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The Essentials of the Sketch of Woman, Nature, the Quadruple Relations of Human being

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Abstract

Whosoever does a righteous deed, be it male or female, believing, We shall assuredly give him to live a goodly life..."¹. In the culture of Islam regarding the insight, the human is theist, regarding the tendency he is deist, and in a word, he is being created as an absolute-seeker, and this is the "nature" and the special creation manner of the human being². Lexically, "relation" is defined as linkage, fondness, and fixation.³ Relation "is a process in which messages convey between two persons with factual or credit contradiction." On one hand the modern centuries are called the age of "communications"; the Muslim philosophers consider the human being as holding four main relations: relation with god, relation with self, relation with others, and relation with the nature. On the other hand, by taking a look at the major issues of the world in recent decades, we can see that issues concerning the women are in the first place, and the especial view of Islam about the woman has been one of the most controversial and political issues of the world. In the viewpoint of Islam, which is the school of "Nature," there is no difference between the actual personality of a man and a woman, and the issues of these two categories can be explained and elaborated in the "Humans' Quadruple Relations" system. From among the four, the relation between human being and the god enjoys from some traits, and shapes other relations and makes them oriented. These four bonds make a comprehensive system in which the modern organization of the women issues would be possible. Because in fact the systematic interaction of the humans' quadruple relations is a factor of the humanity and his nature, to be flourished.

Considering that women, in number, at least comprise half of the world's population and enjoy from a very high capacity in terms of influence and impact on social and international affairs, conducting researches which concern the women issues, can be

¹SuraNahl, Verse 97

²R.K: ABdollahJavadi, Nature in Koran, Page 54, 58

³HemadJohary, Sehad Al-Loghat, Para "Relevancy" Ali Akbar Dehkhoda, Dictionary, Word: Relevancy

considered as one of the most important and most critical issues; especially if such issues are investigated on a modern system relying on the nature-related themes.

Taking a look at the history of the women-oriented topics, we can see that in recent centuries the process of researches related to Woman has been accelerated. By the emergence of the feminism movements in the west, and the outspread of these movements into other nations, and with considering the critical role of women in social and cultural uprisings, the woman-oriented researches would enjoy from a very high importance. As a result, it is required to continuously deal with issues related to women and to scrutinize the stance of Islam about the woman.

The religion of Islam has its own especial bases and worldview, and has legislated the regulations, laws, ethics and duties of the individuals on the basis of the type of worldview and especial foundations, therefore, in our opinion, the necessities of analyzing the women issues can be summarized into some cases: 1. Explaining the issues related to woman in modern and comprehensive model, 2. Relying on the Islam's worldview as the foundation of the Islam's stance toward the woman, 3. Paying special attention to the verses' texts and exterior as the bases of the topic of woman, 4. Relying on the element of nature as the second resource and base of women issues, 5. Noticing the training and pedagogical contextures of the two categories.

The result of the present research, which has been conducted through library-based and analytic method is as follows: In the viewpoint of Islam, the man and woman have a unit human reality, same genus, same type, but two categories. The traditional, psychological and sociological evidences show that: First: the extent of strength and weakness of the dimensions of the Nature (i.e. potentiality, insight and tendency) is not equal in man and woman; as an instance, women enjoy from more powerful potentiality, insight and tendency in comparison to men in the case of making relation with the supreme god, but in terms of the relation with self, men have stronger inherent dimensions. Second: the differences between man and woman hold some significant factors: biological, training, cultural, mental, and functional. In the school of Islam, the biological differences can be accepted but the training, cultural and ethnic ones cannot. It seems that some of psychological differences, which are proposed by the gender-based psychology, cannot be accepted too. Moreover, the reason to obligational and legal differences between man and woman is the type of talents and capabilities allotted to each category and as a result, the different functions of the two categories, which are rooted in their natures.

Introduction:

These days, the sensitivity and importance of the woman-oriented subjects is not covert for anyone. Several various goals in different domains of politics, culture, economy, and etcetera have caused the woman-oriented subjects to be regarded as one of the most important global issues. One of the cases that is so critical in topics related to women and has created a controversy among the feminists and their opponents is the subjects of "Islam's view toward the woman." In order to explain the issue, first we have to deal with the study of the concepts of some terms.

1. **Nature:** In the culture of Islam regarding the insight, the human is theist, regarding the tendency he is deist, and in a word, he is being created as an absolute-seeker, and this is the "nature" and the special creation manner of the human being⁴
2. **Relation:** lexically, the fondness is defined as fixation⁵, and technically, it is a process in which the beginner conveys a message to receiver through a medium and results in an impression or an outcome⁶.
3. **Suggestive definition:** considering that one of the relations in human being is "the relation with self" the relation would be better to be defined as: a process in which a message is conveyed between the two parties with factual differences (relation with others) or credit differences (relation with self)".

During the history, there are many vicissitudes. Henry Bergson, a French philosopher believes that the movement of the history is like the movement of a snail, that is whenever it reaches one side of an extreme, it sets out moving toward the other side of the extreme⁷. With studying the viewpoints of the schools and of former people with respect to woman, to some extent we can understand the historical position of the woman. In an age, the rank and the esteem of the woman was equal to that of domestic animals, instruments or just a tool for satisfying the lust; and even in return for that great amount of intolerable works and labors, she was deprived of the least benefits and rights, and even in some societies she didn't have the right of living; in such a manner that after the death of the husband, the wife shall also have been killed. In semi-savage tribes, they considered her as the creation of devil who lacks the human soul; and for this reason, they knew torturing her as the best deed for the supreme god, and they murdered the girls so that the span of Satan's dominance not to be extended anymore.⁸

In the old western philosophy and in the Islamic doctrine, the case of women has been discussed upon from the aspects of physiological (in natural sciences), ethical (in ethics), political (in politics), family (in family planning) and prosperity and wretchedness (in theology, part of resurrection day), but nothing has been mentioned about it in the domains of ontology (metaphysics). These days, various sciences deal with this subject in different aspects: Biology, Sociobiology, Psychology especially social psychology and criminal psychology and Psychoanalysis, Political sciences, Law, Training Sciences, Theology, Economics, Literature, Art and most of humanitarian sciences.

⁴R.K: AbdollahJavadi, Nature in Koran, P.54-58

⁵HemadJohary, Sehah Al-Loghat, Para "Relevancy" Ali Akbar Dekhoda, Dictionary, Word: Relevance

⁶Julius Gold & William Coeb, Social Science Dictionary, Translated into Farsi by MostfaAzkia and others P.45-47

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⁸Henry Bergson, The two origins of Religion and Ethic, translated by HasanJibi, P.325

Will Durant, History of Civilization, A group of Translators, Volume 2, P.2, YahyaNouri, Laws and Limits of ⁸ woman in Islam.

Since the 17th century, which some gradually doubted in the differences of man and woman, difference scientists put the issues related to woman at the center of their own attention. Primarily, the sciences such as politics, economics, and law emerged which dealt more with objective and humanity issues, and then it was the abstract and philosophical sciences' turn. The first studies were mostly within the domains of value, law, and political issues, in the 20th century the philosophical topics came into existence and talked about the identity of men and women. However, some suggested that the differences between men and women are inherent and intrinsic, while, some others in addition to admitting the differences did not admit it to be inherent; some other people even undermined the axiom of difference.⁹

The gender psychology in west: the modern psychology founded a science of psychology in 1879 in University of Leipzig, which was based on the cognition of the components of the structure of the men adulthood brain awareness. With an alteration from functionalism to behaviorism pattern, more tendency would be made in investigating about the gender differences. In 1989, the womanless psychology¹⁰ was introduced. In the viewpoint of some feminists, Patriarchalis a universal phenomenon and the family is one of the origins of oppression and injustice against the women in the society. Further, the gender equality would be realized only if the patriarchal and family systems are abolished.¹¹

In the school of Islam, the signs of studies related to woman could be found in the Shia and Sunnites Hadith Books. Typically, in such books, some chapters are dedicated to the women, such as Love of women, Plurality of Boon is in Women, Choosing a wife, Proffered Girls, Commanding the Women, Abomination of women consultation, lack of affection toward girl is detestable and.¹² As an instance, SeyedMorteza has published a treatise in relation to the women jurisprudential commands, named The Commands of Women¹³.

Since 15 years ago, Muslim scientists have established a discourse in relation with the equality or the differences between man and woman. In recent decades, due to the rise of Feminism in the western countries and the influence of it on the Islamic communities, the books written about woman has been dedicated a remarkable importance. In works composed by the Muslim thinkers in elaborating the views of Islam with respect to woman, the verses and traditions are used. Moreover, sometimes some other controversial and challenging issues such as blood money, martyrdom, intellection, judgment etc. have been separately studied.

Inefficiency of the feminism theories, which has deemed the patriarchal and family as the basic origin of cruelty and tyranny over women and considers the gender equality as

⁹Mohammad Reza ZibaeiNezhad, Gender Identity and Roles, P.19-43

¹⁰Womanless psychology, 1989

¹¹ShokouhTavabiNezhad, Woman Psychology,, P.19-26, Anthony Giddens, Sociology, P.168-168, AkramKhamseh, "A study on the schemas of gender role and cultural stereotypes in girls students" Woman studies, No.6

¹²Mohammad Ibn Ali Sadough, *Man La Yahzar Al-Faghih*, Volume 3, Page 384, Mohammad IbnYaghoubKoleini, Kafi, Volum 6, page 4; Mohammad Bokhari, *Al-Sahih*, Marriage Book, Chapter 81, Mohammad Taramzi, Al-Sonan, Divorce Book, Chapter 12, Mohammad Ibn Hassan Ameli, Vasaeil Al-Shia, Volume 21, Page 367 and etc.

¹³SeyedMorteza, Rasael Al-Sharif Almorteza, Treatise for Commands of Women.

possible only if the patriarchal and family system is overthrown¹⁴, definitely result in ominous complications such as hostility and conflict between man and woman, lose of ethical values, insecurity in family, degradation and disturbance in the woman's personality, increase of anxieties and mental and psychological abnormalities, disorders in the children educating system and etcetera. In this way, the modern theoreticians of psychoanalysis have taken step toward a revision in psychological dynamics views. Nancy Chodorow, as an instance, within the years 1994-1979, with an emphasis on maternal role of women, states that the primary relation between the mother and her infant, definitely has permanent influences on the growth and development of the personality, and this influence on girls differs from the one on boys. During their development and growth, girls can perform more easily with the help of "self-supposition": because they have formerly assimilated themselves with their mothers.¹⁵

Some of the western women intellectuals, apart from Ms. Chodorow, with the assistance of their nature, sought to revive modesty among the western girls and women and introduced keeping the modesty among women as an art and virtue. Ms. Wendy Shalit is one of the contemporary intellectual women who was born in U.S. and published her first book entitled as "A Return to Modesty: Discovering the Lost Virtue" in 1999, and her second book entitled as "Girls will Return to Modesty" was published in 2007 and was reprinted in 2008¹⁶. The religion of Islam with a comprehensive and profound view to the human being and with relying on monotheistic worldview that is rooted in the nature has a realistic and fair view to the woman, which is beyond the imagination of Feminism. The purpose of this writing is to review the issues related to women from the viewpoint of Islam in the anthropologic model of "quadruple relations" and to exhibit the role of these relations in woman nature efflorescence and development; may it be a step in the way of return of human being into his or her nature.

Resources and Bases of Islam's View toward Woman

In the contemporary world, the subjects of human rights, legal communalities and distinctions, law resources and bases are the most important and controversial day topics, which are analyzed with different religious, politic, economic and other purposes. Some believe that the age of human being task-orientation is over, and the today human being is Fact-based oriented. However, some Muslim intellectuals believe that: in the Islamic school, the divine relation is the nucleus of all the religion principles and other beliefs, and the duties and rights of human beings are formed based on God-orientation. The human being is a fact-based creature, but the true rights of him shall be satisfied through performing the god-commanded duties and revival of social and individual human rights are a necessary factor for his prosperity¹⁷. One of cases, which has warmed up the topics related to women, and has created conflicts between the feminists and their opponents is the subject of woman's rights. The Islamic movement of woman differs in two fundamental points with what happened in the west: first, in the domain of man and woman psychology, Islam has had a miracle, second, Islam while making the women familiar with their human

¹⁴Antony Giddens, Sociology, Page 168-169

¹⁵AkramKhamseh, "Studying the Design of the Lexicons of Gender Role And Cultural Stereotypes in Girl students", Women Studies, No.6 , Page: 117

¹⁶Wendy Shalit and Nancy Lee Demoss, Girls Shall Turn to Modesty, Translated by SamanehModati and Parisa Pour Alamdari, P.12,-17

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rights and giving them personality, character and independence, has never forced them to rebel, disobey and be pessimist against men.¹⁸

Different schools and religions, in order to explain their views enjoy from various "resources" and "Bases". In fact, the divergent views of the schools allude to the two important factors of resources and bases; as a result, it can be said that most of differences between the Islam and other schools and religions are rooted in its resources and bases. In order to elaborate on the view of Islam regarding the woman and her rights, firstly we have to have a look at the bases and resources of Islam in relation to woman:

- 1. Resources of the Islam's View in Relation to Women Issues:** as compilation of the interior regulations of a state requires a unit constitution, also, the topics related to the rights and duties of women, women ethics etc. need overall principles and a common resource. Koran, tradition, intellection, and meetings constitute the resources of beliefs, ethics, and commands of Islam. These religious resources could be categorized at least from two perspectives: Ontology and Epistemology. In the first perspective, some non-Muslim jurists have proposed the norms and principles of human as the law resource, while the law resource must be common between all human beings and must be stable, which means, it must have a uniform and similar message for all people of the world. The common origin that can be regarded as the common point of all human beings is the Divine Nature, which is introduced by the holy Koran as the common origin of all human beings¹⁹. An origin more valuable than the nature is the Revelation. Believing in supreme god and divinely nature for the human is like the rosewater for the flower. From the epistemological viewpoint, the intellection and tradition or in other words, The Book (Koran), the prophet's policy, mind and society are the original resources.²⁰ So, the mystery of communalities and distinctions of the legal (human) and natural personalities of the man and woman must be primarily looked for within the same resources.
- 2. Bases of Islam's Stance:** lexically, base means the foundation on which something is built²¹. Bases are the major foundations and principles which form the groundwork of the regulations²²; for instance, the bidding force of the laws and the base ground of the legal regulations is called the "Legal Base" which is superior and beyond the will of legislator²³. The legal terms are derived from bases and bases are derived from resources. According to this introduction, the women issues in the viewpoint of Islam- such as other subjects- hold special bases. In fact, the two Islamic special components of "worldview" and "anthropology" constitute the bases of Islamic beliefs, ethics and jurisprudence. Topics related to women in Islam have general and special bases:

¹⁸Morteza Motahari, System of Women Rights in Islam, P.76

¹⁹Rome, 30

²⁰Abdollah Javadi, Right & Duty, P.142-145; *Ibid*, Human Rights Philosophy, P.90-92, 105-132

²¹Ali Akbar Dehkhoda, Dictionary, Term: "the Base"

²²Abdullah Javadi, Woman in Mirror of Dignity & Beauty

²³Naser Katoozian, Law Philosophy, Volume 1, P.39-44

2.1. **General Bases:** Bases, which are the groundwork of the Islamic view toward "the man and woman communalities", are called general bases. The types of Islamic worldview and anthropology are the bases of Islamic views:

I. Monotheistic worldview: All schools and religions are based on a type of belief, insight and evaluation about the Existence and on a type of exegesis and analysis from the world. The type of comprehension and ideology which a school has about the cosmos and forms its infrastructure and intellectual fulcrum is technically called Worldview. The Islamic worldview is monotheistic worldview, that means the world is a creature with just one creator and lord, and it is not created in vain and vicious game, and we are all from the supreme god, and to him we shall return. The monotheistic worldview presents the goals and invites the Muslims to follow them, and also specifies some do's and don'ts, rights and duties for the men and women which are in lieu of the necessary and obligatory monotheistic worldview. The Islam's worldview, like all other worldviews, is based on analysis and interpretation of the three basic pivots: Cosmos, Human, and Society.²⁴

II. Islamic Anthropology: Islam considers the human being in three dimensions of Animal, Human and Divine, and sees noticing the human being without considering all these dimensions as a defect in the human being personality. It means that the human being could be cognized in true meaning, and can be talked about his or her issues, only if his or her triple layers are noticed. The animal dimension of the human being is the layer of his or her lust and anger. One with intellection, contemplation, determination, and will is called the Humanistic Self, and the third layer, which is the greatest humanistic self, is in fact, possessed by the supreme god. The real rights of men and women shall be satisfied only if all the three existential dimensions of the human being are included.²⁵

The exterior of most verses of the holy Koran with an emphasis on "human" and without talking about either man or woman predicate on the equality of the human essence and the nature of man and woman. In fact, it indicates the general bases, that is the communalities of the actual and legal personality of the man and woman, such as these verses:

1. We honored the mankind²⁶ ...
2. Indeed, we offered the Trust to the heavens and the earth and the mountains, and they declined to bear it and feared it; but man [undertook to] bear it. Indeed, he was unjust and ignorant²⁷
3. We have certainly created man in the best of stature²⁸

²⁴Morteza Motahari, An introduction to the Islamic Worldview, P.211-73-71-63

²⁵Abdollah Javadi, Right and Duty, P.89, 90, R. K: Mohammad Reza ZibaeiNezhad, An introduction to the system of woman's Virtue System

²⁶Asra, 70

²⁷Ahzab, 72

²⁸Tin, 4

4. Then we made the sperm-drop into a clinging clot, and we made the clot into a lump [of flesh], and we made [from] the lump, bones, and we covered the bones with flesh; then we developed him into another creation. So blessed is Allah, the best of creators.²⁹

5. He has succeeded who purifies his self³⁰

6. "Indeed, I will make upon the earth a successive authority."³¹

Generally, the interpretations such as: O' all people, O' you who believed, O' sons of Adam, Those who believed, O' all human beings, faithful people, Muslims....., all these state the fact that the spiritual dimension in either men and women are equal. From among all verses, the most noble and most important base of human rights-whether man or woman- lies within this divinely word:Indeed, the most noble of you in the sight of Allah is the most righteous of you.³²This verse indicates that there is no criterion other than virtue for being actually superior or inferior, and the virtue does not differ between man and woman.

