

# Application of Z-Test of Hypothesis on Modelling Gender Difference in Crime Involvement by Building and Construction Workers in Adamawa State Nigeria

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## Abstract

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The main objective of the study is to examine gender difference in crime involvement by workers in the building and construction industry. Specifically, to show the application of Z-test statistical tool in research. Adamawa state is the area of study and 392 building and construction workers that were convicted for offences of various categories in the area of the study is the population of the study, what is the gender difference in crime involvement by workers in the building and construction industry in Adamawa state? Is the research question. The null hypothesis tested was “there is no significant difference in gender in crime involvement by workers in the building and construction industry in Adamawa State.” The study was based on secondary data extracted from Adamawa State Statistical Year Book 2012 for period of 4 years (20012-2016). Ten crime types that included theft, cheat, trespass, enticement, deformation of character, mischief, force and assault, conspiracy, intimidation, possession of weapons, were considered for the study. The data obtained was analysed and the hypothesis tested using Z-test at 0.05 level of significance. The result of the analysis showed that female workers commit less crime than male workers in the building and construction industry in Adamawa state. The study recommended that, there should be Prompt and consistent punishment for male workers offenders so as to help reduce the incidence of male workers crime commitment high rate. Positive motivation of the workers in the building and construction industry in the state was recommended. The significance of the study if published include: 1. Adamawa state building and construction industry managers will benefit from the findings of the study because it had remained them on crime involvement rate by workers in the industry and that may motivate them to include remedies or control measures in the management of their workers. 2. Authors and researchers too, because it will remain them on how and when to apply the Z-test of hypothesis when writing: research reports, journals for publication, and other similar issues. 3. Similar benefit goes to the building and construction industry stakeholders; in that it can be a source of information to them at home and workplaces on the behaviours of their workers in relation to crime commitment in the industry. 4. Not only the above stated, Building and construction industries workers themselves will learn some lesson when they witness high gravity of punishments being awarded for such offences in the industry as listed above.

**Keywords:** Z-test, Crime, Gender, Building and construction workers, Adamawa, Nigeria

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## **Background to the Study**

Human beings are the single most important resources of any organization or community, human beings are also the most complex and perhaps the least predictable of all organizational resources. A highly motivated and enthusiastic workforce is a major asset to an organization and contributes substantially to organization's growth, and profitability. Whereas demoralized and un-interested work force can have a debilitating effect on an organization and its activities, the issue of gender difference in crime involvement by building and construction industry workers in Adamawa state may have the workers to be one among the contributing factors, the cause may be due to lack of frequent or poor motivation from the managers of the building and construction industry in the area of the study as opined by Shittu, Bitrus, Abdulsalam, Mara, and Yohanna (2016).

Contributing on the above subject matter, Shittu, Bitrus, and Abdulsalam (2016), explained that the building and construction industry comprises all organizations and persons conceived with the process by which buildings and civil engineering works are procured, produced, altered, repaired, maintained, and demolished as the case may warrant it. Thus; companies, firms, and individuals working as: labourers, consultants, main and sub-contractors, construction materials producers and suppliers, construction equipment producers and suppliers, builders' merchants and many more are among the workers that made up the building and constructions industry in Adamawa state, Nigeria.

Arising from the explanation above, it shows that the building and construction industry render services which are needed for the production of durable shelters and other buildings or structures that will satisfy their owners psychologically, and withstand the test of time. Thus; the building and constructions industry is very unique, especially when cognizance is given to the physical nature of shelters, construction projects, and construction processes. Therefore, workers in the industry need to be regulated, motivated, and checked from time to the other to minimize the cases of crime involvement that may warrant their inability to produce quality work performances. Rather, sub-standard job performance that will be characterised by unnecessary collapse of houses and other structures that cause loses in the socio-economy of Adamawa state and Nigeria as a whole via loose of lives and damage to properties as it is witnessed in almost every part of Nigeria these days.

Z-test is a statistical tool used to determine whether two population means are different. When the variances are known and the sample size is large, the test statistic is assumed to have normal distribution and parameters such as standard deviation should be known in order for an accurate Z-test to be performed as explained by National Bureau of Statistics (NBS) (2010). Furthermore, the (NBS, 2010) gave the summary of the Z-test of significance among others to include:

1. An inferential statistics used to test the significant difference between one or two population means.
2. The choice of the Z-test for use in data analysis is dictated by sample size.
3. The Z-test have different table of value.
4. The Z-test is used to analyse data with sample size that is more than 30.
5. The Z-test has table of value without degree of freedom (df).

6. The Z-test is not used to determine the significance of the difference between more than two population means.

The NBS (2010), explained furthermore that the Z-test and the T-test are both inferential statistical tools used for data analysis in research studies. They differ only in sample size, where Z-test is used for 30 or more sample size, the T-test uses less than 30 as sample size. And that both Z-test and T-test have different table of values, because unlike the T-test, Z-test has table of value without degree of freedom.

