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# Cihan University-Erbil Journal of Humanities and Social Sciences

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# Organizational Justice and Organizational Commitment among Secondary School Teachers

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***Abstract*—The purpose of this study is to find the relationship between organizational justice (OJ) and organizational commitment (OC) among secondary school teachers. The sample consisted of 98 teachers working in 8 public secondary schools. OJ consists of three dimensions, namely, distributive justice (DJ), procedural justice (PJ), and interactional justice (IJ) which were used to measure the level of perception of justice among teachers, whereas to determine the level of commitment among teachers, the study used OC questionnaire. Pearson correlation and regression analysis methods were used to find the relationship and the impact of OJ on OC. The main findings of the study indicated that there is a positive and significant relationship between OJ dimensions and OC; DJ found highly correlated with OC. However, PJ and IJ positively and significantly predicted OC among secondary school teachers. The study could provide some significant literature contributions on the OJ and OC of secondary school teachers in developing countries.**

***Keywords*—Organizational commitment, Organizational justice, Secondary school, Teachers.**

## I. Introduction

One of the most valuable characteristics of individuals residing in contemporary cultures is to lead orderly lives. People have created many organizations to guide personal existence. Of all these organizations, the most significant is the job that individuals have to undertake to guide their lives. Working in structured institutions has made some ideas essential in academic experiences. Two of these ideas stand out; organizational justice (OJ) and organizational commitment (OC) (Buluc and Gunes, 2014). Justice based on the cultural interchange paradigm (Blau, 1964). Since inequality linked to adverse perceptions of the workforce, sound therapy leads to pleasant feelings. Research demonstrates that justice has positive implications for employee commitment (Suliman and Kathairi, 2013). Researchers believe that OJ is a multidimensional paradigm that involves distributive justice (DJ) (whose organizational resources are what), procedural justice (PJ) (how corporate resources are shared/distributed), as well as interactional justice (IJ) (interpersonal diagnosis during corporate contact resources) (Cropanzano et al., 2002). However, according to Buluc and Gunes, 2014, for both teachers and students, OJ is a vital concept. However, the performance and efficiency of educational institutions depend on OJ and OC and consider as fundamental concepts (Ahmad and Jameel, 2018; Buluc and Gunes, 2014).

There is considerable literature on the link between these OJ elements and their implications. In addition, research shows that DJ and PJ relate to commitment (Cohen-Charash and Spector, 2001) and IJ (Elamin, 2012).

Most of the past studies conducted in the public administration field, such as among correctional officers/staff (Griffin and Hepburn, 2005; Lambert, 2003; Lambert et al., 2019) or among police officers (Crow et al., 2012; Qureshi et al., 2017) and there is a lack of the previous studies in the education field, particularly among school teachers (Buluc and Gunes, 2014). However, limited studies conducted in the Middle East countries (Elamin, 2012; Suliman and Kathairi, 2013; Raewf and Thabit, 2018; 2015; Massoudi and Hamdi, 2017), particularly in the Iraqi setting.

The Iraqi education system facing several challenges, decades of war and underinvestment in Iraq, has damaged what was once the region's most exceptional education scheme, significantly curtailing Iraqi children access to value teaching. There are nearly 3.2 million Iraqi young children out of the school (Jameel, 2018a; 2018b; Jameel and Mohammed, 2016; UNICEF, 2018). Children and educators encountered war trauma, displacement, and loved people's loss. Such injury has a long-lasting psychological effect that can influence learning procedures and skills. Schools operate several "changes" in displacement or infrastructure affected

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regions, where it is challenging to deploy skilled professors to work at such places (UNICEF, 2019; Jameel et al., 2017; Jameel and Ahmad, 2018; Mahmood et al., 2019). Our study focuses on one of these cities which suffered from wars and displacement.

The present study aim is to find out relationship between OJ elements and OC and its impact on secondary school teachers with reference to Heet City, the province of Al Anbar, Iraq.

