Acquittal Likelihood, SAW, TOPSIS, prisons, Decision Support System

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Introduction

A prison, penitentiary, or correctional facility is a place where people are physically confined or interned and usually have a limited amount of personal freedom. Prisons are typically institutions that are part of a country's criminal justice system so imprisonment or incarceration is a legal penalty that the state may inflict for the commission of a crime. Overcrowding happens in Nigerian prisons when the number of detainees exceeds prison capacity to the point where inmates cannot be accommodated in a humane, healthy, and psychologically safe manner. Overcrowding is commonly referred to as congestion in Nigeria. It is a significant challenge in Nigerian prisons, particularly those located in major cities. The number of cells in these jails in Nigeria can be double or triple their intended number. Prisoners scarcely have enough room in these cells to move their bodies or limbs freely. Each prisoner in this regime is given a "post," or roughly a foot-and-a-half-square space.

The majority of prisons in Nigeria are jam-packed and overcrowded, which poses significant challenges for the reformation, rehabilitation, and reintegration processes involved in prison administration. Despite an alarming rise in the jail population over the previous two decades, Nigerian prisons have essentially maintained their capacity. Prior to Nigeria's independence in 1960, these jails were constructed by the colonial government and local authorities. The status of these jails is alarmingly deplorable, with little feeling of upkeep or repair indicative of long-term neglect by the Nigerian government. The majority of the prisons built during this period are quite old, in poor condition, and in danger of collapsing.

According to (Aduba 2005), the entire jail capacity from 1978 to 1981 was 27,257, while statistics from (Nigeria prison services, 1978–1981) show that the average monthly population in 1978 was 32,332; in 1979 it was 34,770; in 1980 it was 35,332; and in 1981 it was 38,477. 18.61% were overcrowded in 1978, 27.56% in 1979, 29.43% in 1980, and 41.16% in 1981. Currently, 49,000 people are housed in Nigerian prisons, with 20% of them being offenders and the remainder awaiting trial (Amnesty International Report, 2012). The ability to store and retrieve information rapidly has reduced the complexity of work and information, which is one of the uses or advantages of computers. There is a need for a decision support system that is computer-based to implement rules for choosing and recommending an inmate with a higher probability of acquittal when developing strategies for prison decongestion given selecting inmates with a greater likelihood for discharge or bail, such as those awaiting trials, detainees, pregnant women, and the terminally ill.

The purpose of this study is to create a DSS that aids prison administrators and staff in compiling a list of the prisoners most likely to be granted acquittals, bail, parole, or pardons/mercy. Objectives a) To investigate the criteria for choosing inmates for a trial or amnesty program. b) Gathering opinions and information from those with experience working with prisoners, including warders, inmates, attorneys, and members of non-governmental organizations (NGOs) like the Christian Fellowship. c) Design a decision-support system. Significant of the Research. This research would be useful to prison managers and other stakeholders in developing a decision support system for decongesting Nigerian prisons. It would also increase concern and knowledge about the problem of overcrowding in Nigerian prisons. A decision support system will also necessitate the documentation of jail records in a format that can be accessed via computer systems and networks.

Methodology

The research method was used to obtain the essential data needed as input into the decision support system. A quantitative methodology that includes elements of the qualitative approach.

Design Of the Study

The descriptive survey research design was chosen for the study. According to Muganda et al. (1999), this method aims to define potential behavior, attitudes, values, and traits. To obtain the weight ratings of the selected acquittal likelihood criteria for the prisoners, a descriptive survey research technique was used. The descriptive survey research design was chosen for the study. According to Muganda et al. (1999), this method aims to define potential behavior, attitudes, values, and traits. To obtain the weight ratings of the selected acquittal likelihood criteria for the prisoners, a descriptive survey research technique was used.

Acquittal Likelihood Criteria

The best acquittal criteria were determined to be the following: Status: The terms "Awaiting Trial Males" (ATM), "Awaiting Trial Females" (ATF), "Convicted Males" (CM), "Convicted Females" (CF), "Detained at His Excellences Pleasure" (Underage detainees in prison with special authorization), "Debtors," "Criminal Lunatics" (Mentally ill persons charged with an offense), and "Civil Lunatics" (Mentally ill persons charged Age and sex, as well as the percentage of the sentence that has already passed as well as any health issues or pregnancy. A questionnaire survey was used to carry out the descriptive survey study design. Because it assisted in gathering information and opinions from the stakeholders, this design is appropriate for this study.

Sample And Sampling Techniques

The non-probabilistic sampling technique will be used for the study. To pick the experts, participants or respondents would be sampled on purpose.