2.2. Special Bases: The women-oriented issues in the Islamic school, in addition to the general bases and communalities with men, have also special pillars, on which the human communalities of men and women are specifically based. It means that there are some verses and traditions that have affirmed the equality of the human, spiritual and factual personality of men and women, and on the basis of the same "Factual Personality", the foundation of women's "Legal Personality" is also formed. Some verses of the Koran are in fact the crystallization of the special bases of the human rights and of the man and women communalities which shall be categorized in 5 major groups:

1) Verses which by the correct explanation of "Male or Female" present the equality of the human, spiritual and faith dimension among men and women:

1.1. And whoever does righteous deeds, whether male or female, while being a believer - those will enter Paradise and will not be wronged, [even as much as] the speck on a date seed.³³

2. Verses which clearly affirm the sort unity of man and woman and the equality of their human nature:

2.1. O mankind, fear your Lord, who created you from one soul and created from it its mate³⁴

3. Some of the Koranic texts quit clearly put together the faithful and Muslim men and women equally and generally, regarding their human dimension:

3.1. The believing men and believing women are allies of one another³⁵

Verses 72, Tuba; 58 and 73, Ahzab; 19, Mohammad; 5, Fath; 12, Hadid and 10, Brouj have also put together the man and woman regarding the human and faithfulness dimensions.

²⁹Mumenun, 14

³⁰Shams, 9

³¹Baghareh, 30

³²Al-Hujurat, 13

³³Nisa, 124, &Nahl, 97, & Ale- Omran, 195, &Qafer, 40

³⁴Nisa, 1&A'araf, 189, Zomar, 6

³⁵Tuba, 71. Ahzab, 35

Carrel Ernest believes: it is hard to find another sample of the religious authentic texts which deal with the subject of gender as specifically as in verse 35 of AhzabSura.³⁶

4. And the supreme god has brought some examples from those who turned into being kaffir such as the wife of prophet Noah and the wife of Lout.... and also some examples from those who become faithful such as the wife of pharaoh and.... and also has referred to Maryam daughter of Omran.³⁷

It is clearly identified within this verse that in the domain of being kaffir or faithful, a woman could be regarded as a pattern for other men and women, and this, at least, implicates the equality of the two categories in perfections and vices.

5. And live with them in kindness.³⁸

In the AllameTabatabaei's viewpoint, kindness is a kind of practice, which will be recognized by the people whenever they act according to their own nature.³⁹ This verse is a divinely and Koranic principle for the woman's social life⁴⁰ and it is regarded as the base of commands and laws, which relate to woman.

Quadruple Relations of Human Being

Anthropologists, psychologists, sociologists, lawyers etc. each have looked at the subject of relation from their own viewpoint. Before the sciences come into existence, the human being, intrinsically, had noticed the issue of relation and fondness, and "Solitary" has been the most unpleasant nightmare of human. A nightmare, which even now in 21st century is still with him. The human being quadruple relations which include the relation with god, with self, with others and with the natural environment has a historical background in the domain of training and can be traced till the age of Plato (500 B.C.). The Muslim anthropologists introduce the human as a kind of creature, which can be introduced in a four-dimension system, and these four main relations⁴¹ are the origin of growth, development, sublimation, and efflorescence of his nature.

Diagram of the human-beings' quadruple relations on the basis of the nature

Placing the women-oriented issues within the quadruple relations model is an attempt to arrange the different dimensions of issues related to women within an anthropologic system and to indicate the effect of these relations on the efflorescence of the nature, which is the main target, and aim of the prophets. Because the nature of the human holds three dimensions of Proficiency (Talent), Insight (Knowledge) and Tendency (Desire) and the human being's quadruple relations are a tool for the growth and efflorescence of the Nature's dimensions.

The rational and traditional evidences indicate that the relation with god is the main pivot of other relations of human being, and there would not exist any other relations without this main and comprehensive relation, or at least they are different from bonds, which are aimed by the Islam. In fact the relation of human with the supreme god is rooted in the human's

³⁶ Carrel Ernest, Sanity to Mohammad, Translated by KazemKakaei, Page 163

³⁷ Tahrim, 11-12

³⁸ Nisa, 19

³⁹ Mohammad HosseinTabatabaei, Tafseer Al-mizan, Volume 4, Page 18

⁴⁰ Ibid, Volume 8, Page 75

⁴¹ Some consider the human oriented relations as seven and have raised the subjects of relation with society, history, Satan and angels which seems that they can be integrated in to the main four relations (refer to Abdullah Nasri, Human being in Islam, P.349)

nature; in other words in Islamic anthropology the main factors of humanity is seeking for god, willing for god and the ability to know the god which in fact constitute the three dimensions of the human's nature and as it was said in the subject of "resources, general and special bases", men and women have communalities in these dimensions. Nevertheless, due to the fact that the natural affairs can be fortified or weakened, the traditional, philosophical, mystical, social and psychological evidences indicate that women, in some of these natural dimensions, differ from men. Since this writing seeks to present the "essentials" of the woman sketch, the most important of these differences are listed as follows:

- A. Relation with God: within the domain of insight and natural knowledge toward the supreme god, the traditional, psychological, gender-oriented and sociological indications imply that women have a stronger natural theology due to spiritual features such as soul softness, heart health, fear and reverence, love and affection, strong inner vision, weakness of instincts, religion-taking, modesty and...., rather than men do; and within the dimension of tendency which divulges in prayers and task-taking, women have high capabilities. Due to the fact that the natural tendencies are formed on the basis of inner insights, it is ordinary that the women's power of natural knowledge makes them stronger than men within the domain of worship, invocation and task-taking tendencies. From the viewpoint of intellectual potential, since the talents and capabilities underlie the insights, it can be said that the strong theism in women indicate their high potency in this domain.⁴²
- B. Relation with self: within the dimension of insight relation i.e. self-insight, men and women have communalities in three aspects of body, spirit and soul: 1- from the view of differences among the two, the physical distinctions are undeniable, and the chromosome differences can be observed within all body cells of men and women, on the other hand the subject of pregnancy makes a special condition for women and on this basis the most significant physical difference is that women having the experience of pregnancy, taste the life from inside and according to divine knowledge, they find life inside themselves.⁴³ 2- In the spiritual area also, the gender psychologists have distinguished women from men depending on attributes like generosity, sever affections, showing off, chastity and etcetera. Superfluity of women in showing off and displaying themselves can be considered as one of the weak points and causes of injury to the nature of women, but men in this regard are healthier.⁴⁴ 3- In the domain of soul, in which the two aspects of human nature and ration are reviewed, women, regarding the nature, have the divine knowledge and a more powerful insight within the subject of self-insight, and due to their soul health, subtlety, sever

⁴²Refer to Mohyoddin Ibn Arabi, *Al-fotuhah Al-makiyah*, Volume 3, P.87-89; Volume 1, Page 532; Abdullah Javadi, *Woman in Mirror of Dignity & Beauty*, Page 185-223; Gina Lombroso *Woman's spirit*, Volume 1, Volume 2, translated by Pari Hesam; Roger Pierre, *Man and woman Discrepancy Psychology*, translated by Mohammad Hossein Sarvari; Mohammad Majd: *Human within two looks*; Shokouh Navabi Nejad, *Woman psychology*; Mojtaba Hashemi Rakavandi, *Woman psychology*, Chapter 2, Section 3. Mahmoud Behzad, "man and women differences from the physiological and psychological view", *Negin*, No.134, Page 27

⁴³Refer to: *Mohammad Majd "Human within two looks"*, Chapter 3; *Shokouh Navab Nezhad "women psychology"*, P.99-125, John Pierre: "ethical psychology of men and women", translated by Mohammad Hossein Sarvari, P. 68-152; Mohyoddin Arabi: "Alfotouhat Al-makiyeh", Vol. 1, P.53; *Ibid*, Vol. 3, P. 505.; Vol. 2, P. 190, *Ibid*, "Fosous Al-Hekam", *Taligha Abol-Ala Affifi*, P. 325, *Ibid*, Elaborated on by Ibn Tarakeh, Vol. 2, P.940

⁴⁴Gina Lombroso "Woman's spirit", translated by Pari Hesam Vol. 1, P. 4-13, 42-47, 48-49

affections and etc. enjoy from a more profound self-insight rather than men do. But from the view of reason and considering the types of reason, men and women are common in natural reason but different in acquisitive reason, that is, some spiritual attributes in women such as severe excitement and affections, weakness of intellectual faculty, power of guessing and imagination, shortage of social experience, partial cognition of the issues, inconsistency, flexibility and etc. cause women to be less mighty rather than men regarding the acquisitive reason i.e. the theoretical reason, thrift, instrumental reason and social reason, but still they have stronger practical and eschatological reason.⁴⁵

Within the domain of orientation relation i.e. tendency toward the moral virtues and art-loving, the gender psychologists have acknowledged that women are more successful than men, but regarding the competencies that is the ability of self-improvement, men are pioneering; because some spiritual features such as excessive showing off, noticing the ornaments, weakness of theoretical reason, severity of excitements, precipitance and etcetera, usually deprive the women from the opportunity of serious self-improvement.⁴⁶ One of the reasons behind the canonization of the recommendation of jewelry for the husband and necessity of Hijab is to control the nature of showing off in women.⁴⁷

C. Relation with others: within the domain of insight relation, that is within the practical philosophy, which is in fact understanding the goodness of justice and nastiness of cruelty, it is impossible to issue a command in this case without precise investigations about men and women.⁴⁸ However, in the domain of orientation relation that is tendency toward justice, sociology, sociability, and responsibility, there exist some communalities and differences between men and women; that means, within the domain of justice orientations, women due to their spirit of generosity, are more justice seeking. In the orientation of sociability, women are more permeable and follower rather than men, and play special social roles: maternal role and wife role, are two common and different roles of women. Growth psychologists believe in a special training role for mother, on the other hand, the religious texts also, define an especial function for woman as a mother and as a wife. In the responsibility tendency, which is in fact related to the subject of rights and duties, women have been more accountable than men, and each of these two categories, regarding their own talents, has its especial rights and duties.⁴⁹

⁴⁵Refer to: Rita L. Atkinson et.al: "Hilgard's Introduction to Sociology" translated by Mohammad TaghiBerahani et.al, P. 695; Abdullah Javadi, Woman in Mirror of Dignity & Beauty P.264-271, Gina Lombroso "Woman's spirit", translated by PariHesam Vol. 1, P. 25, 26, 85, 91, 103, 104; Mohammad Majd: "Human within two looks" P.105, Roger Pierre: "Man and woman Discrepancy Psychology", translated by Mohammad HosseinSarvari, Chapter 8; AsadollahJamshidi et.al: A query within the woman ontology", P. 135

⁴⁶ Mahmoud Behzad: "Physiological and Psychological Differenced among Men and Women, Negin, No.134, P. 27-29, Roger Pierre, Man and woman Discrepancy Psychology, translated by Mohammad HosseinSarvari, P.92-137-141; Gina Lombroso "Woman's spirit", translated by PariHesam Vol. 1, P.58, 98, 132, 134, 136, 105; Mohammad Majd: "Human within two looks" P. 175-177;

⁴⁷Refer to: Mohammad HoseinHaghJoo: Ostentation and Showing off, P. 17-20; Abbas Rajabi: "Hijab and the role of it in mental health, P. 95, 94, 91.

⁴⁸ Refer to: Abdullah Javadi, Tasnim, Vol. 22, P.347, 350; Abdullah Javadi: "Human to Human Interpreting", P.112

⁴⁹Roger Pierre, Man and woman Discrepancy Psychology, translated by Mohammad HosseinSarvari, Chapters 7-9; Gina Lombroso: Woman's spirit, Volume 1, Translated by PariHesam, P.14-17, Mohammad TaghiSheikhi:

D. Relation with the natural environment: in the subject of insight relation, some spiritual specifications of woman such as: spirit softness, heart health, purity of self, reverence and affection cause women to achieve a more profound and complete insight of the supreme god and his attributes, in relation with natural environment. Within the subject of orientation relation with natural environment, women enjoy from the power of creativity but lack a powerful innovation, but men are more successful in this regard. The sense of curiosity and innovation in women, due to incorrect training, lack of self-improvement, meticulous and... has been deviated and has been utilized in unimportant and daily affairs, which are sometimes destructive. Women in innate tendency toward the art and beauty express abundant appetency but about the "Artistic Creativity", they are in an obvious weakness. In proficiency relation, we can say that, linkage to the natural environment has flourished the creativity potential in women theological and belletristic aspects more.⁵⁰ On the other hand, women, tasting the "life" inside themselves, become a sign of life and find the creation inside themselves by the divine-blessed knowledge, while men acquire this relation through acquisitive knowledge.⁵¹

In short, the nature, biological factors, and the gender psychology findings indicate that man and woman, maintaining the humanity's communalities, hold different roles and duties and as a result unequal rights, and in proportion to their responsibilities and in terms of nature's dimensions have weaknesses and potentialities.

Some points to consider:

- 1- Paying special attention to the subject of "nature" as the infrastructure and cornerstone of the religion of Islam.
- 2- Also, paying attention to resources, bases and principles of Islam, in elaborating the subject of rights and duties of a Muslim woman
- 3- Noticing the nature-oriented training in children and youths from the families and cultural authorities of the state in education and higher education
- 4- Teaching "the gender roles" to boys and girls from elementary school to university through the school books

Social Issues Sociology, P. 138; Paul Henry Mason et.al: "Child's Growth and Personality", Translated by Mahshid Yasaei, P. 476, 488, 518.

Shokouh NavvabiNezhad, Woman Psychology, P.101, 103, Roger Pierre, Man and woman Discrepancy Psychology, translated by Mohammad HosseinSarvari, P. 87-93; Gina Lombroso: Woman's spirit, Volume 1, Translated by PariHesam, P. 114-115

⁵¹ Mohammad TaghiJafari, NahjulBalagheh Translation and Exegesis, Vol.11, P.249- 255- 262- 263

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Orbit Analysis of Newton Iteration Function Associated to Chaotic Functions

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Abstract

We study the behavior of orbits of Newton Iteration Function (**NIF**) associated to chaotic functions and show that these orbits converge to corresponding fixed points of the chaotic functions using Mathematica programming. We also show that the **NIF** associated to quadratic function for positive real parameter values is chaotic on the real line.

Keywords: Orbit, Newton Iteration Function, Convergence, Conjugacy, Chaotic.

1. Introduction

Newton's method was first published in 1685 in *A Treatise of Algebra both Historical and Practical* by John Wallis. In 1690, Joseph Raphson published a simplified description and viewed Newton's method purely as an algebraic method and restricted its use to polynomials, but he describes the method in terms of the successive approximations x_n instead of the more complicated sequence of polynomials used by Newton.

The Newton iteration function $N(x)$ associated to $f(x)$ is defined as

$$N(x) = x - \frac{f(x)}{f'(x)}.$$

In this article, we use this $f(x)$ as Doubling map, Tent map, Logistic map and Quadratic map of the form $Q_c(x) = x^2 + c$ etc. We describe the behavior of orbits of points under $N(x)$ associated to said well-known chaotic maps. The orbits of points under $N(x)$ associated to Doubling map, Tent map, Logistic map and Quadratic map Q_c converge (when $c < 0$ for Q_c), that is, not chaotic. But the orbits of points under $N(x)$ associated to Q_c does not converge for $c > 0$. That is, the orbits of points under $N(x)$ associated to Q_c is chaotic for $c > 0$ [Main Theorem 4.6]. But the situation is different when $c = 0$ [Corollary 4.2].

2. Preliminaries

Definition 2.1: Let $f : \mathbf{R} \rightarrow \mathbf{R}$ be a map. A point x_0 is said to be fixed point if $f(x_0) = x_0$. Note that in general $f^n(x_0) = x_0$. Obviously, the orbit of a fixed point is the constant sequence $x_0, x_0, x_0, \dots, x_0$.

Example 2.2: Let $f(x) = 2x^2 - 2$ be a function. This function has two roots, at $x = \pm 1$. The Newton iteration function associated to f is

$$N(x) = x - \frac{2x^2 - 2}{4x} = \frac{1}{4} \left(2x + \frac{2}{x} \right).$$

The fixed points are solution of the equation $N(x) = x$. So, the fixed points of N are 1 and -1 which are the roots of f . The graphical analysis of N is shown in the following Figure 1.1. The function N has two fixed points at the roots ± 1 of f . The graphical analysis shows that the orbit of any nonzero point under iteration of N converges to one of these fixed points.

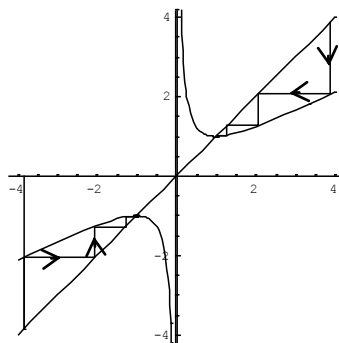


Fig. 1.1 Newton iteration function associated to $f(x) = 2x^2 - 2$

Definition 2.3: A root x_0 of the equation $f(x) = 0$ has multiplicity k if $f^{[k-1]}(x_0) = 0$ but $f^{[k]}(x_0) \neq 0$. Here $f^{[k]}(x_0)$ is the k th derivative of f and $f^{[0]} = f$.

Definition 2.4: If x_0 is a root of f and x_0 has multiplicity k of f and satisfy the equations $f'(x_0) \neq 0$, $N'(x_0) = \frac{k-1}{k} < 1$, then x_0 is an attracting fixed point of N .

Definition 2.5: If x_0 is a root of f and x_0 has multiplicity k of f and satisfy the equations $f'(x_0) \neq 0$, $N'(x_0) = \frac{k-1}{k} > 1$, then x_0 is a repelling fixed point of N .

Definition 2.7: Suppose $F: X \rightarrow X$ and $G: Y \rightarrow Y$ are two dynamical systems. A mapping $h: X \rightarrow Y$ is called a semiconjugacy if it is continuous, onto, at most one-to-one, and satisfies $h \circ F = G \circ h$. Commutative diagram is below:

$$\begin{array}{ccc} X & \xrightarrow{F} & X \\ h \downarrow & & \downarrow h \\ Y & \xrightarrow{G} & Y \end{array}$$

Definition 2.8: Let X be a set. $f: X \rightarrow X$ is said to be chaotic on X if

- C-1. f has sensitive dependence on initial conditions.
- C-2. f is topologically transitive.
- C-3. Periodic points are dense in X . (R. L. Devaney, [02]).

Theorem 2.9: Let (X, f) and (Y, g) are two topological spaces. Then there exists a homeomorphism h such that $h \circ f = g \circ h$. This means if f is chaotic, then g is chaotic on $[0, 1]$.

Proof: To prove this Theorem, we use following Theorem 2.10.

Theorem 2.10: Let X be a compact set and has infinitely many points. If $f: X \rightarrow X$ is transitive and has dense periodic points then f has sensitive dependence on initial conditions. This means, R. L. Devaney's conditions (C-1) and (C-2) imply (C-3).