## II. Literature Review

### *A. OC*

OC in the field of management and organization is one of the most researched institutional behaviors studied in organs and organizations for a long time (Cohen, 2007). Yet, concepts have value and meaning contradictions. OC implies workers' OC, their perception of themselves as belonging to the institution, and their perception of themselves as an unchangeable portion of the institution (Wallace, 1995). OC relates to the connection between the employee and the working organization in general (Lambert et al., 2019; Mowday et al., 1982); affective commitment (AC) means a psychological relationship to the organization, including organizational recognition (i.e., corporate prestige, integration of its objectives, and acceptance of its fundamental principles) and readiness to make efforts to aid the organization (Mowday et al., 1982). This volunteer bond reflects mutual desires and policies among the individual and their institutions (Mowday et al., 1982). If the staff regards the organization as handling them positively, they are more inclined to bind the organization psychologically. In comparison, those who think that the employer or organization treats them poorly or unfairly will leave from the organization (Meyer and Allen, 1997).

### *B. OJ*

Justice is among the most real cultural requirements. It is also the foundation for all right conduct. The notion of fairness is a crucial component of society. OJ refers to the concept of the working environment (Greenberg, 1982). OJ relates to the perception that the employer treats staff justice and fairly (Lambert et al., 2019). Three critical aspects of OJ are DJ, PJ, and IJ.

### *C. DJ*

DJ is anticipated to provide a fair proportion of behavior and results (benefits and expenses). Expenses and profits are allocated based on employee performance. DJ Relates to the perception of reasonable and equitable organizational results (such as salaries, advantages, allocation of shifts, work appraisals, position assignments, bonuses and occupational restraint) (Greenberg, 1982; Griffin and Hepburn, 2005).

In determining equity, staff relates the importance of their job outputs, such as hard work, dedication, and enthusiasm, to the results or benefits they receive from their organizations (Elamin, 2012). The results or benefits obtained are increased salaries, promotions, and appreciation. If the staff thinks that the results of choice are unreasonable, they may clash with their organization (Mohd Kassim et al., 2018).

It is essential to recognize that equity and not equality are the basis of DJ (Greenberg, 1990). Equality implies that all employees are handled the same, regardless of their attempts or effect. Equity means that the result is determined by an individual worker's initiatives and input (Qureshi et al., 2017). Under the equity exchange principle, an individual assesses the organizational output based on inputs and compares these with the results of other workers in similar situations and what is considered as just (Greenberg, 1990).

### *D. PJ*

PJ refers to how the results are allocated, not the results themselves. PJ Refers to the preconception that the systems and processes used by the organization to achieve remarkable results should be just and fair (Greenberg, 1982; Qureshi et al., 2017). Most employees want accurate, open and honest processes used to determine distribution results regardless of the outcome. The mechanism could be as essential and more essential than results itself (Greenberg, 1990). Furthermore, an unfair method can still achieve the right outcomes (Lambert, 2003). Staff not only assesses the honesty of decision-making processes immediately affected by the organizational process but also assesses significant results affecting other employees.

### *E. IJ*

Bies and Moag, 1986, created an IJ which relates to determine the character of an appropriate way of doing business. Bies and Moag, 1986, discerned six features that echo interaction judicial judgments are as follows: Sincerity, disappointment avoidance, kindness, regard for human rights and behavioral freedoms, and decision-making. The first five features are therapy elements, while the last one is explained. IJ concerns the fairness of the partnership between managers and employees (Buluc and Gunes, 2014).

## III. Hypotheses Development

### *A. OJ and OC*

In the field of social exchange theories, the one between OJ and OC is one of the most rigorously researched relations in management literature. Drawing on social exchange theories, the reciprocity rule predicts that workers may reciprocate good or fair treatment with the organization or its managers by committing themselves to the organization (Lavelle et al., 2009). OJ and OC are so closely linked that they are often called the social exchange relationship indicators (Colquitt et al., 2013).