Research Instrument

A questionnaire titled "Weighing Criteria for Acquittal Likelihood (WCAL)" was used to collect data. The questionnaire is divided into two portions, A and B. Section A includes items about respondents' personal information. Section B is made up of ranking scales utilizing the Likert scale of 1-5 for each of the six factors considered.

Data Collection

The researcher and two research assistants were briefed on the goal of the study and how to administer the questionnaires. The surveys were provided to the respondents and were promptly retrieved after completion.

Data Analysis

Descriptive statistics were used to assess the data that were collected. A mean value of 2.50 or more is considered to have a high degree of influence, while scores below that were considered

to have a low degree of influence on the decision point. The association between marital crisis severity and study habit inventory results (rated as poor, fair, average, good, and very good) will be evaluated using partial correlation.

Results

This section contains the survey results, as well as an analysis and discussion of the findings.

a) Oko Prisons

Table 1. Capacity and list of prisons in Oko prison

Status	Male	Female
Condemned inmate	20	5
Lifer	19	8
long sentenced	112	34
Short sentenced	289	87
Detainee	79	23
Awaiting trial	45	17

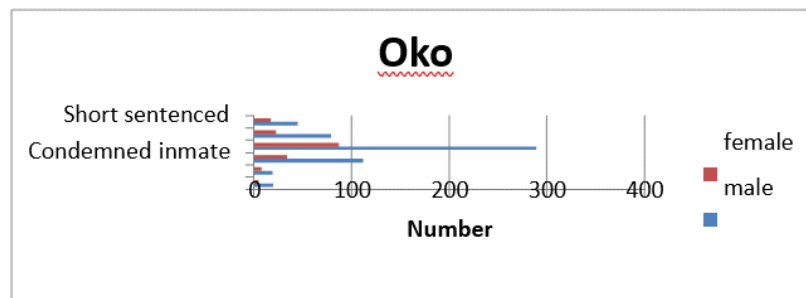


Figure 1. Status of the Inmates at Oko Prisons

b) Ubiaja Prison

Table 2. Capacity and list of prisons in Ubiaja Prison

Status	Male	Female
Condemned inmate	14	2
Lifer	11	3
long sentenced	82	14
Short sentenced	209	61
Detainee	29	11
Awaiting trial	32	14

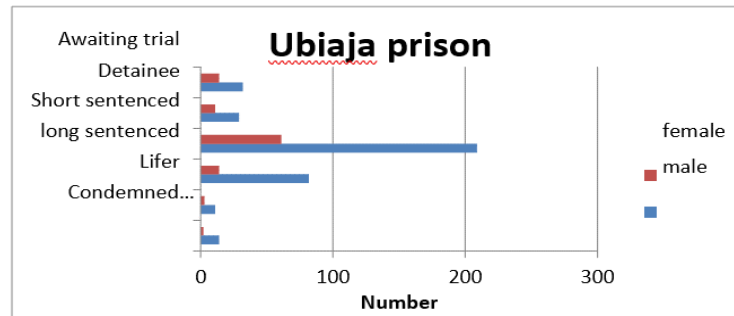


Figure 2. Status of the Inmates at Ubiaja Prisons

Table 3. Capacity and list of prisons in Ozalla prison

Status	Male	Female
Condemned inmate	1	0
Lifer	2	1
long sentenced	54	22
Short sentenced	76	32
Detainee	-	-
Awaiting trial	2	2

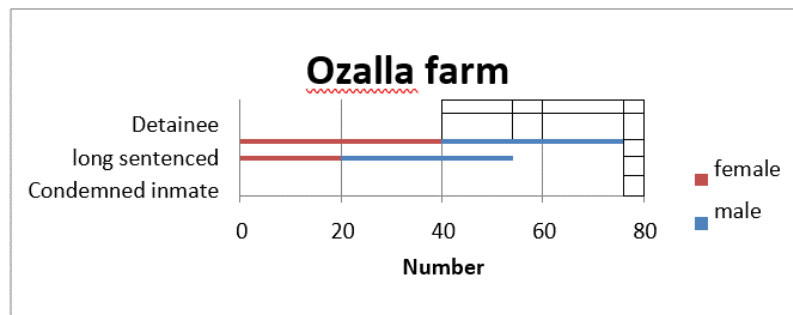


Figure 3: Status of the Inmates at Ozalla Prisons

Statistical Analysis for The Expert System of Weight Criteria

The Relative Rank, which is likewise a relative measure of perception, goes from 0.2 (the lowest ranking index) to 1.0 (the highest ranking index, or 1/5). Table 4.4 displays the weightings W_i and ranks based on W_i values for all selection qualities, with a minimum value of $([IR = 0.2 + RR = 0.2]/2) = 0.2$ and a maximum level of importance index of 1. The table displays status, percentage of sentences served, dependency ($W_i = 0.8$), whereas health/pregnancy ($W_i = 0.6$), age ($W_i = 0.4$), and gender ($W_i = 0.3$).