Proof: The proof of the Theorem is to be found in [01].

Theorem (NFPT) 2.11: Suppose F is a function and N is its associated Newton iteration function. Then x_0 is a root of F of multiplicity k if and only if x_0 is a fixed point of N . Moreover, such a fixed point is always attracting.

Proof: The proof of the Theorem is to be found in [02].

Theorem 2.12: The doubling function D is chaotic on the unit circle.

Proof: The proof of the Theorem is to be found in [02].

3. The Behavior of Orbits of Newton Iteration Function Associated to Doubling Map, Tent Map, Logistic Map, and Cubic Function

3.1 Doubling Map

The Doubling function $D(x) = \begin{cases} 2x & 0 \leq x < 1/2 \\ 2x-1 & 1/2 \leq x < 1 \end{cases}$ is chaotic on $[0,1)$. Obviously, D has two roots 0 and $1/2$ which are on the real line.

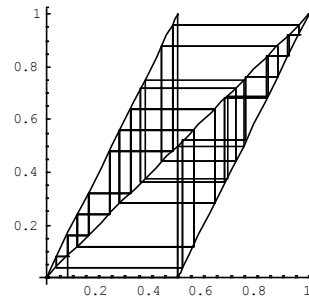
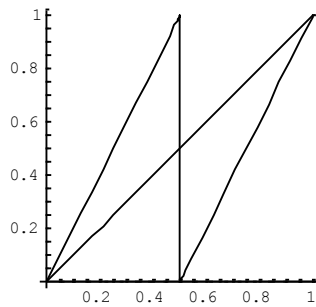


Fig. 3.1 The graph of Doubling Map Fig. 3.2 Chaos in Doubling Map

(1) The Newton iteration function associated to D is $N(x) = x - \frac{2x}{2} = 0$. Note that N has fixed point, at the root 0 of D . We compute $D'(0) = 2$, and we see that $N'(0) = 0$. Thus the fixed point 0 of N is attracting fixed point. Obviously, orbit of any real point under N converges to fixed point 0.

(2) The Newton iteration function associated to D is $N(x) = x - \frac{2x-1}{2} = \frac{1}{2}$. Note that N has fixed point, at the root $1/2$ of D . We compute $D'(1/2) = 2$, and we see that $N'(1/2) = 0$. Thus the fixed point $1/2$ of N is attracting fixed point. Obviously, orbit of any real point under N converges to fixed point $\frac{1}{2}$.

3.2 Tent Map

The Tent Map $\tau(x) = \begin{cases} 2x & 0 \leq x \leq 1/2 \\ 2-2x & 1/2 \leq x \leq 1 \end{cases}$ is chaotic on $[0,1]$. Obviously, τ has two roots 0 and 1 which are on the real line.

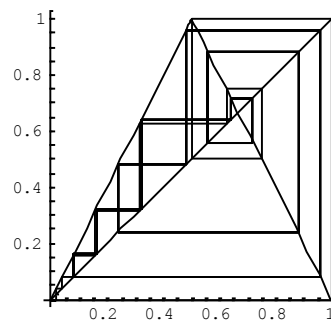
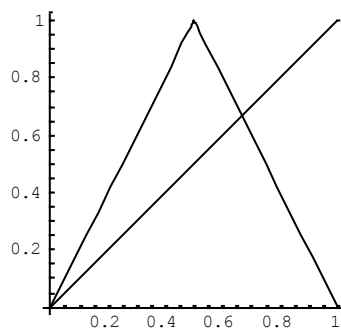


Fig. 3.3 The graph of Tent Map

Fig. 3.4 Chaos in Tent Map

(1) The Newton iteration function associated to τ is $N(x) = x - \frac{2x}{2} = 0$. Note that N has fixed point, at the root 0 of τ . We compute $\tau'(0) = 2$, and we see that $N'(0) = 0$. Thus the fixed point 0 of N is attracting fixed point. Obviously, orbit of any real point under N converges to fixed point 0.

(2) The Newton iteration function associated to τ is $N(x) = x - \frac{2-2x}{-2} = 1$. Note that N has fixed point, at the root 1 of τ . We compute $\tau'(1) = -2$, and we see that $N'(1) = 0$. Thus the fixed point 1 of N is attracting fixed point. Obviously, orbit of any real point under N converges to fixed point 1.

3.3 Logistic Map

Let $f_\lambda(x) = \lambda x(1-x)$, $\lambda \geq 0$ be a logistic function. Obviously, f_λ has two roots 0 and 1 which are on the real line for all real value of λ .

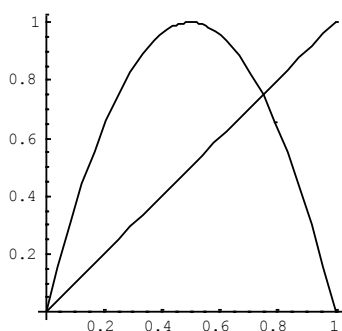


Fig. 4.5 Graph of logistic map when $\lambda = 4$

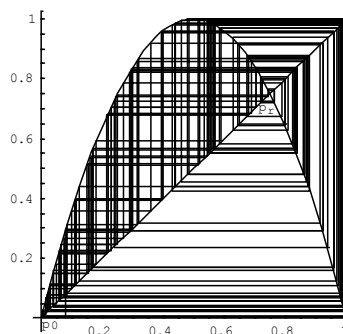


Fig. 4.6 Chaos in logistic map $\lambda = 4$

The Newton iteration function associated to f_λ is $N(x) = x - \frac{\lambda x(1-x)}{\lambda(1-2x)}$. Note that N has two fixed points, at the roots 0, 1 of f_λ . We compute $f'_\lambda(0) = \lambda$, $f'_\lambda(1) = -\lambda$, and we see that $N'(0) = N'(1) = 0$. Thus the fixed points of N are attracting fixed points.

Using the Mathematica programming, we get the following orbits for the point $x = 1.5$ under N converges to the fixed point 1.

$$1.125 \rightarrow 1.0125 \rightarrow 1.00015 \rightarrow 1 \rightarrow 1 \rightarrow 1.$$

We get the following orbits for the point $x = 3.88$ under N converges to the fixed point 1.

$$2.22698 \rightarrow 1.43587 \rightarrow 1.1015 \rightarrow 1.00856 \rightarrow 1.00007 \rightarrow 1 \rightarrow 1 \rightarrow 1.$$

Thus we see that orbit of any positive real point under N converges to one fixed point 1 for all real value of λ but does not converges to fixed points for any negative real point. The graphical analysis of N is shown in the following Fig. 3.7.

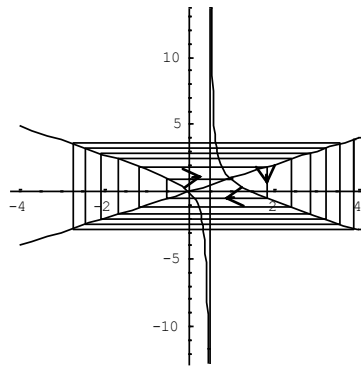


Fig. 3.7 Newton iteration function associated to $f(x) = 4x(1-x)$

3.4 Cubic Function

Let $F(x) = x^3 - 3x$ be a cubic function. Obviously, F has three roots 0, $-\sqrt{3}$ and $\sqrt{3}$ which are on the real line.

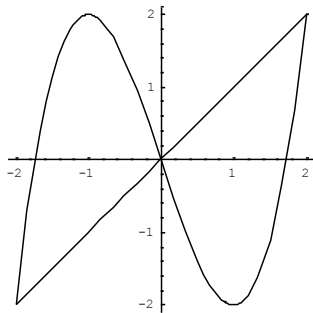


Fig. 3.8 The graph of Cubic function

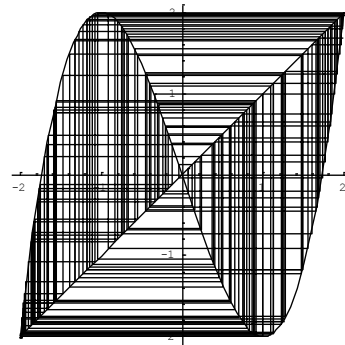


Fig. 3.9 Chaos in Cubic function

The Newton iteration function associated to F is $N(x) = x - \frac{x^3 - 3x}{3x^2 - 3}$. Note that N has three fixed points, at the roots 0, $-\sqrt{3}$ and $\sqrt{3}$. We compute $F'(0) = -3$, $F'(-\sqrt{3}) = 6 = F'(\sqrt{3})$, and we see that $N'(0) = N'(-\sqrt{3}) = N'(\sqrt{3}) = 0$. Thus these fixed points of N are attracting fixed points.

The orbit of any nonzero point under N converges to one of these fixed points. The graphical analysis of N is shown in the following Fig. 3.10.

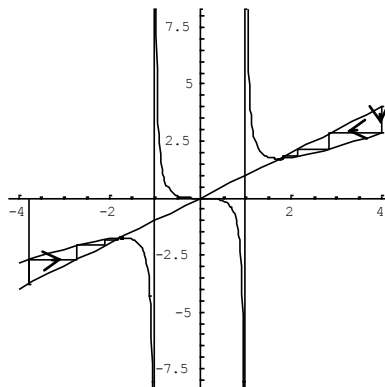


Fig. 3.10 Newton iteration function associated to $F(x) = x^3 - 3x$

4. Main Results

4.1 Orbit Analysis of Newton Iteration Function Associated to Quadratic Functions

To know the behavior of Newton iteration function associated to Quadratic functions (Q_c), we need to know the roots (if exist) of Q_c . As it is known that the exponential and trigonometric functions have no real or imaginary roots, so we do not consider these functions in this case. More exactly, our attention is restricted to those Quadratic functions which have real or imaginary roots.

Consider $Q_c(x) = x^2 + c$, where $c(\neq 0) \in \mathbf{R}$. Obviously, Q_c have no roots on the real line when $c > 0$ but Q_c have two roots on the real line when $c < 0$. The Newton iteration function associated to Q_c is $N(x) = x - \frac{x^2 + c}{2x} = \frac{1}{2}\left(x - \frac{c}{x}\right)$. Here we will analysis of orbit of N which is associated to $Q_c(x) = x^2 + c$ for different values of $c(\neq 0) \in \mathbf{R}$.

(1) If $c=1$, then $Q_c(x) = x^2 + 1$. Obviously, Q_c have no roots on the real line. Then the Newton iteration function associated to Q_c is $N(x) = x - \frac{x^2 + 1}{2x} = \frac{1}{2}\left(x - \frac{1}{x}\right)$. Graphical analysis of N is shown in the Figure 4.1. Typical initial conditions seem to lead to orbits that wander around the real line aimlessly. So we get no convergence to a root, as we expected.

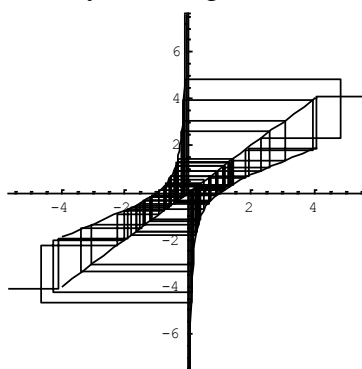


Fig. 4.1 Chaos in Newton iteration function for $f(x) = x^2 + 1$

(2) If $c = -1$, then the roots of Q_c has two roots -1 and 1 which are on the real line. The Newton iteration function associated to Q_c is $N(x) = x - \frac{x^2 - 1}{2x}$. Note that N has two fixed points, at the roots $-1, 1$ of Q_c . We compute $Q'_c(-1) = -2$, $Q'_c(1) = 2$, $Q''_c(-1) = 0 = Q''_c(1)$ and we see that $N'(-1) = 0 = N'(1)$. Thus the fixed points -1 and 1 of N are attracting fixed points, at the roots on real line of Q_c when $c < 0$.

Using the Mathematica programming, we get the following orbit for the point $x=4$ under N converges to the fixed point 1 .

$$2.125 \rightarrow 1.29779 \rightarrow 1.03417 \rightarrow 1 \rightarrow 1 \rightarrow 1.$$

We get the following orbit for the point $x = -3.89$ under N converges to the fixed point -1 .

$$-2.07353 \rightarrow -1.2779 \rightarrow -1.03022 \rightarrow -1.00044 \rightarrow -1 \rightarrow -1 \rightarrow -1.$$

Thus we see that orbit of any nonzero point under N converges to one of these fixed points. The graphical analysis of N is shown in the following Fig. 4.2.

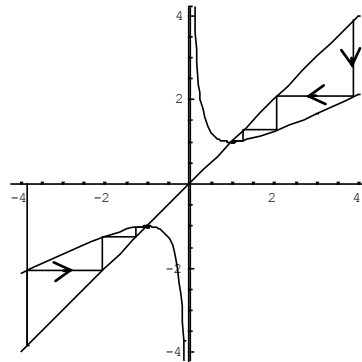


Fig. 4.2 Newton iteration function for $Q_c(x) = x^2 - 1$

(3) If $c = 2$, then the roots of Q_c has two roots $i\sqrt{2}$ and $-i\sqrt{2}$. The Newton iteration function associated to Q_c is $N(x) = x - \frac{x^2 + 2}{2x} = \frac{1}{2}\left(x - \frac{2}{x}\right)$. Note that N has two fixed points, at the roots $\pm i\sqrt{2}$ of Q_c .

Using the Mathematica programming, we get the following orbit for the point $x = 3$ under N does not converge to one of the fixed points.

$$1.66 \rightarrow 0.273 \rightarrow 3.515 \rightarrow 1.473 \rightarrow 0.057 \rightarrow -17.281.$$

The graphical analysis of N is shown in the following Fig. 4.3.

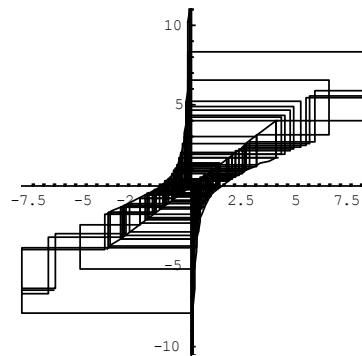


Fig. 4.3 Chaos in Newton iteration function for $Q_c(x) = x^2 + 2$

(4) If $c = -2$, then the roots of Q_c has two roots $\sqrt{2}$ and $-\sqrt{2}$. The Newton iteration function associated to Q_c is $N(x) = x - \frac{x^2 - 2}{2x} = \frac{1}{2}\left(x + \frac{2}{x}\right)$. Note that N has two fixed points, at the roots $\pm\sqrt{2}$ of Q_c . We compute $Q'_c(\sqrt{2}) = 2\sqrt{2}$, $Q'_c(-\sqrt{2}) = -2\sqrt{2}$, but $Q''_c(\sqrt{2}) = 2$. Hence $N'(\sqrt{2}) = 0 = N'(-\sqrt{2})$. Using the Mathematica programming, we get the following orbit for the point $x = 5$ under N converges to the fixed point $\sqrt{2}$.

$$2.7 \rightarrow 1.72037 \rightarrow 1.44146 \rightarrow \sqrt{2} \rightarrow \sqrt{2} \rightarrow \sqrt{2}.$$

We get the following orbit for the point $x = -4$ under N converges to the fixed point $-\sqrt{2}$.

$$-2.25 \rightarrow -1.56944 \rightarrow -1.42189 \rightarrow -\sqrt{2} \rightarrow -\sqrt{2} \rightarrow -\sqrt{2}.$$

Thus we see that orbit of any nonzero point under N converges to one of these fixed points. The graphical analysis of N is shown in the following Fig. 4.4.

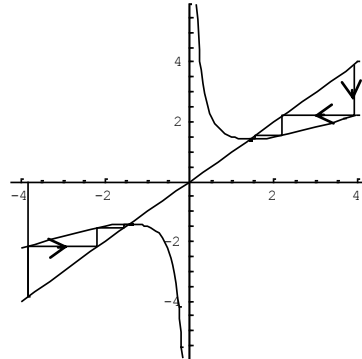


Fig. 4.4 Newton iteration functions for $Q_c(x) = x^2 - 2$.

Remark: The orbit of any nonzero point under Newton iteration function associated to quadratic function $Q_c(x) = x^2 + c$ converges to one of the fixed points of Newton iteration function for the values of $c < 0$ and it does not converge to one of the fixed points for the values of $c > 0$. When $c = 0$, the orbit of Newton iteration function associated to quadratic function $Q_c(x) = x^2 + c$ converges in the following situations.

Corollary 4.2: The Orbit of Newton Iteration Function associated to the function $f_k(x) = x^k$ does not converge to fixed point when $k < 2$ but that converges to fixed point when $k \geq 2$.

Proof: Consider $f_k(x) = x^k$. Obviously, f_k has root 0 which is on the real line for all real value of k . The Newton iteration function associated to f_k is $N(x) = x - \frac{x^k}{k x^{k-1}}$.

(1) If $k = 1/2$, then the function is $f(x) = \sqrt{x}$. The root of f is 0. The Newton iteration function is $N(x) = -x$. Note that N has one fixed point, at the root 0 of f . We observe that the first and second derivatives of f are undefined. Hence, the root 0 has no multiplicity and also $N'(0) = -1$. Thus the fixed point 0 of N is a repelling fixed point. We see that the following orbit of any nonzero point under N does not converge to the fixed point. The graphical analysis of N is shown in the following Fig. 4.5.

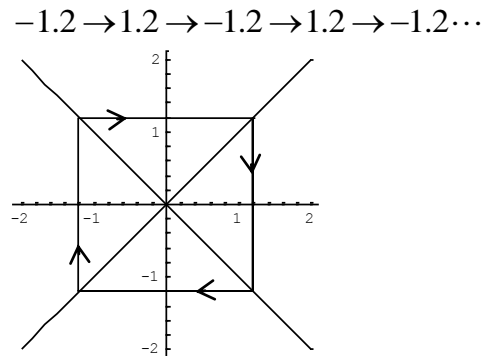


Fig. 4.5 Newton iteration function for $f(x) = \sqrt{x}$

(2) If $k=1/3$, then the function is $f(x) = x^{1/3}$. The root of f is 0. The Newton iteration function is $N(x) = -2x$. Note that N has one fixed point, at the root 0 of f . We observe that the first and second derivatives of f are undefined. Hence, the root 0 has no multiplicity and also $N'(0) = -2$. Thus the fixed point 0 of N is a repelling fixed point. Using Mathematica programming, we see that the following orbit for the nonzero point $x=0.25$ under N does not converge to the fixed point. The graphical analysis of N is shown in the following Fig. 4.6.

$$0.25 \rightarrow -0.50 \rightarrow 1 \rightarrow -2 \rightarrow 4 \rightarrow -8 \dots$$

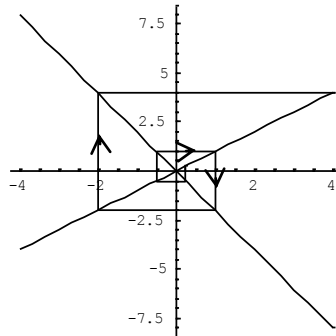


Fig. 4.6 Newton iteration function for $f(x) = x^{1/3}$

(4) If $k = 2$, then the function is $f(x) = x^2$. The root of f is 0. The Newton iteration function is $N(x) = x - \frac{x^2}{2x} = \frac{x}{2}$. Note that N has one fixed point, at the root 0 of f . We compute $f'(0) = 0$, but $f''(0) = 2$, that is, the root 0 has multiplicity 2. Hence $N'(0) = \frac{1}{2} < 1$. Thus the fixed point 0 of N is an attracting fixed point. We see that the orbit of any nonzero point under N converges to the fixed point. The graph of N is displayed in the following Fig. 4.7.