Although the commitment factors were extensively studied by organizational psychologists (Cohen, 2007), an interest in identifying the background of engagement is still a precious research effort, especially since engaged employees offer modern organizations practical advantages. The commitment was usually regarded from an attitudinal view, in which the worker demonstrates organization identity, participation, and trustworthiness (Porter et al., 1974). OC was, therefore, postulated as "powerful faith in and recognition of the organization's objectives and principles, readiness to make significant efforts on behalf of the organization, and a clear desire to preserve organizational citizenship" (Porter et al., 1974). Researchers agree that organization justice is a predicate of organization commitment (Aryee et al., 2004). Nevertheless, the differential impacts of justice elements on OC dimensions were not studied in the context of Iraq. We motive such expertise will not only add to literature but also guide organizational exercise as to which sort of justice should gain full expenditure when a certain amount of commitment is required. Researchers explore OC as a three-dimensional notion (Meyer and Allen, 1991), namely, AC, continuance commitments (CC), and normative commitment (NC). Although interconnected, in their perspective, they are unique (Meyer et al., 2002; Steijn and Leisink, 2006) while AC mirrors staff mental connection with the organization, ongoing commitment interventions have tangible advantages and NC, reveal a sense of coercion to proceed with the work process (Kumasey et al., 2017; Meyer and Allen, 1997).

Research demonstrates that OJ is usually in line with AC rather than continuity or NC (Crow et al., 2012; Loi et al., 2006). The evidence is plentiful that PJ is a helpful predictor of organizational involvement, as cognitive processes generate the impression that staff will receive the right proportion of organizational performance if they conduct well, despite the reality that current benefits are unreasonable (Loi et al., 2006). This result is compatible with the view of cultural return, which emphasizes natural comportment reciprocity (Blau, 1964). This indicates that research is conducted to uncover the distinctive impact of DJ, PJ, and IJ on each of the three elements of Iraqi setting. For instance, we believe that organizational strategies and procedures have consequences on each element of the engagement: Strategies and procedures on human resources that improve the self-worth of staff are linked with the growth of AC; apparent costs of failure in human resource activities are related to CC, and the expected need to settle owing is also connected with NC (Meyer and Allen, 1997).

In this respect, we anticipate that the three elements of OJ will encourage staff to create their corresponding concentrations of commitment because the knowledge of distribution, procedure, and interaction may lead a team to show beneficial behavior. Several studies confirmed the impact of OJ components on OC (Al-Kilani, 2017; Buluc and Gunes, 2014; Crow et al., 2012; Lavelle et al., 2009; Mohd Kassim et al., 2018; Rahman et al., 2016; Thabit and Raewf, 2018; 2016). Thus, we hypothesize that:

$H_1$: DJ relates positively to OC.

$H_2$: PJ relates positively to OC.

$H_3$: IJ relates positively to OC.

## IV. Methodology

This study is a cross-sectional survey and has tried to figure out the direct link between and impact between OJ components and OC among academic staff in secondary schools. The data collection method was collected using a structured questionnaire for the current study. The sample size of the study was 210 teachers who taught in 8 public secondary schools in Heet City, the province of Al Anbar, Iraq, during the academic year 2018–2019. Stratified random sampling choice depending on the total of teachers at each school, has been implemented. Total questionnaires applicable 98, the data were coded and analyzed in version 23 of the Social Sciences Statistical Package. The instruments of this study are as follows:

### *A. OJ*

OJ dimensions measured by 15 items which developed by Crow et al., 2012, each dimension has 5 items DJ, PJ, and IJ. The study used 5-point Likert scale strongly disagree to strongly agree.

### *B. OC*

OC factor consists of this study from 5 items developed by Crow et al., 2012, to evaluate this factor among teachers in secondary school. The 5-point Likert scale strongly disagree to strongly agree has been deployed.

## V. Analysis and Results

### *A. Demographic Descriptive*

Table I illustrates the demographic results; most of the responded was male with 60% and other females; however, most of the teacher's age was between 40 and 49 years old. Bachelor degree with 80% of teachers. Tenure was 11–15 years around 35% and equal to or more than 26 years around 33%, Table I, for more details.