### **Statement of the Problem**

Prisoners Rehabilitation and Welfare Action (PRAWA), (2010) publication stated that there is significant difference between male and female citizens' offence rates. According to the publication, in some cases the ratio is as high as 16:1 indictable offence. Thus, this has kept the number of females in custody in Nigeria and perhaps elsewhere in the world relatively below compared to the male.

In support to the publication above, (Oluwadere et.al, 2011) are of the view that there had been differences in the crimes committed by male citizens and female citizens in various stages throughout Nigeria and probably the world over. According to them, generally, male citizens' criminality became the most significant issue in the literary discussion of crime which gave female citizens' criminality little or no attention as such. It is against these reasons that the researcher became kin to investigate the gender difference in crime involvement by male and female workers in the building and construction industry in Adamawa state in north-eastern Nigeria using the Z- Test of hypothesis.

### **Objective of the Study**

The main objective of the study is to examine the gender difference in crime involvement by male and female workers in the building and construction industry in Adamawa state, North-Eastern Nigeria. Specifically, to show the application of Z-Test of hypothesis.

### **Research Question**

What is the gender difference in crime involvement by workers in the building and construction industry in Adamawa state?

### **Research Hypothesis**

There is no significant difference in gender in crime involvement by workers in the building and construction industry in Adamawa state.

### **Significance of the Study**

The findings of the study are of great benefit to:

1. Adamawa state building and construction industry managers, because it will remain them on crime involvement rate by workers in the industry and that may motivate them to include remedies or control measures in the management of their workers.

2. Authors and researchers because it will teach or remain them on how and when to use the Z-test when writing research reports, journals for publication, and other similar issues.
3. Building and construction industry stakeholders, in that it can be a source of information to them at home and work places on the behaviours of the workers in relation to crime commitment in the industry.
4. Owners of building and construction industries as it will inform them of the type and character of their workers on crime involvement rate, so that they will adjust and control security in their respective industries in the state.
5. Building and construction industries workers themselves, because it will serve as detrain to them when they see the rate of crime committed by their fellow workers and the degree of punishments awarded for such offences.

### **Literature Review**

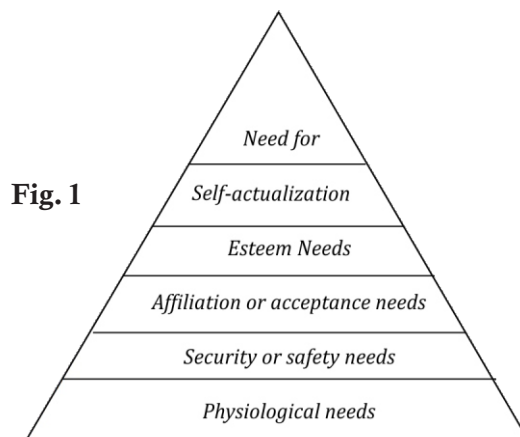
From historical point of view of human beings, no human being came into the world or new situation completely blank minded. In the case of the workers in building and construction industry in Adamawa state, Nigeria; the workers do come from different homes, their immediate communities and peer groups where they would have picked up an assortment of good and bad characters as considered by the law of the society. These characters constitute the knowledge base on which further characters will be built upon as they interact with others, thus, crime commitment may be possible. The term crime is viewed in different ways by different authors and scholars. For an example, Lindsay (2010), explained crime as being created by the law or as product of the law. That is, where there is no law, there will be no crime; an act can only be regarded as a crime if there is a law that sees or classifies it as such. Similarly, the Oxford English Dictionary defines crime as an unlawful act punishable by the state (Law). It is an act, which could be harmful to an individual, some individuals and the larger society. Through an established system of laws, the society or an organization defines what crime is or is not. For an act to be an offence or crime, there must be an extent to which the law prohibits such an act. Consequently, crime occurs when an individual breaks or acts against the law. Crime could be an overt act, omission or neglect that can result in punishment.

The study revealed that Adamawa's experience of criminality amongst her citizens has been a gender issue, because, female citizens are no longer playing only the role of second fiddle as was expected even by creation, instate, they engage in such negative activities which the male citizens do for living or to control family; especially, where the breadwinner had died or weak to provide such. Because of the difficulty in achieving these goals, the tendency of criminality became unavoidable among female citizen's circle. For the fact that female criminality had not been stressed as male, the endeavour is therefore pertinent to fill the gap that has been left in the body of literature, thereby constituting the subject matter to sex differences in criminal behaviour as opined by Oluwadere and Agboola (2011).