Table 5. *Weights of the different factors*

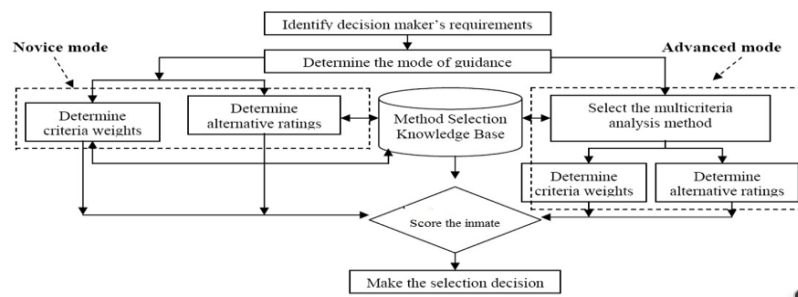


Figure 4. Shows a decision-support system for choosing prisoners with a high possibility of being found not guilty.

	Scale	Frequency	Median	IR	Importance of criteria	RR	Weig	Rank
Status	1	1	4	0.8	4	0.8	0.8	1
	2	3						
	3	3						

Table 5. Weights of the different factors

	Scale	Frequency	Median	IR	Importance of criteria	RR	Weight	Rank
Status	1	1	4	0.8	4	0.8	0.8	1
	2	3						
	3	3						
	4	12						
	5	23						
Fraction of	1	0	5	1	3	0.6	0.8	1
	2	4						
	3	7						
	4	7						
	5	24						
Health Condition/Preg	1	7	3	0.6	3	0.6	0.6	2
	2	9						
	3	10						
	4	12						
	5	4						
Age	1	13	2	0.4	2	0.4	0.4	3
	2	10						
	3	4						
	4	7						
	5	8						
	1	11	2	0.4	1	0.2		
	2	21						
	3	4						

	4	3						
	5	1						
Gender	1	0	5	1	3	0.6	0.3	4
	2	6						
	3	4						
	4	10						
Dependency	5	22					0.8	1

Example of ratings for Inmates using the Simple additive weighing method (SAW): Paul Osakpamwan and Josephine Amadi:

a) Paul Osakpamwan

	Value	Scale	WE
		1	
		2	
		3	4.0
		4	
Status	Awaiting trial	✓ 5	
		✓ 1	0.8
		2	
		3	
Fraction of sentence served	3 out of 24 yrs	4	
		5	
		✓ 1	0.6
		2	
		3	
		4	
Health Condition/Pregnancy	Very Healthy	5	
		1	
		2	
		✓ 3	1.2
		4	
Age	54	5	
		✓ 1	0.3
Gender	Male	2	
		1	
		2	
		3	
		4	
Dependency	Not applicable	5	
Total acquittal likelihood factor			6.9

b) Josephine Amadi

	Value	Scale	WR
Status	Short sentence	1	1.6
		✓ 2	
		3	
		4	
		5	
Fraction of sentence served	10 out of 15 yrs	1	2.4
		2	
		3	
		✓ 4	
		5	
Health Condition	Healthy	1	1.2
		✓ 2	
		3	
		4	
		5	
Age	42	1	0.8
		✓ 2	
		3	
		4	
		5	
Gender	Female	1	0.6
		□ 2	
		3	
		4	
		5	
Dependency	Not applicable	5	
Total acquittal likelihood factor			6.6

Based on the results shown above for two detainees, the decision ranking using the SAW technique yields a ranking of acquittal likelihood of 6.9 for Paul osakpamwan and a score of 6.6 for Josephine Amadi, implying that Josephine Amadi has a lesser score in comparison. It should be emphasized that the ratings for a given convict are expected to rise over time.

Discussion

The Decision Support System Framework

It is not only desirable but also crucial to implement a DSS to address the prison overcrowding issue. By enabling them to interact with the system and exchange information with it, the DSS gives the decision-maker efficient tools to better grasp the choice problem and the effects of their decision-making behaviors on the business. The DSS must be effective, efficient,

and adaptable to properly resolve the general IS project selection problem due to the diversity and complexity of the selection criteria, their interrelationships, and the volume of information. The decongestion strategy for prisons is presented in this section. The DSS was created to assist the decision maker in selecting the best inmate simply and straightforwardly by allowing the decision maker to input values to express his or her requirements and to fully explore the relationships between the criteria, the alternatives, the methods available, and the outcome of the selection process. The DSS assists the decision maker in adopting a problem-oriented approach to problem-solving through interactive information exchange between the two parties. In this process, the DSS lets the problem it is attempting to solve define the best strategy to use. This solution-focused approach is essential for tackling the IS project evaluation and selection issue in a company effectively and quickly.