TABLE I
Demographic Description

| Variables | Count | Column *n*% |
|---|---|---|
| Gander | | |
| Male | 59 | 60.2 |
| Female | 39 | 39.8 |
| Age | | |
| Below 30 | 4 | 4.1 |
| 30–39 | 36 | 36.7 |
| 40–49 | 42 | 42.9 |
| 50–59 | 11 | 11.2 |
| 60 and above | 5 | 5.1 |
| Qualifications | | |
| Bachelor | 80 | 81.6 |
| Master | 9 | 9.2 |
| Diploma | 6 | 6.1 |
| PhD | 3 | 3.1 |
| Tenure | | |
| <10 years | 11 | 11.2 |
| 11–15 years | 34 | 34.7 |
| 16–20 | 8 | 8.2 |
| 21–25 | 13 | 13.3 |
| Equal to or more than 26 years | 32 | 32.7 |

N=98

*B. Validity and Reliability*

Table II displays the Cronbach's alpha results and factor loading, all the factors with an acceptable level of reliability which exceed the recommended level 0.7 by Nunally and Bernstein, 1978. However, factor loading exceeds the recommended level 0.5 by (Hair et al., 2010), see Table II.

*C. Correlation Analysis*

The Pearson correlation was executed as displayed in Table III in the calculation of the path of connection among the independent factors (DJ, PJ, and IJ) and dependent factor (OC). All three dimensions of OJ have a positive and significant correlation with each other and with OC. However, the DJ has a positively and significantly correlated with OC on a strong level of r = 0.828. Similarly, PJ and IJ have a positive and significant correlation with OC (r = 0.651 and 0.759).

*D. Regression Analysis*

The purpose of regression analysis is to find the impact of OJ dimensions on OC. Table IV illustrates the results of the regression analysis in this study.

DJ has a positive and significant impact on OC among secondary schools teachers on the level of $\beta = 0.797$ and $P < 0.05$, the similar results were reported by Rahman et al. 2016. Thus, H1 has accepted. Similarly, PJ has a positive and significant impact on OC among secondary schools teachers with $\beta = 0.546$ and $P < 0.05$, the same finding was reported with Rahman et al. 2016, which reported that PJ has a positive impact on OC. Thus, H2 accepted. The last hypothesis has been accepted H3 due to the result of a positive and significance level with $\beta = 0.637$ and $P < 0.05$. The matching result reported by Al-Kilani, 2017. However, the coefficient showed that $R^2$ is 0.735. This result indicates that DJ, PJ, and IJ explain 73.5% of the variance in OC.

TABLE II
VALIDITY AND RELIABILITY

| Variables | Items | Factor loading | Cronbach's alpha |
|---|---|---|---|
| OC | OC1 | 0.895 | 0.845 |
| | OC2 | 0.892 | |
| | OC3 | 0.903 | |
| | OC4 | 0.921 | |
| | OC5 | 0.623 | |
| DJ | DJ1 | 0.934 | 0.844 |
| | DJ2 | 0.835 | |
| | DJ3 | 0.860 | |
| | DJ4 | 0.872 | |
| | DJ5 | 0.860 | |
| PJ | PJ1 | 0.752 | 0.903 |
| | PJ2 | 0.878 | |
| | PJ3 | 0.816 | |
| | PJ4 | 0.852 | |
| | PJ5 | 0.812 | |
| IJ | IJ1 | 0.719 | 0.855 |
| | IJ2 | 0.885 | |
| | IJ3 | 0.881 | |
| | IJ4 | 0.768 | |
| | IJ5 | 0.768 | |

DJ: Distributive justice, PJ: Procedural justice, IJ: Interactional justice, OC: Organizational commitment

TABLE III
CORRELATION

| Variables | DJ | PJ | IJ | OC |
|---|---|---|---|---|
| DJ | 1 | 0.566** | 0.649* | 0.828** |
| PJ | | 1 | 0.778** | 0.651** |
| IJ | | | 1 | 0.759* |
| OC | | | | 1 |

**Correlation is significant at 0.01 level (two tailed). *Correlation is significant at 0.05 level (two tailed). DJ: Distributive justice, PJ: Procedural justice, IJ: Interactional justice, OC: Organizational commitment

## VI. DISCUSSION

The purpose of this study was to find the impact of OJ dimensions on OC among secondary school teachers this purpose has achieved. The results of the survey indicate that secondary school teachers with a propensity to show good feelings toward DJ, PJ, and IJ show a higher level of OC. Meanwhile, results indicated that there is a positive and significant relationship between OJ dimensions and OC, Table III, correlation analysis, while DJ has a strong correlation with OC with high level, $r = 0.828$. This result shows when DJ increases, OC level increases by 0.828. Similarly, with PJ and IJ have a strong correlation with OC. Similar results reported by (Lambert, 2003; Rahman et al.,2016) while, like PJ, the institution's institutional outcomes, such as OC, would be more closely related.