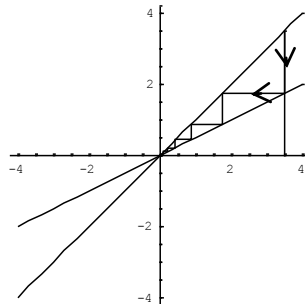


Fig. 4.7 Newton iteration function for $f(x) = x^2$

Remark: From the above observation, the Orbit of any nonzero point under Newton Iteration Function associated to function $f_k(x) = x^k$ does not converge to the fixed point when $0 < k < 2$, but that converges to the fixed point when $k \geq 2$. Hence this completes the proof.

Lemma 4.3 [02]: Let N_f be Newton Iteration Function associated to $f(x) = x^2 + 1$. Then N_f is conjugate to Doubling map.

Corresponding example: The Doubling map is defined as

$$D(x) = \begin{cases} 2x & 0 \leq x < 1/2 \\ 2x-1 & 1/2 \leq x < 1 \end{cases} \quad \text{and let } N_f(x) = x - \frac{x^2+1}{2x} = \frac{1}{2} \left(x - \frac{1}{x} \right) \text{ be Newton}$$

Iteration Function defined on \mathbf{R} . We show that N_f is conjugate to D .

There exists a homeomorphism $h: [0,1) \rightarrow \mathbf{R}$ defined by $h(x) = \cot(\pi x)$. Then we have

$$\begin{aligned} h \circ D(x) &= \cot(\pi \cdot D(x)) = \cot(2\pi x) = \frac{\cos^2(\pi x) - \sin^2(\pi x)}{2 \sin(\pi x) \cos(\pi x)} \\ &= \frac{1}{2} (\cot(\pi x) - \tan(\pi x)) = N_f \circ h(x) \end{aligned}$$

Therefore, N_f is conjugate to D . We have the following commutative diagram:

$$\begin{array}{ccc} [0,1) & \xrightarrow{D} & [0,1) \\ h \downarrow & & \downarrow h \\ \mathbf{R} & \xrightarrow{N_f} & \mathbf{R} \end{array}$$

This completes the proof.

Lemma 4.4: Let N_f be Newton Iteration Function associated to $f(x) = x^2 + 1$. Then N_f is chaotic on \mathbf{R} .

Proof: Given that $f(x) = x^2 + 1$. Then $N_f(x) = x - \frac{x^2+1}{2x} = \frac{1}{2} \left(x - \frac{1}{x} \right)$. By R. L. Devaney D is chaotic on $[0,1]$. By Lemma 4.3 N_f is conjugate to D . By Theorem 2.9 since D is chaotic on $[0,1]$, then N_f is chaotic on \mathbf{R} .

Lemma 4.5: Let N_f and N_{Q_c} be two Newton Iteration Functions associated to $f(x) = x^2 + 1$ and $Q_c(x) = x^2 + c$, $c(\neq 0) \in \mathbf{R}$ respectively. Then there exists a conjugacy h which is defined by $h(x) = \sqrt{c} x$, $c(\neq 0) \in \mathbf{R}$ such that $h \circ N_f = N_{Q_c} \circ h$. This means, N_{Q_c} is conjugate to N_f .

Proof: Here $N_f(x) = x - \frac{x^2+1}{2x} = \frac{1}{2} \left(x - \frac{1}{x} \right)$, $N_{Q_c}(x) = x - \frac{x^2+c}{2x} = \frac{1}{2} \left(x - \frac{c}{x} \right)$, and $h(x) = \sqrt{c} x$, $c(\neq 0) \in \mathbf{R}$. We will show that $h \circ N_f = N_{Q_c} \circ h$.

$$\begin{aligned} \text{Now } h \circ N_f(x) &= h\left(\frac{1}{2} \left(x - \frac{1}{x} \right)\right) = \sqrt{c} \cdot \frac{1}{2} \left(x - \frac{1}{x} \right) = \frac{1}{2} \left(\sqrt{c} x - \frac{\sqrt{c}}{x} \right) = \frac{1}{2} \left(\sqrt{c} x - \frac{c}{\sqrt{c} x} \right) \\ &= N_{Q_c}(\sqrt{c} x) = N_{Q_c} \circ h(x) \end{aligned}$$

Therefore, N_{Q_c} is conjugate to N_f . We have the following commutative diagram:

$$\begin{array}{ccc}
 \mathbf{R} & \xrightarrow{N_f} & \mathbf{R} \\
 h \downarrow & & \downarrow h \\
 \mathbf{R} & \xrightarrow{N_{Q_c}} & \mathbf{R}
 \end{array}$$

Remark: When $c = 0$ in the above conjugacy relation has no meaning and thus we dropped the relation for $c = 0$ from our discussion.

Theorem 4.6[Main Theorem]: Let N_{Q_c} be Newton Iteration Function associated to $Q_c(x) = x^2 + c$, where $c(> 0) \in \mathbf{R}$. Then N_{Q_c} is chaotic on \mathbf{R} .

Proof: It is relevant to mention here that it is difficult to show N_{Q_c} is chaotic in the sense of Devaney. Thus using the idea that we used in Theorem 2.9. By Lemma 4.4, N_f is chaotic on \mathbf{R} . Also by Lemma 4.5, N_{Q_c} is conjugate to N_f . Hence by Theorem 2.9, N_{Q_c} is chaotic on \mathbf{R} .

Conclusion: We have shown that Newton Iteration Function associated to one-dimensional chaotic map converges to one of the fixed points (attracting) and does not converge (not attracting). We have also shown that Newton Iteration Function associated to Q_c , where $c(> 0) \in \mathbf{R}$ is chaotic on the real line. These results may be extended to higher dimensional chaotic maps.

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The Industrial Connections between Singapore, Johor and the Riau Islands, 1870-1940s an Early Type of Growth Triangle

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Abstract

This paper analyses the industrial development in Singapore, Johor and the Riau Islands between 1870 and 1940s. The result shows that, a modern manufacturing sector had already been established in Singapore in the late colonial period, whereas industrial development in Johor and the Riau Islands lagged behind. The industries in Singapore were to a large extent created as a result of backward and forward linkages based on the raw materials from Johor and the Riau Islands. These linkages indicated a strong industrial connection between Singapore and the other two created by all ethnic groups, notably the Europeans and the Chinese. Their mutual industrial connection formed the basis of present regional cooperation project: the SIJORI Growth Triangle.

Keywords: Industry, Connection, Growth Triangle

1. Introduction

Southeast Asia after achieving independence has been considered a place with changing dynamics, such as strengthened foreign relations, reduced intra-regional tensions and enhanced domestic security. Although there have still remained local insurgencies, political disagreements and ideological divergences, much progress in regional economic cooperation and integration has been made by the Southeast Asian nations (Leung, 2012). The achievement was further encouraged and signified in 1989, when the then deputy prime minister of Singapore, Goh Chok Tong, announced the establishment of SIJORI Growth Triangle (Singapore-Johor-Riau Growth Triangle). This highly expected proposal also attracted interests from other regions, thus when more Malaysian and Indonesian states joined the grouping, a Memorandum of Understanding (MOU) was signed on 17 December 1994 to extend SIJORI to be IMS-GT (Indonesia-Malaysia-Singapore Growth Triangle).

Rather than a new idea, the formation of these regional connections and cooperation is historically rooted. The three involved regions used to be incorporated in a unified sultanate in the seventeenth and eighteenth century – the Johor Empire (Andaya, 1971), which was dissolved by the Europeans in the late eighteenth century, resulting in the formation of three different polities in the nineteenth century under colonial influence: Singapore, the State of Johor and Riau Residency. Such a political separation, however, could not cut off the socio-economic ties within the triangle, which were created by Chinese activities in the form of *kongsis*, opium farming, gambir and pepper plantations particularly in the nineteenth century prior to the influx of Western capital (Colombijn, 1997; Trocki, 1990). Aside from the study of these visible, legal and formal connections, there are also scholars focusing on the invisible, illegal and informal aspects – piracy and smuggling. Ota Atsushi depicts how pirates in these areas established and operated their military and commercial networks, and how the Europeans and locals dealt with piracy (Ota, 2010; Rosenberg, 2011). More systematic research of such a regional illegal network has been done by Tagliacozzo (Tagliacozzo, 2005; Tagliacozzo & Chang, 2011). He has described the smuggling across the long boundary between Dutch and British possessions in insular Southeast Asia, the interplay between the colonial state project of boundary building and the transgressive project of smuggling, and the relationship between borders and contraband (Gainsborough, 2009).

In general, these studies can be characterized as having a strong focus on the period before the twentieth century as the scale of European activities and economy were still limited. In addition, most of the research is highly socially and political oriented rather than applying an economic perspective. Also, concerning regional ethnic groups, more attention is paid to the Chinese without taking into consideration, for instance, the Europeans and the Malays. These untouched points result in a gap to fill in, especially concerning the regional economic connections after 1870 when Europeans replaced Chinese in terms economic significance in the late colonial period. This study brings the analysis to the 1940s before the Japanese Occupation completely destroyed the colonial pattern.

Therefore, this study focuses on the industrial aspects within the triangle between 1870 and 1940s to answer the research question: Which paths of regional economic connections emerged as indicated industrial development? The result of the analysis also tries to react the argument of regional “draining economy” or “colonial drain”, especially in Indonesia, as criticized by many scholars, notably Thee Kian Wee, who discussed regional trade pattern of vent-for-surplus and argued limited creation of backward and forward linkages in the producing areas (Thee, 1989).

This study focuses on following category of industries: agroprocessing industry, mining, forestry production and supporting industries based on the consultancy of government annual reports and other official and unofficial publications.

2. Agroprocessing industry

A common and traditional definition of agroprocessing industry refers to the subset of manufacturing that processes raw materials and intermediate products derived from the primary sector (Food and Agriculture Organization of the United Nations, 1985). Considering the relative importance of different agricultural products, main attention in this study is paid to the processing industry of commercial agriculture and food production. According to the period of their emergence and scale, they are distinguished as early establishments and modern industries.

2.1 Traditional establishments

The embryo of regional industries came from the treatment of gambir. Except for traditional use as an ingredient of betel drug, gambir was also processed in the form of small cubical or round cakes to meet the demand from Western leather industries, resulting in the establishment of tanning, dyeing and brewing industries in Singapore in the course of the nineteenth century (Colombijn, 1997). In 1889, there were 40 dyers and 20 tannery establishments in the city to process gambir which was mainly supplied by Johor and the Riau Islands. A few other processing industries, such as copra, sago and oil manufactories, were also set up based on products from the other two regions, but on a smaller scale (Table 1). With very few exceptions, these factories were privately owned by Chinese with extensive connections with businesses scattered throughout British Malaya and the Netherlands Indies (SYB, 1947). The establishment of these industries and the expansion of expansion of plantations were founded on large labour inputs and hard work rather than skills and capital. This resulted in a large increase of immigration and rapid population growth, which in turn required the establishment of food production manufacturing, which was mainly operated by European firms.

Very few industries were actually owned by Chinese. In Singapore in 1889, they only possessed 5 food production industries: Chua Lum (rice mill), Low Juan (sago manufactory), Ang Say Beng (sago manufactory), Wee Bin (sago manufacturing), Wee Guan Ho (sago manufacturing). There was also a Ho Ho Biscuit Factory founded by Chew Boon Lay later in the 1890s (STDS, 1891 and 1907). Compared to Europeans, the Chinese capitalists had a disadvantaged position in terms of number and size of their firms. Faced with various problems, these small-scale Chinese factories were vulnerable to external disturbances. Among these Chinese factories, there was only one, Ang Say Beng was still in operation up to 1907.

Due to fierce European competition in Singapore, Chinese capitalists invested their capital more in Johor and the Riau Islands. Both numbers and scale were much smaller than in Singapore. In Johor, the earliest notable enterprise was the Malacca Rubber and Tapioca Company, formed in 1898 by a syndicate of Chinese, Tan Chay Yan, who in the same year showed samples of rubber at the Malacca Exhibition (Drabble, 1973, p. 21). Some other industries included sago processing and fisheries. In the Riau Islands, Chinese capital was found in the agroprocessing industries of lime-kilns, sago-rasp and sago-wash. Although the processing industries of copra, sago, rice and other food production industries were not comparable to modern and heavy industries in terms of capital, technology and output, they still played a supplementary role in regional economic development.

Table 1: Agroprocessing industries and manufacturing in Singapore in 1889.

Category	Name	Number (1889)
Commercial agricultural processing	Dyers	40
	Tannery establishments	20
Food production	Bread and Biscuit Manufactories	13
	Oil manufactories	8
	Ice manufactories	2
	Mills-flour	1
	Mills-rice cleaning	22
	Mills-sago	11
	Soda water manufactories	5
Engineering and foundries		8
Brick-making Establishments		4
Potteries		6
Printing establishments		8
Soap manufactories		21
Dock and shipping repair companies		2
Telegraphy companies		2
Telephone companies		1
Gas companies		1

Source: STDS, 1889; CSAR, 1947.

2.2 Modern industries

In the twentieth century, industrial development was characterized by expansion of existing industries and the creation of new enterprises. Especially the emergence of plantation of rubber and pineapple required the establishment of rubber processing industries and cannery and preservation factories. The rise of these establishments formed the foundation of modern agroprocessing.

(1) Rubber processing

In connection with the preparation of rubber, the creaming process for concentrating latex was worked on a commercial scale (JAR, 1932). The creaming process for concentrating latex was encouraged in connection with preparation of rubber which received a booming development since the 1910s. These industries were worked on a commercial scale on estates in Singapore financed not only by European merchant houses but also by Chinese smallholders supported by their *chops* (small groceries).

Later on, they were also established in Johor and the Riau Islands but in limited numbers. In 1932, there were two revertex plants and a large central factory using centrifugal concentrators working in the state of Johor. One of them was the Lee Rubber Company, founded by a Singaporean Chinese, Lee Kong Chian. Starting as the Lee Smoke House in

Muar, Lee Rubber gradually became the largest Chinese rubber processing manufactory in Johor. These Chinese industries in Johor were not only involved in planting but also in rubber processing, export, and trade. They were diversified spontaneously by the establishment of tapioca processing, pineapples canning, small ice factories, aerated water plants, engineering workshops, printing-works, beer distilleries, brickworks, china clay, jelutong, plywood, etc. (JAR, 1933). The establishment of these industries was more limited in the Riau Islands where in the early 1900s there were only 4 European factories established, including Galang Noembing, Kepala-Djeri, Kelong, which employed Javanese contract labour and aimed at producing rubber and copra (MvO, 1908).

(2) Cannery

Pineapple cannery was another light industry carried out mainly by Chinese estates and smallholders because of the low requirements in technology and capital. According to an article on the pineapple preserving industry in Singapore in 1908 by E. de Kruff, the industry was not favoured by European capitalists, although Singapore took the lion's share of the preserved pineapple export trade. Almost all the factories were in Chinese hands. European hesitation in cannery was probably due to following reasons:

1. Speculation in the product. Owing to lack of working capital, the packers must sell their product at once, and they cannot wait for a more favourable market. At the auctions in London and Liverpool, speculators manipulated the price with disastrous results to the Chinese preservers, who work with insufficient capital.
2. The advance system. By receiving advances in money and in raw materials, such as tinplate, the preservers were at the mercy of exporters.
3. Want of capital. This represents the employment of machinery to secure important saving in manual labour (Song, 1923, p. 428).

According to the news posted by The Straits Time on 4 January 1902, some Chinese business firms were also engaged in the sale of pineapple preserving machines, implying the emergence of cannery industry. The first Chinese cannery in Singapore was initiated by Seah Eu Chin and his son Seah Liang Seah under their *Chop* Chin Choon and *Chop* Chin Giap. Later, Tan Taw Hee had built up a flourishing tinned pineapple factory under the *Chop* Tek Watt. The fruit was obtained from Tanjung Pinggi and Pulu Batam, until its cultivation was superseded by rubber (Song, 1923, p. 429). In 1906, 16 factories in Singapore produced 707,943 cases (36 toms = 1 case) of preserved pineapples, which would represent an average daily output of 4,500 tins from each factory. In 1936, there were still 13 factories employing more than 15,000 Chinese labourers (CO273/620/14: Labour Disputes in Malaya).

Such Chinese business was also extended to Johor in 1924. The best known was the Lee Pineapple Company. It was a landmark in Skudai that used to be heralded to passers-by by the distinct pong of canning waster. The Lee Pineapple Company is also the only surviving cannery today (Lim, 2009, p. 34). The harvested fruits were usually transported by bicycle from the collecting point to the roadside. All the fruits by the smallholders were sold to the canneries through organizations or individuals authorized by the Malayan Pineapple Industry board. There were pineapple marketing cooperatives, farmers associations and licensed pineapple dealers. The private dealers or vendors were more popular because of their long acquaintance, prompt payment and availability of lorry transports. The private dealers (as marketing agents) transported the fruits from the road side to the canneries.

(3) Palm Oil industry

The first European palm oil industry in Johor, the Elaeis Estate Factory, was set up by Tungku Mahkota in August 1929 using hydraulic presses (JAR, 1930). In the following

decades, the palm oil industry underwent rapid development. In 1933, another two estates lay down light railway systems, one of them allowing truck transport direct from factory to port. On Ulu Remis estates the Sultan opened a spacious factory fitted with a Stork Expression Plant capable of dealing with the output from 8,000 acres of palms (JAR, 1933). Nevertheless, palm oil industry did become predominant until the implementation of government's diversification policies in Malaysia in the 1950s.