The researcher has hinged the study on Maslow's Hierarchy of need theory due to its close relationship with the study. Abraham Maslow, a psychologist, saw human needs in the form of a hierarchy in an ascending order of importance from the lowest to highest and concluded

that when one set of the needs is satisfied, then that kind of need ceases to be a motivator. The basic human needs placed by Maslow in an ascending order of importance are:

1. **Physiological Needs:** These are the basic needs for sustaining human life itself such as food, water, warmth, shelter and sleep. Maslow took the position that, until these needs are satisfied to the degree necessary to maintain life, other needs will not motivate people.
2. **Security or safety needs:** People want to be free of physical danger and of the fear of losing a job, property, food, or shelter (Housing).
3. **Affiliation or social needs:** since people are social beings, they need to belong, to be accepted by others (inter-relationship).
4. **Esteem needs:** according to Maslow, once people begin to satisfy their need to belong, they tend to want to be held in esteem both by themselves and by others. This kind of need produces such satisfactions as power, prestige, status, and self-confidence.
5. **Self-actualization needs:** Maslow regards this as the highest need in his hierarchy. It is the desire to become what one is capable of becoming. I.e., to maximize one's potential and to accomplish something. Maslow's hierarchy of needs can be represented as shown below:



As explained above, it can be seen clearly that Maslow's hierarchy of need theory is closely related to researcher's study in the need for: motivation of workers in an organization, security or safety, and social need.

### **Materials/Method**

The area of the study was Adamawa State, Adamawa state is located in the North Eastern part of Nigeria, which was carved out of the former Gongola State on the 17<sup>th</sup> August 1991, with headquarters in Yola. It is bordered by Borno and Yobe State in the North, Gombe State in the West, Taraba State in the South and the Republic of Cameroun from the East (along Nigerian international border). It lies between latitude 8<sup>o</sup> N and 11<sup>o</sup> and longitude 11.5<sup>o</sup> and 13.5<sup>o</sup>E. It covers a land mass of 39,742.12 square Kilometres that is about 4.4% of the land area of Nigeria. It has a population of 3,168,101 based on the 2006 census. The state has 21 local

Government areas and 50 State Development Areas (Adamawa State Government House Dairy, 2014). The study population covers 392 male and female construction workers that were convicted for criminal offences in Adamawa State. The study was based on secondary data which was extracted from Adamawa State Statistical Year Book 2012 for the period of 4 years, from 2012-2016. The figure below is the map of the area of the study.



**Fig. 2:** Area of the study: Map of Adamawa State, North-Eastern Nigeria.

## Results and Discussions

### Test of Hypothesis

The stated hypothesis above was tested using Z-test as stated below:

$$Z = \frac{p_i - p_j}{\sqrt{\left(\frac{p_i q_i}{n_i} + \frac{p_j q_j}{n_j}\right)}} \sim N(0,1) \text{ at } \alpha = 0.05$$

Where:

$p_i$  = The proportion of male workers.

$p_j$  = The proportion of female workers.

$q_i$  = One minus the proportion of male workers.

$q_j$  = One minus the proportion of female workers.

$n_i$  = The number of male workers.

$n_j$  = The number of female workers.

### Decision Rule

If  $|Z_{cal}| \leq Z_{tab}$ , reject null hypothesis otherwise accept.

### Research Question:

What is the gender difference in crime involvement by workers in the building and construction industry in Adamawa state?

**Table 1:** Research Question Table of Offence by Gender Difference from 2012-2016

S/N	Crimes	$P_1$	$P_2$	$n_1$	$n_2$	$Z_{cal}$	Decision
1	Theft	0.86	0.14	1691	284	32.36	Reject
2	Cheating	0.82	0.18	1050	223	22.59	Reject
3	Trespass	0.84	0.16	826	152	21.02	Reject
4	Enticement	0.83	0.17	732	153	19.77	Reject
5	Character Deformation	0.77	0.23	898	269	18.46	Reject
6	Mischief	0.84	0.16	830	153	21.08	Reject
7	Force & Assault	0.81	0.19	1139	268	23.28	Reject
8	Conspiracy	0.80	0.20	553	141	15.90	Reject
9	Intimidation	0.83	0.17	903	180	21.53	Reject
10	Weapons Possession	0.86	0.14	813	134	22.26	Reject

Critical Value 1.96

In the table above, the proportion of male workers' offences are more than those of the female workers. A vivid observation revealed that all the crime are male workers biased in terms of gender. In all the offences the hypothesis is rejected. This is an indication that male workers commit crime more than female workers in the building and construction industry in Adamawa State in north-eastern Nigeria.

### Conclusions and Recommendations

The bond between gender and crime is strong and insistent, and is likely to remain so. Female workers have traditionally been much less likely than male workers to commit crimes. Based on the findings of the study, there are clear evidences from the results that female workers commit less crime than male workers. In other to condense this high rate of crime among male workers in the building and construction industry in Adamawa State in north-eastern Nigeria, there should be Prompt and consistent punishment for male workers offenders so as to help reduce the incidence of male workers crime commitment in the building and construction industry in the state. Also, workers in the industry need to be motivated, and checked from time to the other to minimize the cases of crime involvement which promotes sub-standard job performance characterised by un-necessary collapse of houses and other structures that causes loses in the socio-economy of Nigeria via loose of lives and damage to properties as it is witnessed in almost every part of Nigeria these days.

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