Moreover, the dimensions of OJ significantly predicted OC among teachers. Similar results have been reported by Buluc and Gunes, 2014; Rahman et al. 2016, which reported that OJ significantly predicted OC. According to the findings of the study, teachers have favorable views of OJ in secondary schools that can be translated principals that handle teachers equally. However, the most important term for the development of a healthy and harmonious job environment is OJ. According to the study results, secondary school teachers also have high levels of institutional commitment. OC is essential in organizational success.

Furthermore, OC consists of some crucial aspects that are a strong belief in, or recognition of, the organization's goals and principles, the willingness to work hard for and maintain an organization's representative. It indicates that commitment is also an essential concept for education and particularly for schools. Should involvement of teachers in organization commitment upon embrace and recognition of the aims and principles of the school, efforts to achieve those objectives and preparation to continue within the organization will lead to achieving high teaching quality and more commitment among academic staff.

TABLE IV
REGRESSION

| Hypotheses | Beta | *P*-value | Sig. | Remark |
|---|---|---|---|---|
| DJ→OC | 0.797 | 0.000 | <0.05 | Supported |
| PJ→OC | 0.546 | 0.000 | <0.05 | Supported |
| IJ→OC | 0.637 | 0.001 | <0.05 | Supported |

$n$=98. R=0.841, $R^2$=0.735. Std. error of the estimate 0.525. DJ: Distributive justice, PJ: Procedural justice, IJ: Interactional justice, OC: Organizational commitment

## VII. Conclusion

OJ and OC are fundamental concepts if the quality and productivity of educational institutions taken into account. The fair treatment of the principal would positively affect not only the teacher's loyalty to his/her school but also job satisfaction, morale, and the school environment. OJ and OC are highly correlated in the present study. Furthermore, it is showed that OJ is an indicator of OC. The work discussed here makes some significant literature contributions on the OC of secondary school teachers in Iraq. Furthermore, this research extended OJ investigation among school teachers, particularly secondary school teachers, to examine whether teachers affect their OC of three dimensions of OJ. However, this study would enrich the body of knowledge in the context of Iraq, which suffers from the lack of studies conducted in the education field.

## Recommendation

Research carried out to date shows that OJ and OC are basic concepts for academic institutions. The perceptions of teacher justice as far as schools and administrators are concerned to have a positive impact on their commitment. In this context, teachers' commitment to their organizations and performance will increase if the directors treat teachers equally.

## Limitations and Future Study

The study faced some limitations such as a low response from the teachers only 46% responded. Meanwhile, the study conducted among eight public schools which cannot generalize the result to all Iraqi secondary schools, a future study could be conducted with more sample size and find the causal effect between the OJ and OC such as satisfaction.

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# Linguistic Deviation in Literary Style: A Stylistic Analysis

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***Abstract*—This paper is an attempt to shed light on linguistic deviation in literary style. Literary language, with its three main genres; poetry, drama, and prose, is a situational variety of English that has specific features which belong to the literary and elevated language of the past. Literary language has been assigned a special status since antiquity and is still used nowadays by some speakers and writers in certain situations and contexts. It has been considered as sublime and distinctive from all other types of language; one which is deviant from ordinary use of language in that it breaks the common norms or standards of language. A basic characteristic of literary style is a linguistic deviation which occurs at different levels; lexical, semantic, syntactic, phonological, morphological, graphological, historical, dialectal, and register. All these types of deviations are thoroughly investigated and stylistically analyzed in this paper so as to acquaint readers, students of English, researchers, and those interested in the field, with this type of linguistic phenomenon whose data are based on selected samples from major classical works in English literature.**