3. Mining

Rich mineral deposits formed an asset which next to commercial agriculture attracted much capital. Overseas Chinese had been engaged in the small-scale tin mining in Malaya since the eighteenth century by using traditional washing methods. The arrival of Europeans and their method of dredging – a capital-intensive method – improved the productivity of mining. Up to the early twentieth century, European production accounted for about two-thirds of Malaya's output (Kratoska, 1998). Many of these Western mining companies were registered in Singapore. In 1891, there were three engaged in the mining in Malay Peninsula: Jebeu Mining and Trading Company, Mahlembu Mining Company, Raub Australian Syndicate. In 1907, the total number of mining companies increased to 15, representing a rapid increase of European capital investment. The majority of tin ore was transported to Singapore for smelting. In 1891, there was one tin smelter located at Pulau Brani, off Singapore. The Straits Trading Company's new smelter at Butterworth in the Federation of Malaya treated part of the ore formerly sent to Singapore (CSAR, 1956).

Although tin ore was also found in Johor near the Kota Tinggi district on the alluvial plain of Johor river, extending to the slopes of the mountains Panti and Mentahak, these mining sites did not attract much European capital. The tin deposit in Johor was not as rich as in Pahang, and Johor was a place that European methods could not possibly be introduced due to their demand for large capital (Lake, 1894, pp. 281-297). In the early twentieth century, there were only two European mining companies conducting business there: Royal Johore Tin Mining Company, registered in Singapore, and Tengkil Tin Syndicate registered in Johor. In 1932, another Pelepah Tin Dredging Company, which was the only dredging technology applied in Johor.

On the local side, although Malays had been mining tin for centuries, their activities were carried out on a smaller scale, and Malays played little part in the new mining industry. Some Chinese mining industries were set up here, yielding good return by using labour-intensive hydraulic and gravel pump method (Lake, 1894, pp. 281-297). These Chinese capitalists, however, were completely Singapore-based. The first tin mining in Johor was set up by Mr. Seah Cheng Joo, younger son of Seah Chiam Yeow. Since 1915 he had been engaged in tin mining at Mersing with Seah Eng Kiat. Another Chinese, Tan Kim Wah born in Singapore in 1875, went to Johor to try his fortune at the tin mines in the early twentieth century. Under prospecting licences, he worked both in Johor and Siamese States for a number of years. In 1914, his partner J. C. Robertson, while tracing a footpath at Ulu Jemluang, Johor, came across some rich tin land in Ulu Jemluang valley. Eventually he secured a mining concession from the colonial government. A number of other Chinese tin mining businesses, such as Hap Liong Company formed by Tan Wi Yan, Sim Cheng Mia, J. C. Robertson, and E. Fong Seng, Wong Siew Yuen and the Ulu Jemluang Tin Mines had both been worked since with great success (Song, 1923, pp. 355, 519). From 1910 onwards, deposits of alluvial tin were worked in the neighbourhood of both the Johor and Muar rivers and further deposits were believed to exist in the Endau valley but up to then no extensive fields had been located there (JAR, 1910). In 1920, some reported pointed out the existence of oil and coal, but no serious attempts had yet been undertaken to explore these sites (JAR, 1910). The following

decade saw a decline of Chinese tin industry as a result of its incapacity to compete with modern technology and equipment (Ng, 1976, p. 38). Other mining industries worked in small scale. In addition, there were also other industries of clay, gold washing and wolfram productions running in the time run showing a strong Chinese influence (JAR, 1925).

More extensive mining exploration took place in Johor from the 1920s by the Japanese who showed a great interest in the production of iron and bauxite ore (Kratoska, 1998, p. 20). Concerning iron ore mining, it was initiated by Japanese Haematite (Iron-Ore) Mine at Bukit Medan. In 1932, a new company was set up by Chinese on the Sedili River in this year. The 1940s was seen more Japanese business: Sri Medan Mine, Batu Pahat; Iizuka Mine, Endau. However, Sri Medan Mine was closed down during the Japanese occupation, partly owing to lack of ore resources and also because the machinery was required for mining bauxite. Compared to iron, bauxite was much richer in Johor. It was also initiated by the Japanese in 1936 at Batu Pahat. In 1938, another unit was opened at Kim Kim by a Chinese miner. The development of the mining industry in Johor is apparent from the labour force employed (Table 2): the 1930s can be regarded by a golden age of mining in Johor.

Table 2. Labour force in mining in Johor, 1931-1966.

	Iron	Tin	Gold	Bauxite	China clay	Total
	1228	1707				
1931						
1932	956	871	50		5	1882
1936	2143	2072	32	55	2	4304
1937	1875	2426		209	18	4538
1938	1597	1847	22	742		4208

Source: JAR, 1931-1941.

In the Riau Islands, the Chinese population was also engaged in tin mining, but most of them were wage-earning labourers rather than capitalists. The large investments in tin mining were from European capital (Ng, 1976, p. 38). Here mining industry was operated by *Singkep Tin Maatschappij* (The Singkep Tin Company), which obtained the only concession from the Sultan for the mining industry in Singkep (1899, 8 pits in Dabo and 7 pits in Raija). In the early twentieth century, the company also extended its business to Karimun and Pulau Kundur to exploit tin (MvO, 1908). Even though, the volume of tin smelted was insignificant. From July 1904 to June 1905, Singkep Tin Company produced 6,007 piculs tin, 632 piculs came from the company in Kedah (Malacca). In the 1920s, explorations were conducted in the Riau Islands for tin ore deposits. The spread of tin ores in Bintan and Batam was much wider than expected. Various other minerals were also found in the vicinities, also in Nutuna Islands. Production of tin in 1920 amounted to 11,648 Straits piculs. Production of tin in 1920 amounted to 11648 Straits piculs and the average labour force was 646 men, all Chinese (KV, 1922, pp. 322-327). In 1933, it was bought up by the Billiton Company, which had engaged in tin exploitation on the like-named island since 1860 by virtue of a government concession (KV, 1905, pp. 277-278). In the late 1903s, the *Nederlands-Indische Bauxiet Maatschappij* (Dutch East India Bauxite Company) started exploiting bauxite from its concession in Bintan (Touwen, 1997, p. 90).

The tin ore was delivered by the ships of the company to Banka first, from where it was traded to Singapore. Compared with Johor, production from the Riau Islands was rather limited. Nevertheless, it did suggest a connection with Singapore and this area.

4. Long existing forest production

One regional agricultural production with a non-Western character but with some economic importance was forestry, locally referred to as panglong industry, a timber-exploitation concern run by Chinese engaged in beam-cutting mills, sawmills, firewood mills, and charcoal-burning plants. Panglong enterprises spread from the Riau archipelago along the east coast of Sumatra and to the small islands off North Sumatra and Sumatra's east Coast, especially on the Bintan group and Karimun Island around Singapore as far back as the mid-nineteenth century. In the 1890s, many of these islands were deforested after three decades of exploration (Cator, 1936, pp. 217-218; Erman, 1994). Nevertheless, in the Riau Islands, both numbers and output were still on a significant scale (Table 3).

Table 3. Wood industry in Riau Residency in the early twentieth century.

	Beams	Firewood	charcoal
Indragiri		8	
Karimun	3		29 (75 ovens)
Kateman	16	4	
Tanjung Pinang			95 (182 ovens)
Lingga	3		64 (118 ovens)
Bengkalis	65	33	72 (200 ovens)

Sources: Cator, 1936, pp. 217-220.

In Johor, a cursory inspection suggested that the Johor forests were exceptionally rich in valuable timber, if they were properly cared for (JAR, 1910). Most timber from Johor was exported, while some sawn softwood plants were imported from adjacent Sumatra (including the Riau Islands). All the timber enterprises were founded by Chinese, which shows the close relationship with the Riau Islands. These Chinese, like those in the Riau Islands, were also Singapore-based. One of them was Lee Keng Liat, who owned business both in the Straits Settlements and Johor, established the only saw-mill factory in Muar, the Muar Steam Saw Mills. A Western factory also existed temporarily, the Johor Steam Saw Mills Company, set up by European timber merchants (STDS, 1891, pp. 293-294). In the Riau-Lingga archipelago, as well as in Inragiri, Bangka, and Bengkalis, Chinese *tauke* from Singapore exploited the forest, paying export duties on the wood and taxes on charcoal-burning facilities and labour (Touwen, 1997, p. 91).

The timber was not only for local production and consumption, but also for charcoal manufacturing and saw-mills in Singapore ship-building yards, and furniture-factories in Singapore owned by Chinese capitalists (Cator, 1936, p. 218). After being sawn in beams locally, the timber was sent to large saw-mills in Singapore by vessels either owned or hired by panglong-holders. In Singapore, the timber was sawn to planks before being sent to Hong Kong, Mauritius, China, Thailand and the Netherlands Indies. In 1889, there were 103 charcoal

factories and 7 saw-mills on the island, all owned by Chinese (Ng, 1976, p. 38). Attributed to the slump of the demand for sawn timber and the uneconomic production, there were only 30 sawn mills still in operation in Singapore in the 1940s, and several more were expected to close down (SYB, 1947). Nevertheless, industries engaged in forest product processing maintained their important position in the local economy

There is no doubt that the timber was all sent to Singapore instead of being processed locally or exported to somewhere else. Most Chinese panglong-holders were seated in Singapore. These Chinese capitalists and their working capital resided in Singapore where they received a license from the authorities for establishing a panglong. Personnel was recruited by panglong-owners in Singapore and sent out to the panglongs. Money and provisions were sent out from Singapore, in proportion to the amount of timber received. Labour conflicts were not rare, since the *tauke*'s representative in Singapore often seemed far from friendly. It was this system that made many panglong-holders ignorant of the wretched conditions prevailing at the panglongs. Part of the timber output was sent to saw-mills in Johor, creating the only significant connection between Johor and the Riau Islands.

5. Supporting industries

Investment of capital in the services sector reflected forward linkages facilitating the export trade (Drake, 2004, p. 46). In the triangle, this category of industries arose in Singapore, including docking facilities, shipping repair companies, telegraph companies, gas companies and engine manufactories. Together with the development of agriculture and mining, these industries were diversified and extended to Johor and the Riau Islands. If capital invested in these industries in the colonial period showed a certain dependence on Singapore, the post-war development was different and more focused on the specific region.

In Singapore, Pioneer European ventures started with very limited number and sorts, but underwent rapid growth in the following decades as a result of the agricultural expansion. In 1889, there were 53 manufacturing plants in Singapore, covering many branches. They represented large-scale capital investments and formed the mainstream of industrial development. Singapore Gas Company was founded with a capital of £ 100,000, in 20,000 shares of £ 25 each, 13 official staff in 1891.

The development of these European manufactories is indicated by the increasing number of personnel they employed and the expansion of new branches in other regions (Table 4). In general, the development of manufacturing in Singapore was rather limited in the colonial period. All factories were in the hands of Westerners.

Table 4. Growth of European manufacturings in Singapore, in 1891 and 1907.

	1891	1907
Tanjong Pagar Dock Company	70 official staff. 2 docks. 1 machine shop and 1 blacksmiths' shop. 3 wharves.	126 official staff and clerks. Departments of wharf, traffic, water service, coal, dockyard and workshop, engineer, etc.
The Eastern Extension Australasia and China Telegraph Company	57 official staff. Offices in Penang, Singapore, and Malacca.	113 official staff. Offices in Penang, Singapore, and Malacca.

Oriental Telephone Company	16 official staff.	19 official staff. Branches in 14 places in Asia. Local Offices & Exchanges – “Telephone House” in Johor.
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Source: STDS, 1891 and 1907.

Limited industries were also set up in Johor where the Chinese played a considerable part. The bulk of local manufacturing (soap, motor tyres, rubber footwear, pineapple canning) was in Chinese hands. Steadily through the years the Chinese became the leading economic factor, at first as labourers, followed in more recent by ownership and direction of industry and to an important extent also in financing trading operation (Beale, 1929, p. 4). At the same time, the prosperity of plantation and mining industries generated large volumes of profit known as the “export surplus,” which caused Johor and colonial governments to attract capital back to this land. As D. G. Campbell, General Advisor to the Johor Government, 1911, planned that, a systematic expenditure was considered in the development of means of communication to render vast areas of fertile land accessible and convenient for Singapore. Favourable terms should ensure that much Singapore capital which hitherto was sent further afield would come to Johor. The slight progress was made in the codification and publication of the laws in English had done much to establish the confidence of foreign capitalists (JAR, 1910). Generally, during the colonial period, adherence by the British Colonial Government to the “vent for surplus” export policy hindered the development of an industrial sector in the country. This was also the case in Johor (Othman & Fong, 1982, p. 220).

By the beginning of the twentieth century it could be said that the whole Indonesian archipelago had been put under effective Dutch control, offering a favourable environment for the operation of a full-fledged and lucrative colonial economy with an infrastructure required to facilitate production and exports of primary commodities. In addition, limited direct capital transfers took place, not to finance expansions, but to keep the export industries viable. It is likely that supporting industries were rather lacking in the Riau Islands. These limited industries, did not lay the basis for sustained economic growth and successful transformation into a more diversified economy. The expansion of primary exports during this period was generally initiated and undertaken by Dutch and other Western enterprises, in which the Indonesian population only participated as lesser of land and unskilled workers. It was therefore not surprising that at independence in 1945, there was a widespread desire on the part of the Indonesian people to “convert the colonial economy into a national economy.” (Thee, 1989, pp. 4, 8, 18).

6. Conclusion

It has been argued that there was a limited development of manufacturing sector during the colonial period due to colonial policy of draining economy. However, considering the three regions a whole unit, commercial agriculture and mining products from Johor and the Riau Islands fostered the creation of backward and forward linkages and the formation and expansion of the manufacturing sector in Singapore, although these industries were limited in sort and scale. When industries developed to a certain extent in Singapore, many of them were also extended to Johor and the Riau Islands financed by capital from Singapore. Nevertheless, there was also a difference between Johor and the Riau Islands. Industrial development in Johor was more advanced and diversified than in the Riau Islands, indicating a much stronger connection between Singapore and Johor and Singapore and the Riau Islands.

Generally, all ethnic groups participated in the formation of regional economies – in which Chinese and Indian labour under European and Chinese capital, and indigenous

smallholders played a great part. Regional capital networks showed a cooperation between all three ethnic groups. Europeans held a leading position in manufacturing development in the colonial period in Singapore. Their dominance, however, met with great competition from the Chinese in Johor and the Riau Islands, whereas Malays, especially Malay smallholders were absent in this picture. Another power, Japanese also played an important part, particularly in mining in Johor and machinery manufactures in the Riau Islands.

Determined by the character of these ethnic groups, the regional economic connections showed certain dynamics. The Europeans and Japanese were regarded as international factors connecting this region to the international market. The Chinese, on the other hand, engaged more in the creation and maintaining of a regional network. Based on Singapore, many of them set up plantations and industries both in Johor and the Riau Islands. Therefore, the colonial period was characterized by both strong international connections and strong regional connections. The indigenous business class had considerable political influence, but they lacked a solid capitalist foundation, business culture, and skills. It was a weak bourgeoisie (Robison, 1986, p. 13). Therefore, the intensive industrial activities of Westerners and Chinese indicate strong connections both outward and internally, it was the Chinese capital and capitalists connected Singapore-Johor-the Riau Islands together, whereas the European capital and capitalists brought regional capital network to the world market.

Back to the present SIJORI Growth Triangle, current feature shows so many similarities with colonial pattern, such as Singapore's leading position but a weak development in the Riau Islands, strong connections between Singapore and the other two but weak connections between Johor and the Riau Islands, the economic predominance of the Europeans and the Chinese rather than the ethnic Malay, etc. From the perspective of path dependence, this study suggests that the re-establishment of regional connections lies in the recovery of European and Chinese economic and social initiatives as a continuation of existed colonial pattern. Some effort in this direction has been made, but not enough. For instance, although the Riau Islands since 1995 was characterized by increasing population mobility, the influx of population was as a result of inter-provincial migrants rather than foreign migrants (Suryadinata, 2009, pp. 34-35). it would be rather regrettable if these non-Malay ethnic groups could not receive stimuli from the government. Since the economy today is stirring priorities toward the communication of social (Stejskal & Hajek, 2012). Moreover, historical evidence also shows that there has been a growing Japanese importance in the triangle area since the nineteenth century. Regional economic cooperation should not only rely on Singapore, instead, the Japanese seems to be a third alternative. A pattern of harmonious multi-ethnic diversity can thus contribute not only to political balancing mechanism, but also to social stability and mobility, and economic diversity (Sasse, 2010).

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JAR	Johor Annual Report (1910-1942)
KV	<i>Koloniaal Verslag</i> (1870-190)
MvO	<i>Memories van Overgave</i> (1903, 1908)
STDS	The STRAITS Times Directory of Singapore (1889, 1891, 1907, 1908)
SYB	Singapore Year Book (1949-1966)

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Exclusionary practices against HIV positive persons in the workplace in Nigeria: Implications for social work practice.

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Abstract

The paper assessed the level and manifestations of HIV-related discrimination in the workplace in Nigeria. A purposive sample of 150 people living with HIV/AIDS (PLHIV) was interviewed in three states of Nigeria using a structured interview schedule from 11th March 2004 to 4th April 2004. This was complemented by focus group discussions. Out of the 150 PLHIV, 80 had worked. Of these 80, 16% were rejected, restricted from sharing toilets, canteens and sports facilities (36%) and (13%) respectively. 48% lost their jobs, threatened with dismissal (16%). Job duties were changed for 26%. About 10% lost prospects for promotion and 40% were excluded from insurance schemes. More women than men experienced these stigmatising and discriminating acts. In Nigeria, Anti discrimination policy was launched in 2002 and there is an anti-discrimination protection in section 42 of the Constitution. It is a common knowledge that many organisations have adopted the policy yet the discrimination continues unabated. The organisations only pay a lip service to it. In view of this, therefore, massive HIV/AIDS education and enlightenment campaigns should be organised. ILO, anti-discriminatory laws and CEDAW should be enforced

Key words: Discrimination, HIV positive persons, Nigeria, stigmatisation, workplace

1.0 Introduction

Globally, 35.3 million people were living with HIV at the end of 2012 (UNAIDS, 2013) although the burden of the epidemic varied considerably between countries and regions. Sub-Saharan Africa remains most severely affected accounting for 71% of the people living with HIV worldwide. Epidemiological trends show that the number of newly infected people in 2012 (2.3 million) was 33% lower than in 2001 and that there were steep declines in some national epidemics (UNAIDS, 2013) especially in Sub-Saharan Africa. Despite these gains, sub-Saharan Africa accounted for 70% of the adults and children newly infected in 2012, underscoring the importance of continuing and strengthening HIV prevention efforts in the region.