The DSS is composed of three major subsystems: (a) The dialogue subsystem, (b) The input management subsystem, and (c) The knowledge management subsystem. The conversation subsystem is responsible for user-friendly communications between the DSS and the decision maker as well as integrating several other subsystems. All operations or directives selected by the decision maker are coordinated by the subsystem. The interface enables the decision-maker to change or visualize the data as well as apply one of the available MA algorithms. The interface is created to give the decision maker flexibility to customize the system; the decision maker can define the criteria he or she wants to ask about as well as add, remove or edit criteria. To analyze various possibilities utilizing the knowledge management subsystem, a decision maker uses the database through the dialogue subsystem. The IS project assessment and selection problem is solved by the input management subsystem, which organizes and controls all of the inputs. Typically, each challenge has a different set of required data inputs, both in terms of type and number. Primary and secondary types of these input data are distinguishable. The choices, the criteria, the decision matrix, and the pairwise comparison matrices make up the main input data. The weightings for the criteria are part of the secondary data.

The input data are entered into the system for processing, and once they are there, they can also be changed. Due to the potential inclusion of additional MA methods in the DSS, it should be highlighted that the system is adaptable enough to support the incorporation of new data types. All of the MA methods offered by the DSS are managed via the knowledge management subsystem. Six MA methods have been included in the proposed DSS to explain it, and to aid the decision maker in choosing the best MA method to address a particular IS project assessment and selection problem. These three techniques include 1. Simple Additive Weighting (SAW) method, 2. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method, 3. Analytical Hierarchy Process (AHP) method and additional techniques. The decision maker may directly use one of these MA techniques or the suggested DSS may automatically choose one of them using the knowledge management subsystem. The proposed DSS is divided into six phases: (a) identification of decision-maker requirements; (b) determination of criteria weights; (c) determination of performance ratings of alternative IS projects concerning each criterion; (d) choice of the best MA method; (e) assessment of the IS project; and (f) choice of the appropriate IS project alternative.

The comprehensive DSS framework for tackling the problem is depicted in Figure 4. When evaluating and choosing IS projects, the initial phase begins with the identification of the decision maker's requirements. Among these conditions are (a) the decision maker's preference for a particular MA method, (b) the decision maker's availability of time, (c) the decision maker's desire to interact with the system, and (d) the desire to allow the system to choose one satisfactory solution or for the decision maker to choose the best solution. The DSS offers the decision maker two different levels of guidance, namely (a) a beginner mode and (b) an expert mode. For a decision-maker who is not familiar with the MA process, the beginner mode is created. In the

beginner's mode, the decision-maker is first questioned by the knowledge management subsystem about the nature of the issue and the ideal kind of solution. When the decision maker is knowledgeable about MA approaches and competent to choose a certain method, they employ the advanced mode. The identification of fundamental criteria weights in a particular choice circumstance is the next step in the second phase. The decision maker may use predetermined weights set by experts to establish the basic criteria weights using the DSS user interface. The knowledge base uses the verbal phrases in the universe $U = \text{"Very high extent," "high extent," "medium extent," "low extent," and "very low extent."}$ Following the quantitative scaling on the 6 components from a database, the performance ratings of alternative inmates about the acquittal criteria will be determined. Practically, the criteria may contain both quantitative and qualitative variables that meet the needs of the decision-maker and, depending on the MA employed, result in a ranking of the inmates.

Conclusion

This study examines three prisons in Edo state (Okoko, Ozalla Farm Prison, and Ubiaja Prisons as case studies) to examine the issue of decongesting the Nigerian prison system. The DSS's goal is to rank and recommend prisoners who should be given priority for a rapid trial, bail, or transportation to another correctional facility or manner by Nigerian legal guidelines. The DSS offers the decision maker two types of guidance: (a) a beginner mode, and (b) an advanced mode. A decision maker who is not familiar with the MA methodology should use the beginner mode. The knowledge management subsystem first questions the decision maker in beginner mode about the features of the problem and the sort of solution desired. The advanced mode is utilized when the decision maker is conversant with MA methods and can select a specific approach based on the predetermined weights.

Conflicts of Interest

No Conflicts of interest.

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