***Keywords*—Linguistic deviation, Literary style, Register, Stylistic analysis, Variety.**

## I. Introduction

As a general term, deviation means the act of moving away from what is normal or acceptable, i.e., a difference from what is expected or acceptable. In this sense, any departure from the usual and acceptable norms of language is considered as a deviation. Accordingly, the linguistic deviation is "a case of non-conformity to the norms and regularities of discourse structure" Cook (1989. p. 74). To Crystal (2003a. p. 134), deviation refers to a sentence, or another unit, which violates the rules of the normal use of language and appears grammatically, phonologically, or even semantically ill-formed.

### *A. Objective of the Study*

This research paper is of expository and informative nature. The objective is two-fold. First, it aims at exploring and revealing all types of linguistic deviation in literary style. Second, it is an attempt to acquaint readers and learners (students of English in particular), researchers, and those interested in the field, with this linguistic phenomenon which is found problematic due to its unfamiliarity with normal standards and rules of language. It is hoped that the findings of this study will help readers and learners of English to understand the different types of deviations in literary language and their stylistic variation.

### *B. Scope of the Study*

The present study is focused on the phenomenon of linguistic deviation in literary style as a situational variety of English. It is limited to the exploration of different types of linguistic deviations in the three literary genres: Poetry, drama, and prose. The study is accessed by the qualitative mode of inquiry which is further specified to content analysis of the selected data. The study is based on Leech's theory of linguistic deviation (1969) with its nine types as its theoretical framework. Data analysis has been executed by the descriptive method as the data have been carefully chosen and stylistically analyzed.

### *C. Data of the Study*

The data of this study are a variety of samples from different sources of English literature (old and new) covering the basic genres; poetry, drama, and prose. The method adopted in data collection is selective and qualitative in nature. Only relevant examples that exhibit the different types of linguistic deviations with their stylistic variations are collected, and then stylistically analyzed and put into well-defined groups depending on Leech's categorization.

### *D. Research Questions*

This research paper is concerned with finding answers to the following questions: (1) What is meant by linguistic

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deviation as a characteristic phenomenon in language, and literary texts in particular? (2) What forms does it take? (3) How can knowledge and comprehension of its different types assist English language learners to understand it? The first question is answered by investigating the phenomenon of linguistic deviation in literary language. The second question is answered by exploring different genres of literary works to locate the relevant linguistic deviations through a stylistic analysis of these deviations. The third question is answered through the expository and informative framework displayed by the researchers to acquaint readers (non-native students of English), and those interested in this field with a better understanding of this linguistic phenomenon and the stylistic analysis adopted in this respect.

### *E. Definition of Related Terms*

The term *situational variety (varieties) refers* to various types of the same language, which differ as regard the context, situation, or the language user. This term sometimes overlaps with the terms *register* and *style*. Therefore, when we speak about different registers or styles, we refer to situational varieties of language in one way or another (Stern, 1996).

As a general term discourse refers to examples of language use (spoken or written) which are produced as a result of communication (Richards et al., 1993: p. 111) to convey meaning. When discourse is studied and analyzed in terms of the context in which it occurs it is called discourse analysis. In linguistic terminology, "discourse analysis focuses on the record (spoken or written) of the process by which language is used in some context to express intention" (Yule, 2000. p. 83-4). It is concerned with the different tools that speakers and writers employ to put sentences together to produce a coherent and cohesive whole (Mansoor, 2014. p. 106). But here, we are interested in studying and analyzing the written form represented by samples from literary texts (verse and prose).

Style, as a general term, is the manner of doing something. It generally refers to different types of activities executed by human beings. When applied to language, it is concerned with the variation in a person's speech or writing. In literature, style is the way an author uses words to tell a story or compose a poem. It is a writer's way of showing his/her personality on paper. The term stylistics refers to the study of style, or the study of "variation in language (style) which is dependent on the situation in which the language is used and also the effect the writer or speaker wishes to create on the reader or hearer" (Richards et al., 1993. p. 360). It is an objective, systematic, and scientific study and analysis of the style of literary texts (Abrams and Harpham, 2009. p. 352).