Since the first AIDS case was diagnosed in 1986 in Nigeria, the prevalence rate has increased unhindered from 1.8% in 1991 to 5.8% in 2001 (Federal Ministry of Health (FMOH), 2010). Between 2001 and 2010, the prevalence rates have been fluctuating between 4.4% in 2005, 4.6% in 2008 and 4.1% in 2010 (FMOH, 2010). These varied from 1.0% in Kebbi State to 12.7% in Benue State.

It has been established that PLHIV not only suffer the health consequences of the disease they are also excluded from social activities or from participating in public functions either in the communities, families, workplaces or in the healthcare facilities. Reports have shown that PLHIV in Nigeria have experienced various forms of exclusionary practices such as mandatory HIV testing, barriers to employment and housing, access to medical treatment and care, to education, health insurance scheme, names reporting, partners notification and breach of confidentiality in various institutions particularly in the workplace (Anarfi, 1995; Iwuagwu et al 2001, 2003; Akparanta – Emenogu, 2002; Durojaiye, 2003; Adirieje, 2003; Udom, 2004; Nwanna, 2011). According to data collected through the People Living with HIV Stigma Index, 29% of people living with HIV in Nigeria reported that they lost their jobs or incomes on the grounds of HIV status (UNAIDS, 2012).

These exclusionary practices translate into discrimination which is widely acknowledged as a key obstacle to successful care and prevention throughout the world. Discrimination translates into human rights violation. Negative attitudes and beliefs can also increase internalised self-stigma, guilt, shame and alienation felt by PLHIV (UNAIDS, 2012). This can lead to denial, continued adoption of a lifestyle that puts others at risk, continued under-reporting of the epidemic and a resistance to the use of voluntary confidential counselling and testing services.

Empirical studies necessary to develop an understanding of the ways in which exclusionary practices are manifested in the workplace are limited. Against this background, the study set out to assess the level and manifestations of exclusionary practices in the workplace in Nigeria. The questions begging for answers are: what is the extent of exclusionary practices against PLHIV in the workplace in Nigeria? In what forms do they manifest? This paper seeks to unravel these questions.

2.0 Earlier studies

There is limited empirical evidence on the exclusionary practices against PLHIV in the workplace in Nigeria. However, few of the available ones will be reviewed here. In Nigeria, exclusionary practices in the workplace manifest mainly in the loss of employment. They are pervasive. Akparanta – Emenogu (2002) and Durojaiye (2003) reported that a man was denied admission into the Nigerian Naval Training College, Onne, Port Harcourt, on account of his HIV status despite being successful at the recruitment test. According to the man's narration, he was admitted into the navy as a squadron leader and was then sent to Calabar for

assignments. During the period a medical test was conducted without his knowledge of the reason of the test. He was later informed that he was HIV+ and was subsequently denied employment.

In another instance, Adirieje (2003) and Iwuagwu et al (2001) reported that in 1995, a nurse filed a suit in court against her employer, a private hospital, for dismissing her on the grounds of her HIV status. She alleged that she was tested for HIV virus without her knowledge and consent. Following the suit, a high court judge also withdrew from it in 2001 because the judge feared the plaintiff was a health hazard. The Nigeria Police demoted a Nigeria policewoman living with HIV/AIDS when her HIV status was revealed to the public by a media house without her consent (Iwuagwu et al., 2003).

Iwuagwu et al (2001; 2003) conducted a national study to document the pattern of exclusionary practices against PLHIV in Nigeria. Three states namely Lagos, Kano and Onitsha were studied using focus group discussions (FGDs) that involved 53 PLHIV. They found that an auxiliary nurse's appointment was terminated because of her HIV status. She had worked for five years in the hospital and became pregnant. She developed some boils that led to a laboratory test by the employer. The result of the test showed that she was HIV positive and she was instantly dismissed because the management felt they could not afford to put the staff and patients at risk. And when she lost the pregnancy, the hospital refused to evacuate her uterus of the product of conception because the hospital management reasoned that they could not afford to contaminate the theatre.

Udom (2004) reported that a receptionist in a hotel, a woman was dismissed by her employer after she was diagnosed HIV+ so as not to '*spread the fruit of her waywardness to other members of staff and clients*'. Not only did the employer call her names and terminate her appointment, the employer also called receptionist's aunt and informed her about the result of the HIV test. The receptionist was subsequently evicted from her aunt's home. Why should people living with HIV/AIDS be excluded or isolated by their colleagues and employers? Social identity theory will attempt to explain that in the next section.

3.0 Theoretical anchorage

The theoretical premise of this work is social identity theory (SIT) developed by Tajfel and Turner in 1979 (cited in Foster and Potgieter, 1995). The central thesis of social identity theory is that members of an in-group seek to find negative aspects of an out-group, thus enhancing their self-image. The perception of people in terms of categories or groups on the basis of criteria has relevance to the classifier. People have the ability of seeing themselves as the norm for how a person is supposed to be, others are therefore not normal and easier to discriminate. The in-group members create a series of binary identifications: the good and the bad, the normal and the deviant, morality and immorality. They perceive themselves as superior and the others as profoundly inferior. Through this process of binary creation, they therefore exclude or isolate the members of the out-group. For example, in the work place, HIV-negative colleagues and employers will see themselves as the normal or healthy people while seeing their HIV-positive colleagues and employees respectively as the abnormal ones and therefore exclude them from using facilities in the work place. Similarly, colleagues and employers who use ways of transmission as a classifying criterion will have strong argument that those who lead a promiscuous life deserve to be HIV-positive but feel pity for those who are infected through blood transfusion. This theory explains why colleagues and employers exclude PLHIV from participating in some social activities and use of official facilities particularly when they do not have full knowledge of the modes of transmission and prevention of HIV infection.

4.0 Methods

4.1 Study settings

This was an urban-based cross-sectional survey conducted in three out of six geopolitical zones of Nigeria: North Central, South East and South West zones. A state was chosen from each zone based on the HIV prevalence rates. As at the time of the study, HIV prevalence rate in Benue (North Central zone) was 16.8%, Enugu (South East zone) – 4.7% and Lagos (South West zone) -6.7% (NIMR, 2000). The survey was conducted in the state capitals namely Makurdi, Enugu and Lagos metropolis.

Benue State

Benue state lies in the Middle belt Region of the country, astride the Benue River. The state has a population of 4,253,641 people (Federal Republic of Nigeria (FGN), 2009) who are popularly farmers and of different ethnic groups mainly Tiv, Idoma and Igede. It has an agrarian economy interspersed by a few industries. The larger population of the state can be found in the rural areas. The urban areas are populated mostly by civil servants, retired and serving army and police officers, a few “nouveau rich” politicians, and traders of southern (mainly of southern eastern origin). Due to its high prevalence rate, there are about 31 screening centres, and 6 anti-retro viral (ARV) centres.

Enugu State

Enugu State is one of the five states in the South – East zone of Nigeria. The other four States are Abia, Ebonyi, Anambra and Imo. The advent of colonial rule saw Enugu town as the seat of government as it became the capital of the then East Central State and it is mainly occupied by civil servants. Enugu State has a total population of 3,267,837 (FGN, 2009). There are 48 Government owned hospitals and clinics, 3 ARV centres and 4 screening centres.

Lagos State

Lagos state is located on the south western part of Nigeria on the narrow coastal plain of the Bight of Benin. According to the 2006 census, the state has a population of 9,113,605 (FGN, 2009) but the State Bureau of Statistics estimates that its current population stands at just over 20 million and an annual growth rate of 3.2% per annum (Lagos State Government (LSG), 2013). Until 1991, Lagos was the capital and the nerve centre of Federal Republic of Nigeria. As a cosmopolitan city, Lagos has a mix of people from all ethnic, religious, social and economic backgrounds. It has a good concentration of both public and private hospitals, 3 health facilities providing ARV, 15 voluntary counselling and testing (VCT) centres and 5 screening centres.

Each of these states described above enjoys the presence of both the State Action Committee on AIDS (SACA) and the Local Action Committee on AIDS (LACA).

4.2 Data collection and analysis

Purposive and accidental sampling techniques were adopted to select 150 respondents (50 per state). The study was guided by the principle of Greater Involvement of People Living with AIDS (GIPA) therefore two PLHIV from each state were recruited as research assistants (RAs). A comprehensive capacity enhancement workshop for them took place between the 1st and 5th of March, 2004. Data were collected using a structured interview schedule complemented with focus group discussions. Four FGDs were conducted involving 29 PLHIV. In Enugu and Benue states, two focus group discussions (FGDs) (one per state) were conducted comprising 9 persons, with a minimum of 4 women. On the contrary, in Lagos state,

two FGDs were held separately for each gender. At the end of the fieldwork the data were cleaned, coded and transcribed into the computer for processing. Data were analyzed by the use of Statistical Package for Social Sciences (SPSS). The outputs were interpreted using qualitative, quantitative and comparative analyses.

Five corporate and two government organisations were also selected for interview to assess the knowledge and attitudes of employers and colleagues towards PLHIV. This was futile because all the organisations declined. They also had no HIV policy at the time of the study although one of the organisations was in the verge of having one.

5.0 Findings

5.1 Socio-demographic profile of respondents

Socio-demographic characteristics of PLHIV show that 83 (55%) respondents were women and 67 men (45%) (See table 1 below). Ages of the respondents ranged from 11 to 57 years with a mean age of 34.5 years. Majority of the respondents were aged 30 to 39 years. Almost One-third of the PLHIV were never married/cohabiting (32%). About 44% of the respondents were married. Twenty respondents (13%) were widowed. Most of the respondents had secondary education (47%) and post secondary education (34%). Respondents' occupations revealed that civil servants formed 23% and professionals (12%). Traders constituted 14%. Nine of the female respondents (10%) were housewives. Two out of three commercial sex workers were women. More than one-third of the respondents received less than N10,000 (equivalent of \$58.8 @ N170 per \$1 as at 30th January 2013) per month. An additional 19% had no income.

Table 1: Distribution of respondents' profile

Lagos			Benue		Enugu		Total	
		%	N	%	N	%	N	%
Sex								
Male	2	44	26	52	19	38	67	44.7
Female	8	56	24	48	31	62	83	55.3
Total	10	100	50	100	50	100	150	100
Age							N=150	%
10-19							5	3.3
20-29							41	27.3
30-39							57	38.0
40-49							35	23.3
50+							7	4.7
Missing							5	3.3
Mean age =34.5								
Marital status							N=150	%
Never Married/cohabiting							48	32.0
Married							66	44.0
Divorced/Separated							16	10.7
Widow							20	13.3
Educational status							N=150	%

None	4	2.7
Primary	17	11.3
Junior Secondary	15	10.0
Senior Secondary/Polytechnic	55	36.7
University/ polytechnic	51	34.0
Others	2	1.3
Missing	6	4.0
Occupation	N=150	%
Unemployment/house wife	21	14.0
Student/ Pupil	15	10.0
Artisan/apprentice	13	8.7
Trader/business person	33	22.0
Civil Servant	34	22.7
Professional Person	18	12.0
Farmer	2	1.3
Commercial Sex worker	3	2.0
Others	2	1.3
Missing	7	4.7
Income	N=150	%
Less than 10, 000	54	35.3
#10,001-#20,000	34	22.7
#20,001-30,000	13	8.7
#30,001-40,000	6	4.0
#40,001 and above	12	8.0
None	26	19.3
Missing	6	4.0

5.2 Exclusionary practices within the workplace

To be able to assess the level and patterns of exclusionary practices, it is paramount to know the number of PLHIV who had worked, their organisations, the length of service, if the HIV + status was disclosed to the organisations and if so, how they reacted. In Table 2, are the sectors in which the respondents worked or were still working at the time of the study. Out of 150 respondents, 80 PLHIV consisting of 38 women and 42 men had worked or were still working as at the time of the study. Among these, 41% and 40% were working in organised private sector and public sector respectively. About 9% were employed in government parastatals while 4% of them were employed in the informal sector. Five respondents, i.e. 6% worked with multinational organisations. A good proportion of women (45%) were civil servants as against 36% men. More men than women, 45% and 10% worked within the organized private sector and with multinational organisation respectively where remunerations were usually higher than other public and informal sectors. For the length of service, many of the respondents (38%) had worked for less than 5 years while 25% had worked for their organisations between 10 and 14 years. About 8% had put in 20 years or more in their places of work.

Table 2: Distribution of respondents' organizations and length of service

Respondents' Organizations	Male		Female		Total	
	N	%	N	%	N	%
Civil Service	15	35.7	17	44.7	32	40.0
Parastatals	4	9.5	3	7.9	7	8.7
Organized Private Sector	19	45.2	14	36.8	33	41.1
Informal Sector	-	-	3	7.9	3	3.7
Multi-National	4	9.5	1	2.6	5	6.3
Total	42	100	38	100	80	100
Length of Service						
Less than five years	11	26.2	19	50.0	30	37.5
5-9yrs	11	26.2	6	15.8	17	21.3
10-14yrs	12	28.6	8	21.1	20	25.0
15-19yrs	3	7.1	1	2.6	4	5.0
20+	3	7.1	3	7.8	6	7.5
Missing	2	4.8	-	-	2	2.5
Total	42	100	38	100	80	100

Among those who had worked, 31 admitted that their places of work knew about their sero-positive status. Out of these 31, majority pointed out that they did not disclose their status to their managements. About 10% of the 31 respondents could not tell who informed their employers and colleagues. Hospital (13%), other relations (10%), colleagues (7%) and friends (7%) notified PLHIV's organizations about the respondents' sero-positivity. As these sources of information were unauthorized, their gossips tantamount to a breach of privacy.

The respondents were asked to describe the reactions of their employers and colleagues when they learnt about the HIV status. Table 3 below highlights the reactions which ranged from rejection (16%), sympathy 16% to empathy 3%. Only 10% of the respondents were accepted without prejudice while one-quarter of the PLHIV indifferent reactions from their colleagues and employers.

Table 3: Initial Reaction of Organizations to PLWHA

Initial reactions	N	%
Sympathy	5	16.1
Disbelief	1	3.2
Sadness	5	16.1
Indifferent	8	25.8
Shocked	2	6.5
Empathy	1	3.2
Rejection	5	16.1
Acceptance	3	9.7
Missing	1	3.2
Total	31	100

Twenty-one out of the 80 PLHIV who had worked were found to have actually stopped work (see Table 4 below). Out of these 21 respondents, 48% lost their jobs. Among these were termination (19%) which constituted only women, discrimination (10%), self-stigma and ill-health (10%) each, 33% retired from their jobs i.e. men (57%) and women (21%). Other respondents mentioned reasons like relocation of residence. Their decisions might have been informed by discrimination in the workplace and neighbourhoods. One female PLHIV stopped work because of pregnancy. When one considers the percentage that stopped work it then becomes obvious that there is a high level of exclusionary practices in the workplace.

About 13% of those PLHIV who worked admitted that their workplaces had insurance scheme for staff but two-fifth of them were excluded from policy cover (see Table 4 below). Majority of those affected were women (75%).

In Table 4 below, 36% of the 31 respondents whose status was disclosed in the workplace were excluded from using toilets and canteens with other workers. Gender analysis indicated that more women (38%) than men (33%) experienced this exclusion. One male PLHIV was isolated in a separate office on the grounds of his HIV status while 7% of the respondents were restricted to certain areas within their premises of the organisations. In situations where employers knew about the status of the PLWHA, Table 4 above shows that 16% of the PLHIV reported that they had received threats of termination of appointments because of their status. There were more women (19%) than men (13%) in this category. Almost one in ten PLHIV had experienced deployment to other departments or units on the grounds of their HIV status. However, one of those in this category acknowledged that the change was to enable him/her be engaged in stress free tasks. One-quarter of the respondents complained that their duties were changed. More women than men experienced this. About 10% of the respondents were denied prospects for promotions on account of their HIV status as demonstrated in Table 4 above. More men than women experienced deployment to other units and loss of promotion prospects.

Table 4: Exclusionary practices against the people living with HIV and AIDS

For all those who had ever worked	Male		Female		Total	
Ever stopped working?						
YES	7	16.7	14	36.8	21	26.2
NO	35	83.3	24	63.2	59	73.8
TOTAL	42	100	38	100	80	100
Reasons for stopping work						
Dismissed because of HIV	-	-	4	28.6	4	19.0
Because of discrimination	1	14.3	1	7.1	2	9.5
Retirement	4	57.1	3	21.4	7	33.3
Because of ill health	-	-	2	14.3	2	9.5
Because of self stigma	1	14.3	1	7.1	2	9.5
Others	1	14.3	3	21.4	4	19.0
Total	7	100	14	100	21	100
Any insurance scheme in your organization?						
YES	6	14.3	4	10.5	10	12.5
NO	31	73.8	32	84.2	63	78.8
MISSING	5	11.9	2	5.3	7	8.7
TOTAL	42	100	38	100	80	100
(For those whose employers were aware of their HIV+ status)						

Allowed to participate in insurance scheme?	Male		Female		Total	
YES	5	83.3	1	25.0	6	60.0
NO	1	16.7	3	75.0	4	40.0
TOTAL	6	100	4	100	10	100
Allowed to share organization's facilities (toilet, canteen etc.)	Male		Female		Total	
YES	10	66.7	10	62.5	20	64.5
NO	5	33.3	6	37.5	11	35.5
TOTAL	15	100	16	100	31	100
Ever been denied access to sports facilities?						
YES	2	13.3	2	12.5	4	12.9
NO	13	86.7	14	87.5	27	87.1
TOTAL	15	100	16	100	31	100
Total	7	100	14	100	21	100
Ever been threatened with dismissal by employer on grounds of HIV status?						
YES	2	13.3	3	18.7	5	16.1
NO	13	86.7	13	81.3	26	83.9
TOTAL	15	100	16	100	31	100
Ever been deployed to another department because of HIV status?						
YES	2	13.3	1	6.3	3	9.7
NO	13	86.7	15	93.7	28	90.3
TOTAL	15	100	16	100	31	100
Duties ever been changed because of HIV status?						
YES	3	20.0	5	31.3	8	25.8
NO	12	80.0	11	68.7	23	74.2
TOTAL	15	100	16	100	31	100
Ever been denied promotion on account of HIV status?						
YES	2	13.3	1	6.3	3	9.7
NO	13	86.7	15	93.7	28	90.3
TOTAL	15	100	16	100	31	100

The findings from the survey were confirmed by the FGD findings. In fact, the major problems facing PLWHA as identified by FGD participants were unfair dismissal from work and mandatory pre-employment HIV tests. One of the female PLWHA in Lagos reported during the FGDs that she was denied employment because of her HIV status. She had after passing all qualifying tests and the final interview and was only disqualified after she had submitted to the mandatory medical tests. Although she was not informed by the company, she realised this after prevarications and the silence that followed her enquiries from the company. In her words:

I want to start from entrance (entry) level when the employer wants to screen new staff coming in. The problem is that, it will not be known to the individual recipients of the test that they are going to carry out HIV test on them, but they will tell you that they are only carrying out baseline test and it could range from blood count to genotype as well and they will carry out HIV test. If you are negative, you will be absorbed in the company without knowing what you have gone through and if you are found positive probably they will tell you

that you did not meet up with the employment requirement and it will not be in any record that an HIV test had been conducted. You will not be able to make a case anyway; I mean there is no proof that you were dropped because of your HIV status. I think I am facing that right now. I don't know. They are yet to decide. You know I told you I had finished the interviews and I'm just left with the pre-employment medical test, and I know I do my best at all times, I know am healthy, if not for HIV test, and I've been going there, in fact, when you called me, I was supposed to go there. They said my results are not ready, that the lab person is trying to reconcile my test result and my person. And I have been asking for the detail of test and he kept telling me everything is fine. I have been asking and he said no HIV test was carried out. He then asked for another repeat of whatever they did, that he wanted to be sure. I am just waiting, my case may just be a test run, but I guess they are trying to be careful, and those are the cases of so many people. They come out there and they will never know their status. They will be asked to go back into the labour market, whereas it is just an issue of discrimination or exclusion. Although for other staff they may not be opportune to test them except if they report sick in the clinic. Otherwise everybody hides under pretence that none of their staff is HIV positive.

Denial of employment to PLWHA only undermines any strategic response to the challenges posed by the epidemic because the disease itself increases significantly the burden of the cost of living for individuals.

6.0 Discussion and policy implications

The results of the study indicated that PLWHA experienced discrimination at work in form of segregation and isolation in separate offices and many reported that they were not allowed to share toilets, canteens and sports facilities with other workers. The findings were not different from those of focus group discussions (FGDs). In fact the major problems expressed by the discussants were dismissal and mandatory pre-employment HIV tests. One of the PLHIV in Lagos state reported during the FGDs that she was denied employment because of her HIV status after passing all qualifying tests and the final interview. This does not augur well for the pandemic, for the PLHIV need their jobs and money to be able to cope with life. HIV/AIDS by its very nature impoverishes the PLHIV due to its protracted nature, its high management cost and the fact that it particularly affects the economically active groups in the society. Therefore adequate measures should be put in place to check these stigmatising and discriminatory acts. Government should undertake the reform of labour laws to make them responsive to the challenges of HIV/AIDS and effectively guarantee to PLHIV the right to work, protection against unfair dismissal and other employment-related rights.

It was reported that some PLHIV were excluded from participating in insurance scheme. One probable reason for this is that insurance companies generally regard PLHIV as high risk insured for them because it is deemed that the HIV-infection significantly increases the risk of early liability which does not augur well for their business which can only be mediated by increased premium payment to be borne by the prospective insured. Majority of those affected were women (75%). It is not clear how gender and designation in the organisations intersected with HIV/AIDS status to increase women's vulnerability in this respect. The implication of these findings is that many organisations have not yet formulated HIV/AIDS policies to protect the PLHIV employees from exclusion and consequently stigma and discrimination.

The study indicated that some PLHIV received threats of termination of appointments because of their status. More women than men were affected. It was unclear whether threats of termination had come on the basis of the HIV status *simpliciter* or whether it was because HIV status occasioned lower level of performance occasioned by frequent illnesses, general fatigue or emotional effects of demoralisation from awareness of HIV status.

Apparently, HIV/AIDS interventions at the respondents' workplace were minimal, particularly among indigenous companies, therefore there is need for organizational/institutional employers to adopt and implement appropriate workplace policies.

All the findings suggest that there is a high level of exclusionary practices in the workplace which in turn leads to stigmatisation and discrimination. Stigmatisation and discrimination are manifestations of fear of contracting HIV and total ignorance about the modes of transmission and prevention of HIV/AIDS. Therefore, massive HIV/AIDS education and enlightenment campaigns should be organized for the workplace in particular and general population. International Labour Organization (ILO) has a guideline on workplace practice for PLHIV. It needs to be turned into proper legislation for Nigeria and applied as a policy in the workplace.

Stigmatisation and discrimination subsequently translate into violation of human rights of PLHIV to work. The right to work ensures that individuals have access to work without any discrimination. There are international instruments and some provisions of the Nigerian Constitution which guarantee the rights of people to work but they are not fully enforced. With regards to this right, the Universal Declaration of Human Rights (UDHR) in Article 23, section 1 provides that '*everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment*'. Art. 15 of African Charter on Human and Peoples Rights (ACHPR) *inter-alia* states that '*every individual shall have the right to work under equitable and satisfactory condition*'.

Article 7 of International Covenant on Economic, Social and Cultural Rights (ICESCR) also guarantees safe and healthy working conditions and equal opportunity to be promoted without discrimination. With respect to discrimination, Article 2 of African Charter on Human and Peoples Rights (ACHPR), Article 7 of Universal Declaration of Human Rights (UDHR) and section 42 of 1999 Constitution of Nigeria guarantee the right to freedom from discrimination. The findings also run contrary to the following provisions: Art.20 (1) of UDHR, Art.9 (1) and Art.22 (1) of International Covenant on Civil and Political Rights (ICCPR), Art.10 (1) of ACHPR and Sec. 40 of 1999 constitution which state that *everyone has the right to free association*, therefore isolating PLWHA in separate offices violates their rights to freedom of association. According to Articles 13 (1) of UDHR, 12 (1) of ICCPR, 12 (1) of ACHPR and Section 41 (1) of 1999 Constitution, everybody has the right to freedom of movement.

The findings also suggest that women are more vulnerable to HIV-related stigma and discrimination than men. Apart from provisions of CEDAW, Art.18 (3) of ACHPR also enjoins the State to ensure the elimination of all forms of discrimination against women. Therefore provisions of CEDAW and Art.18 (3) of ACHPR should be fully enforced.

The 2003 National Policy on HIV/AIDS ensures that the rights of PLHIV are protected by prohibiting stigma and discrimination against people living with HIV/AIDS on the basis of their health status with respect to employment, education, training etc. The policy also enjoins people to respect the rights to privacy and confidentiality of PLHIV and avoid disseminating information on the HIV status of individuals without their consent. Furthermore, the policy states that mandatory HIV testing without consent is illegal. This policy is yet to be fully

enforced and many people including employers are unaware of it. Therefore, government should expedite action in educating the populace especially in the workplace. Employers should be encouraged to have policies on HIV/AIDS for their employees.

Finally, capacity building workshop should be organized for the PLHIV to sensitize and empower them to litigate and seek redress when they experience any form of stigma or discrimination from their employers and colleagues.

Implications of the exclusionary practices against PLHIV for social work practice in Nigeria

The major challenge for Nigerian social workers is that the profession is not yet recognized in Nigeria and therefore they do not do anything to defend or protect the rights of the PLHIV. Social workers are supposed to be committed to social justice and human rights yet they are not visible therefore the following are recommended:

- Social workers should lobby for the formulation of antidiscrimination laws and the increase in funding for AIDS education, treatment, and prevention.
- They should educate and empower PLHIV to litigate when faced with discrimination.
- Social workers should not practice, condone, facilitate, or collaborate with any form of exclusion.
- They should dispel the myths and stereotypes about HIV/AIDS through massive HIV education.
- Provide accurate information to employers and colleagues about the modes of transmission and prevention.

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HUMAN RIGHTS LEGISLATIONS

African Charter on Human and Peoples Rights (ACHPR)

Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)

ILO Code of Good Practice on HIV/AIDS

International Covenant on Civil and Political Rights (ICCPR)

International Covenant on Economic, Social and Cultural Rights (ICESCR)

Universal Declaration of Human Rights (UDHR)

1999 Constitution of the Federal Republic of Nigeria

2003 National Policy on HIV/AIDS

Diagnosis and Management of Egg Yolk Peritonitis in Commercial Layer Chicken in Zaria, Nigeria.

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Abstract

Normal egg formation is a reliable indicator of a bird's health status. This study reports on egg peritonitis in a 400 capacity, 54-week-old battery caged egg type chicken presented with soft massive palpable abdomen. Abdominocentesis using flexible rubber catheter revealed yolk in the abdominal cavity. Abdomino-pelvis ultrasound scan revealed hyperechogenic regions of soft shell eggs with pockets of anechogenic fluid filled areas while Ventra-dorsal X-ray showed marked soft tissue inflammation of pectoro-abdominal region. *Escherichia coli* were isolated from the abdominal aspirate at Microbiology laboratory. Surgical intervention was employed to correct the condition. This study showed possible surgical approach to correcting egg peritonitis in birds and also suggested other possible intervention ways to help farmers take timely management decisions.

Key words: Egg peritonitis, surgery, exotic chicken, Nigeria

Introduction

Normal egg production is a sensitive indicator of the health status of a hen [1]. Maintenance of optimum egg production significantly depends on a healthy and functional reproductive system of the chicken which in turn will ensure profitability and subsequent sustainability of poultry production as an enterprise. It seems documented literatures aimed at quantifying total economic impact to the egg industry or the cost implication to the farmer due to reproductive abnormalities is lacking [2]. Egg peritonitis is a one of the serious reproductive problems to the commercial egg industry but appears to be kept out of research scope majorly due to the fact that farmers are reluctant to report its usual sporadic occurrences and also to share their experiences. This consequently resulted into what appears little information on field detection techniques and management of egg peritonitis [2]. Egg yolk peritonitis has been documented to be the most single common cause of mortality in commercial layers and breeders [1, 2, 4].

In most developing nations, the major problem affecting commercial poultry farms is economic losses due to mortality and disorders causing drop in egg production [1, 2, 4]. This has led to either suspension or total closure of commercial poultry ventures as revenue generation would not maintain their viability. Staff retrenchment, negative impacts on poultry owners' livelihoods and regional decline in poultry products are some of the immediate and future consequences of commercial poultry farm closure.

In Nigeria, few cases of reproductive abnormalities have been reported to adversely affect economic gain of poultry production due mainly to losses in total egg production caused by reproductive disorders and mortality in birds [5, 6, 7]. Abdu et al. [5] and Ate et al. [7] evaluated common gross reproductive abnormalities of the domestic fowl in Zaria, Nigeria. An incidence of 5.3% gross genital disorders of the domestic fowl was reported [7]. In a yet to be published report, Musa et al recorded an incidence of 22% egg yolk peritonitis which was second only to cases of oophoritis (39%). It was further believed that genital disorders affected egg production but feed consumption still persisted causing even more economic waste to the farmer as such birds would not be easily detected [7]. Recently, Rosen, [8], further showed there were underlying husbandry and/or management issues associated with the reproductive diseases and conditions of laying birds to which clinical signs were almost always vague. Though obstetric problems of birds were believed to be due to multiple causes, emphasis has always been on diseases that cause death of laying birds [1, 2, 3, 5].

The peritoneum of a chicken is a serous, colourless, double layer sac like membrane lining the abdominal and pelvis (coelomic) cavities and investing the viscera organs [2]. Egg yolk is caustic and capable of eliciting mild histolytic to severe inflammatory responses; it also serves as a good medium for bacterial growth. High productivity associated with estrogenic activity that leads to relaxation of the sphincter between vagina and cloaca are strong influencers of this condition [2]. Other factors like large egg size, rough handling, high environmental temperature, fat accumulation in abdominal cavity and enteric disturbances are some other factors responsible for this condition. *E. coli* can ascend the oviduct from cloaca leading to salpingitis and peritonitis even in the absence of predisposing factors.

Egg yolk peritonitis is often an acute condition with affected birds appearing physiologically normal making its diagnosis difficult [7]. The history of egg laying is a strong base for the diagnosis of this condition. Gross lesions are mainly those of inflammatory responses affecting many organs. In advance cases exudates may undergo cessation to become cheese like. Chronic cases are often presented with yolk that formed clumps in the abdominal cavity and the adherence of almost all visceral organs, air sacculitis and fibrinous deposits.

Clinical cases of early yolk peritonitis may respond to corticosteroids and broad spectrum antibiotic treatment. Aspirin in water or in juice given 8 hourly was also found to be helpful. Surgical intervention with supportive care of vitamins, fluids and warmth has been reported to be most successful [3].

It has been observed that genetic, pharmacologic, nutritional and agent-host-environmental relationships play major roles in the reproductive systems of birds and subsequently on egg production [8, 9]. However, there appears little or no information on reproductive disorders, its impacts and especially its management in poultry in Zaria, Nigeria. This study brings to the fore possible surgical intervention in one of the major reproductive abnormalities of the domestic fowl in Zaria, Nigeria.

Case presentation



On the 11th March, 2014, one live bird was presented to the Veterinary Teaching Hospital of the Ahmadu Bello University, Zaria, Nigeria with distended abdominal area. Upon examination clinical features observed included weakness ruffled feathers and straining. On palpation, the massive swelling was soft and fluid filled. The birds had comprehensive vaccination history and were previously medicated with antibiotics (neomycin, chloramphenicol and oxytetracycline). Flock mortality with similar conditions was reported sporadic and of low grade (0.2%).

A = chicken presented with distended abdomen

Diagnosis

Aspirated fluid of the swollen abdominal area using flexible rubber catheter revealed egg yolk. The bird was taken to diagnostic imaging laboratory of the VTH for ultrasound scan and X-ray.

The bird was properly restrained on its dorsum and ventro-dorsal X-ray of the chicken was taken which showed marked soft tissue inflammation (pectoral and abdominal muscles) while the bones showed normal radiographic findings. Abdomino-pelvis ultrasound scan was also conducted and showed portions of hyperechogenic region and some pockets of anechogenic areas within the abdominal cavity. Other visceral structures were not adequately visualized. It was thus concluded that soft tissue inflammation occurred and broken soft shell eggs were seen in fluid filled abdominal cavity.



B



C

B = Ventro-dorsal X-ray of a chicken showing marked inflammation of soft tissue (distended abdomen)

C = abdomino-pelvic ultrasound scan (hyperechogenic- black arrow and anechogenic –red arrow) indicating shell of egg and fluid filled cavity respectively

Case management

Food and water were withheld for 12 and 6 hours before the surgery respectively. 8 cm of the ventral abdominal region (from the sternum to the cloaca) was plucked off feathers and scrubbed with soap and water. Pre-operative medication was achieved using Gentamycin® and piroxicam® (Pauco pharmaceutical industry Nigeria Limited, Nigeria) at 5 mg/kg IM and 0.5 mg/ kg IM respectively were administered 8 hours before the commencement of the operation. Anaesthesia was achieved using ketamine hydrochloride (Ketamine® - Rotex Medica Trittau, Germany) at 50 mg/kg IM, alongside atropine sulphate (AMOPIN® - Yanzhou Xierkangtai Pharma. Co., Ltd, China) at 0.05 mg/kg IM. 2 ml of 2% lidocaine hydrochloride (LIGNOVIT 20-AH® Vital Healthcare PVT, Ltd., Nashik, China) was infiltrated along the line of incision.



D



E



F



G



H



I

D = Asepsis of surgical site using povidone iodine

E = Local anaesthesia using 2% lidocane

F = Midline surgical incision

G = Exposure of the abdominal cavity using Allis tissue forceps

H = Removal of broken eggs within the uterus and abdomen

I = Sutured surgical site

The bird was placed in a dorsal recumbency on the surgical table, the ventral midline was aseptically prepared with 5% povidone iodine (WOSAN^(R)-Jawa International Ltd, Lagos, Nigeria) solution and the legs were abducted and retracted caudally. The abdominal cavity was accessed via ventral midline coeliotomy. A 5 cm skin incision was made cranio-caudally (mid postventer region from the sternum to the interpubic space). Stab incision was made on the *linea alba* to expose, isolate, exteriorize and position the uterus. Haemostasis was achieved using gauze and haemostatic forceps. The uterus was then incised (3 cm), broken eggs were carefully removed from the uterus. The bird was then reclined at angle 20⁰ caudally and the uterine lumen flushed with 2% povidone iodine solution and uterine incision was sutured immediately by 2 rows of cushing suture pattern with size 4/0 Ethicon-Vicryl[®] (Polyglactin 910- Johnson-Johnson Jult, Belgium). The peritoneal cavity was lavaged with warm normal

saline-povidon iodine solution, which was then suctioned with suction machine. The *linea alba*, subcutis and the skin incisions were separately sutured using simple continuous suture pattern with 4/0 Ethicon-Vicryl^(R) and 3/0 (OGOTEX, NYLON MONOFILAMENT^(R)-Shenzhen Runch Industrial Corp. China) respectively. The bird was monitored until recovery from anaesthesia, after which it was moved to a cage for post-operative recovery and monitoring. The whole procedure took 58 minutes.



J



K

J = Recovery from anaesthesia

K = The chicken 1 week post surgery

Postoperatively, the bird was maintained on gentamycin sulphate at 5 mg/kg o.d IM x $\frac{5}{7}$ and piroxicam at 0.5 mg/kg o.d IM x $\frac{3}{7}$. On the 7th day post-surgery the bird was discharged.

Discussion

There have been documented reports of higher incidences (15.1-27.5%) of reproductive disorders in domestic fowl in some countries [9, 10] but few reports of reproductive abnormalities of birds have been documented in Zaria, Nigeria [5, 7]. The ovaries in one of the studies were mainly affected signifying a probable major decline in egg production which is a major concern to the poultry farmer. Abdu et al., [5] observed most obstetric problems to have occurred in improved commercial layers where owners of such birds had put in huge financial investment thus made such owners promptly submitted dead and diseased birds to veterinary clinics for diagnosis and treatment. It is also the views of Abdu et al. [5] that local chickens in comparism to exotic chickens are not so productive, had less active reproductive organs producing fewer eggs per year, not stressed under the intensive management system, hence were less prone to reproductive disorders and had less chances of presentation for clinical attention.

Egg yolk is a very good medium for microorganisms' growth, hence a high possibility of bacterial infection associated with egg yolk found in the peritoneal cavity, also viral diseases that have affects on the reproductive tract of birds could lead to frequent oophoritis and egg yolk peritonitis. Notably amongst this are Newcastle disease and avian influenza. *Escherichia coli* isolated in this case falls within the findings of many authors to be responsible for egg peritonitis. It was believed that *E. coli* could induce peritonitis without the predisposing factors

since it can ascend oviduct from cloaca to cause salpingitis and peritonitis [2, 9]. In this study egg yolk, shellless and soft shell eggs were recovered from the uterus and the abdominal cavity. Severe adhesions of visceral organs, peritoneum and intestinal mesentery were also observed. The fact that egg yolk peritonitis could result from inability of released ova to enter the infundibulum, obstruction, rupture of oviduct or reverse peristalsis explains some of the above findings. Additionally, such ectopic ova may be resorbed without incidence of peritonitis, but many times, it is characterised by abdominal distention, depression, anorexia and lethargy as clinically observed in this case. Furthermore, the close proximity of ovary to many organs like the lungs, liver, kidneys, spleen, intestine and air sacs could make it highly likely to ascending infections from these organs thus accounting for some of the lesions seen in this study.

In the efforts to making diagnosis of egg yolk peritonitis, history of egg laying, presenting clinical signs and complete blood count revealing leukocytosis with left shift neutrophilia (which is indicative of inflammatory responses) have been very helpful in the diagnosis of egg yolk peritonitis but abdominocentesis or laparotomy usually confirm this condition [12, 13, 14]. In this case abdominocentesis revealed yolk intra-abdominally, leukocytosis with a left shift neutrophilia was evident from the haemogram, and laparotomy conducted during surgery and at postmortem, egg yolk, yolk clumps and severe organ adhesions were observed in the abdominal cavity. Chronic cases of egg yolk peritonitis were earlier reported with yolk forming clumps in the abdominal cavity and adherence of almost all visceral organs, air sacculitis and fibrinous deposits [8, 13, 14, 15].

Ultrasound and radiograph are effective in detecting reproductive abnormalities [16, 17]. Their use in the avian species especially chickens appear limited majorly because cost benefit of the procedure appears not to be effective. In the same vein surgical approach to correct such reproductive anomalies are always frowned at or neglected by owners or clinicians. However, a critical look at this scenario means salvaging affected chicken will terminate future expected eggs to be layed by the chicken. More critical is the experience obtained from its management that may confer confidence and enhance efficiency in handling similar conditions in highly priced birds. It is on these notes that this case was managed.

Mild cases of egg yolk peritonitis may be managed medically while severe cases is by surgical intervention through ventra midline celiotomy which provides adequate access to both sides of coelomic cavity and provides easy way to drain intra-abdominal fluids [16, 17].

Conclusion

To fully appreciate avian practice in an attempt to help our feathered patients, we must initiate research projects targeting the epidemiology of avian obstetric problems, test hypothesis and gather relevant field experiences.

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Information Quality: concepts and dimension

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Abstract :

Sometimes it pays to go back to basics. This is certainly true when talking about information. Most people agree that information is critical to how we live and work and that information, to be effective, must have "quality". But what is "quality information"?

At first, the concept seems obvious. Quality information meets certain recognized criteria such as "accuracy", "timeliness", "relevance", and "understandability". We know it when we see it. Yet, despite an intuitive grasp of the term, all of us have presented what we thought was quality information to others, only to find that their opinion differed significantly from our own. If the concept is so obvious, then why do so many people disagree on specifics?

The meaning of information quality lies in how the information is perceived and used by its customer. Though absolute attributes are important, it is how those attributes are perceived, now and in the future, that defines information quality. Identifying quality information involves two stages: first, highlighting which attributes are important and second, determining how these attributes affect the customers in question. The following discusses ten attributes of information quality and how they can be used as benchmarks to improve the effectiveness of information systems and to develop information quality strategies for all organizations, particularly for those in the information business.

Keywords : Information – Quality – strategies - customer – business

1. Introduction:

In an age characterized by information, information quality is a critical concern for a wide range of organizations. More than ever before, many organizations focus their main business on the provision of valuable information. In order to assure that such information is of a high standard, organizations face the considerable challenge of controlling information quality. Therefore information quality management has become an essential component of organizational management.

Many studies have confirmed that information quality is a multi-dimensional concept (Ballou and Pazer 1985; Redman 1996; Wand and Wang 1996; Wang and Strong 1996; Huang et al. 1999). Over the last two decades, different sets of information quality dimensions have been identified from both database and management perspectives. We review information quality dimensions from four angles: identification, definition, classification, and dependency.

2. Concepts of information quality:

2.1. Information quality definition:

The concept of quality has been discussed extensively over recent decades. Various definitions are to be found in a wide range of literature. Gilmore (1974) defines quality as conformance to specifications. This definition is relatively straightforward and frequently used in manufacturing industries. It facilitates measurement and increases measuring efficiency. Organizations can determine the quality of products by measuring how well the product conforms to an established specification. Also, the measuring procedure can be automatically implemented. However it fails to capture the customer's view on product performance. To compensate for the disadvantage of this definition, Gronroos (1983) defines quality as meeting and/or exceeding customer's expectations. This definition is especially prevalent in marketing research and the service industries. Following this definition, researchers posit that it is the customer who is the ultimate judge of the quality of a product/service. Thus organizations can make a quick response to market changes. However, it is difficult to measure the extent to which a product/service meets and/or exceeds the customer's expectation. Since different customers may assign different values to Product/service attributes, coordinating and unifying the various quality results are the principal difficulties facing this definition. To provide a general definition, Juran (1974) introduces the definition of quality as fitness for use, which is used to measure the extent to which a product successfully serves its intended use. As this is the definition widely used in information quality research, we adopt fitness for use as the definition of quality in our research.

There are two significant definitions of information quality. One is its inherent quality, and the other is its pragmatic quality. Inherent information quality is the correctness or accuracy of data. Pragmatic information quality is the value that accurate data has in supporting the work of the enterprise. Data that does not help enable the enterprise accomplish its mission has no quality, no matter how accurate it is.

Inherent information quality is, simply stated, data accuracy. Inherent information quality is the degree to which data accurately reflects the real-world object that the data represents. All data is an abstraction or a representation of something real. Jean Baudrillard, the French semiologist, observes that "the very definition of the real becomes: that of which it is possible to give an equivalent reproduction."

Data is an equivalent reproduction of something real. If all facts that an organization needs to know about an entity are accurate, that data has inherent quality—it is an electronic reproduction of reality. For example, if someone has a data value of "October 24, 1976" for my

daughter Ashley's "Birth Date," that data has inherent quality. Inherent information quality means that data is correct.

Pragmatic information quality is the degree of usefulness and value data has to support the enterprise processes that enable accomplishing enterprise objectives.

In essence, pragmatic information quality is the degree of customer satisfaction derived by the knowledge workers who use it to do their jobs.

Data in a database or data warehouse has no actual value; it only has potential value. Data has realized value only when someone uses it to do something useful; for example, to ship an order to a customer, or to determine the correct location to drill a well shaft. Pragmatic information quality is the degree to which data enables knowledge workers to meet enterprise objectives efficiently and effectively.

Information quality can be generally defined from two perspectives: information and user. From the information perspective, information quality is defined as information that meets specifications or requirements (Kahn and Strong, 1998). Some researchers argue that ultimately it is the information consumer who will judge whether or not an information product is fit for use. Thus from the user's perspective, information quality is defined as information that is fit for use by information consumers (Wang and Strong, 1996).

2.2. Information quality development:

In order to thoroughly understand the concepts of information quality, we decide to review the development of information quality research. According to our review, we found three major phases in information quality research.

The first phase is prior to 1980. Most information quality research in this phase remains isolated. In the late 1960s, statisticians were the first to study information quality problems (Batini and Scannapieco 2006, Lee et al. 2006). They investigated data duplication issues in statistical datasets using mathematical theories. The major researchers were accounting professionals. For example, Yu and Neter (1973) developed a quantitative model to measure data errors in financial information systems. Cushing (1974) proposed a mathematical approach to detect and prevent data errors in accounting internal control systems. Hilton (1979) provided an illustrative analysis to show the effect of information accuracy and timeliness on accounting. In the mean time, psychology and management researchers also began to consider the concept of information quality. Streufert (1973) used an experimental methodology to investigate the effects of information relevance on decision-making. Zmud (1978) carried out an empirical study to derive certain information dimensions - relevant, accurate, factual, quantity, reliable, timely, arrangement, readable and reasonable.

Most of these dimensions are confirmed as information quality dimensions by subsequent research (e.g. Wang and Strong 1996, Lee et al. 2002). Reviewing the information quality research in this phase, these pioneering works have either stated or implied the concept of information quality and investigated certain information quality dimensions.

The second phase approximately lasts from the 1980s to the early 1990s. In this phase, information quality research is widespread but not yet systematic. Researchers begin to focus on exploring information quality dimensions, assessment methodologies and improvement strategies. In this phase, different sets of information quality dimensions were explored. For example, Brodie (1980) proposed that information quality contained three distinct components: information reliability, logical integrity and physical integrity. Olson and Lucas (1982) used appearance and accuracy to measure data quality in office automation information systems. Morey (1982) considered information quality to be information accuracy and proposed three

information accuracy measures in the context of information systems. O' Reilly (1982) investigated the effects of information quality on the use of information sources. In his study, information quality is measured by accessibility, accuracy, specificity, timeliness, relevance and amount of information. Ballou and Pazer (1985) considered accuracy, completeness, timeliness and consistency in the measurement of information quality in multi-input and multi-output information systems. Laudon (1986) identified completeness, accuracy and ambiguity as information quality dimensions for criminal-record systems. Observing the works above, it is found that different information quality dimensions can be derived from different contexts.

Additionally, in this phase different assessment methodologies were proposed. For example, Paradice and Fuerst (1991) developed a quantitative measure to formulate the error rate of stored records in information systems. O' Reilly (1982) proposed 18 questions with which users could determine information quality. One prominent work in this period is by Agmon and Ahituv (1987). They proposed an approach to assess information quality consisting of three elements: (1) internal assessment, to determine the intrinsic characteristics of data using widely accepted criteria, (2) assessment from the users' perspective, which focuses on the expectations and requirements of the user, and (3) assessment by comparison between database and reality.

This element is designed to locate data deficiencies by comparing database systems and real world systems. In addition to assessing information quality, a number of researchers also investigated the methods for information quality improvement. Whilst some researchers attempted to completely eradicate data errors from databases (Morey 1982, Janson 1988), others suggest allocating limited resources in an optimal way to enhance information quality (Ballou and Tayi 1989, Paradice and Fuerst 1991). As evidenced by the discussion above, in the second phase researchers concluded that information quality is a key determinant for information system success (DeLone and McLean 1992). Since different sets of dimensions are developed according to different contexts, such as reporting system (Ahituv 1980) and office automation information system (Olson and Lucas 1982), there is no comprehensive set of information quality dimensions in this phase. Furthermore, there appears to be no single accepted definition of information quality. Some researchers (e.g. Morey 1982) consider information quality to be information accuracy, while other researchers

(e.g. Keller and Staelin 1987) define information quality in terms of usefulness to consumers. Finally, most of the works in this phase are not validated by practical application.

The third phase can be identified from the middle 1990s to the present day. In this phase, information quality research becomes intensive, systematic and empirical. Therefore, the amount of information quality papers significantly increases, across a wide range of journals and conferences. From 1995 to 2008, more than 15 information quality books were published. These books have addressed different aspects of information quality research. Three information quality journals have been launched so far: the Data Quality Journal in 1995, the International Journal of Information Quality in 2007 and the ACM Journal of Data and Information Quality in 2008. In addition, many leading database and information system conferences such as Special Interest Group on Management of Data (SIGMOD), Very Large Data Bases (VLDB) and Conference on Advanced Information Systems (CAiSE) have included information quality as one of their themes. Furthermore, since 1996, the International Conference

on Information Quality (ICIQ) is held annually to provide a forum for researchers and practitioners to present research findings and exchange knowledge in the field of information quality. Beyond research developments in academia, industry and government have also begun

to pay attention to information quality issues. For example, Navesink Consulting Group was formed in 1996 and provided information quality solutions and services to other organizations. In 2001, the US president signed information quality legislation into law (Batini and Scannapieco 2006). These newly founded companies and government operations clearly indicate the empirical application of information quality research. Due to the significant research development in this phase, the remainder of this chapter focuses on analysing literature of this phase.

3. Importance of Information Quality :

Case studies concerning information quality problems are frequently documented. Such information quality issues may not only cause inconvenience in everyday life but also potentially generate harmful disasters. For example, on the 28th January 1986, NASA launched the space shuttle Challenger. Seconds after lift-off, the shuttle exploded and killed the seven astronauts on board. The Presidential Commission investigated the Challenger accident and found that NASA's decision-making process was based on incomplete and misleading information. Just two years later in July 1988, U.S. Navy Cruiser USS Vincennes shot down an Iranian commercial aircraft and killed its 290 passengers. Officials who investigated the Vincennes accident admitted that poor quality information was a major factor in the flawed Vincennes decision-making process. Fisher and Kingma (2001) carried out an in-depth analysis of the Challenger accident and the Vincennes accident and concluded that the explosion of space shuttle Challenger and the shooting down of an Iranian airbus by the USS Vincennes were the result of information quality problems and information quality management errors. Yet not only in the space and military industries but also in our daily life, information quality problems can be found to be severe. For instance, Pirani (2004) reported that one piece of wrong biopsy information caused a patient's death in an Australian hospital. The above case studies demonstrate that information quality is a vital issue in both industry and everyday life. Information quality problems have been investigated in a substantial body of literature.

The results of a number of investigations are summarized in the following:

More than 60% of 500 medium-size firms were found to suffer from information quality problems (Wand and Wang 1996); it is estimated that 1% to 10% of data in organizational databases is inaccurate (Klein et al. 1997); an industrial information error rate up to 30% is considered typical and it is often reported that the error rate rises to 75% (Redman 1996); 70% of manufacturing orders are assessed as of poor information quality (Wang et al. 2001); 40% of the credit-risk management database in a New York bank was found to be incomplete (Wang and Strong 1996); and between 50% and 80% of computerized U.S. criminal records are estimated to be inaccurate, incomplete and ambiguous (Strong et al. 1997). From the figures above, we are able to observe that information quality problems are pervasive in many organizations.

In addition, these information quality problems are often associated with high costs. For example, poor information quality management costs more than \$1.4 billion annually in 599 surveyed companies (Olson 2003): a telecommunications company lost \$3 million because of the poor information quality in customer bills (Huang et al. 1999); it is estimated that poor information quality results in 8% to 12% loss of revenue in a typical enterprise, and informally estimated to be responsible for 40% to 60% of expense in service organizations (Redman 1998).

4. Information quality dimension:

Many studies have confirmed that information quality is a multi-dimensional concept (Ballou and Pazer 1985; Redman 1996; Wand and Wang 1996; Wang and Strong 1996; Huang et al. 1999). Over the last two decades, different sets of information quality dimensions have been identified from both database and management perspectives. We review information quality dimensions from four angles: identification, definition, classification, and dependency.

4.1. Identification of Information Quality Dimensions :

Wang and Strong (1996) propose three approaches to study information quality: the intuitive, theoretical and empirical approaches. We adopt these approaches in our analysis of the identification of information quality dimensions. The intuitive approach derives information quality dimensions from the researchers' experience or from the requirements of particular cases. In this approach, information quality dimensions are identified according to specific application contexts. For example, O'Reilly (1982) used accessibility, accuracy, specificity, timeliness, relevance, and the amount of information to assess information quality in the context of decision-making. Ballou and Pazer (1985) employed accuracy, timeliness, completeness and consistency to model information quality deficiencies in multi-input, multi-output information systems. The theoretical approach generates information quality dimensions on the basis of data deficiencies in the data manufacturing process. For example, Wand and Wang (1996) used an ontological approach to derive information quality dimensions by observing inconsistencies between the real-world system and the information system. The empirical approach provides information quality dimensions by focusing on whether the information is fit for use by information consumers. For example, Wang and Strong (1996) captured 15 information quality dimensions of importance to information consumers. Kahn et al. (2002) selected 16 information quality dimensions for delivering high quality information to information consumers. From the discussion above, we found that varying sets of information quality dimensions can be identified using different approaches.

4.2. Definition of Information Quality Dimensions:

The three approaches above can also be considered as three perspectives for defining information quality dimensions. The intuitive approach defines information quality dimensions from the data perspective. For example, Ballou and Pazer (1985) defined completeness as a situation in which all values for a certain variable are recorded.

The theoretical approach defines information quality dimensions from the real-world perspective. For example, Wand and Wang (1996) defined completeness as the ability of an information system to represent every meaningful state of the represented real world system. The empirical approach defines information quality dimensions from the user's perspective. For example, Wang and Strong (1996) defined completeness as the extent to which data are of sufficient breadth, depth, and scope for the task at hand.

The advantage of using a data perspective is that information quality can be automatically assessed and objectively controlled. The advantage of employing a real-world perspective is that the referencing quality specification is theoretically perfect. However, both perspectives fail to capture the expectations of data consumers. From a user perspective, a comprehensive set of dimensions can be used to measure information quality. Also, underlying this perspective is the idea that information quality can be improved according to the intended use. Yet this perspective fails to measure information quality automatically, making it difficult to negotiate a large amount of data. Considering the advantage of each perspective, we use data perspective to define the dimensions and assess the quality of raw data. When assessing the quality of information products, we define the dimensions from user perspective.

4.3. Classification of Information Quality Dimensions

Wang and Strong (1996) proposed a hierarchical framework that consists of four information quality categories: intrinsic information quality, contextual, representational and accessibility. Wand and Wang (1996) used an ontological approach to derive information quality dimensions and categorized them by internal view and external view. Internal view is use-independent and contains a set of information quality dimensions that are comparable across applications. External view is concerned with the use and effect of information systems, which represent the real-world system. Naumann and Rolker (2000) organized information quality dimensions with three main factors that influence information quality: the perception of the user, the information itself, and the process of accessing information. These three factors can be considered as subject, object and process. Helfert (2001) classified information quality dimensions by employing semiotics and two elements of quality, which are

quality of design and quality of conformance. Semiotics comprises three levels: syntactic, semantic and pragmatic. The syntactic level considers the basic representation of information. The semantic level focuses on information related to real world objects. Finally the pragmatic level deals with information processes and information users. Kahn et al. (2002) developed a two-by-two conceptual model to describe information quality dimensions. Whilst the two rows are product quality and service quality, the two columns are conformance to specifications and meeting and exceeding consumer expectations. Therefore information quality dimensions are located in four quadrants: sound, dependable, useful, and usable. Bovee et al. (2003) presented a categorisation of information quality dimensions with the sequence of using information. The sequence includes the following four steps: obtaining the information (accessibility), understanding the information (interpretability), connecting the information with the given context (relevance), and assuring the information is free from error (integrity).

5. Conclusion:

Information quality has become a critical concern to the success of organizations. Numerous business initiatives have been delayed or even cancelled, citing poor-quality information as the main reason. Previous research indicated that understanding the effects of information quality is critical to the success of organizations. However, little research has been done to analyze the effects of information quality in an organizational context.

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