Stylistic analysis is mainly concerned with exploring and investigating the main stylistic features and functions which characterize a certain linguistic text. It is a type of analysis which is interested in analyzing the marked features of language rather than the unmarked ones. By marked (unusual) features, we mean those features or elements of linguistic expression which deviate from the natural and frequent language use (unmarked) and thus considered as deviations from the normal standards of language (Richards et al., 1993; Ghazala, 1994).

## II. Linguistic Deviation in Literary Style

Literary style is a mode of linguistic expression characterized by special features which attempt to express the message to the reader simply, clearly, and convincingly; keeping the reader attentive, engaged, and interested by demonstrating the writer's skills, knowledge, and abilities (Hacker, 1991; Sebranek et al., 2006). A striking and defining characteristic of literary style is its deviation from language norms and standards.

The deviation is a "term used to describe any pronunciation, word, or sentence structure which does not conform to a norm" (Richards et al., 1993. p. 105). From a linguistic perspective, norm means "a standard practice in speech and writing" (Crystal, 2003. p. 319). There are two main types of norm General and local or internal. The general norm refers to the conventional ways in which a particular language is used or the literary style in question, while the local norm refers to a norm set up in a particular text by the author (Awonuga et al., 2018).

Within the framework of literature, the deviation is considered as a license or permission for poets and writers to say or write what people in normal situations of language use cannot. Writers, and poets in particular, exploit deviation at various linguistic levels to bring about specific artistic aims and effects by doing with words what normal use of language cannot do to convey the message they have in mind. According to Leech (1969), linguistic deviation is a necessity to produce an artistic work. A poet may exceed or overpass the language limits to investigate and convey new experiences and effects through the choice of words and the techniques he invents to impress the readers.

Although deviation may cause some interruption problems for the readers as regard the normal process of language communication, yet it represents a source of interest and surprise for attracting the readers' attention and stimulating them to seek clarification for the content. It raises the readers' linguistic awareness and understanding of literary texts and their stylistic variations. Thus, the deviation is seen as an effective means to enrich the text in which it occurs.

Deviation from the general rules of English (syntactic, phonological, graphological, morphological, semantic, etc.) is a common phenomenon in literary language, especially in poetry. Any departure from the general rules of language, lexical or syntactic, is generally described as a deviation. The term linguistic deviation was coined by Geoffrey Leech in 1969 while studying a number of poems. He discovered many irregularities in using language from a linguistic outlook (Rahman and Weda, 2019. p. 38). Leech (1976. p. 42-52) located nine types of linguistic deviation in poetry; lexical, semantic, syntactic, phonological, morphological, graphological, historical, dialectal, and register.

## III. Types of Linguistic Deviation

### A. Lexical Deviation

Lexical deviation in literature occurs when words depart from their normal standard, or when words are invented in a process called neologism or nonce-formation, to create deeper meaning and esthetic value, to achieve a certain (stylistic) effect or to meet a lexical need for a single occasion. Nonce-formation, according to Crystal (2003a. p. 260), is seen as a linguistic form which is consciously invented or accidentally used by a particular speaker on one occasion. This process is also called lexical invention or innovation (Leech, 1969. p. 42).

Since the morphological rules of English permit the use of the prefix "*fore*" (meaning: *Before* or *in advance*) with verbs such as *foresee*, *foreknow*, *foretell* and *forewarn*, T.S. Eliot, by analogy, invented a new lexical item; a verb which has never been used before in English (Ouameur, 2013. p. 8-9). A typical example of neologism is found in the italicized word in the following line:

And I Tiresias have *fore suffered* all

(Waste Land: T.S Eliot)

A similar example is given by Hopkins when he uses the prefix "*un*" to coin words which are not used in Standard English (*unchilding* and *unfathering*), in addition to the use of compound word *widow-making* which represents another lexical deviation, thus exploiting both compounding and affixation (Leech, 1969 cited in Ouameur, 2013. p. 8-9):

The *widow-making unchilding unfathering* deeps

(The Wreck of the Deutschl and: Hopkins)

Lexical deviation in poetry is realized in the form of repetition. A typical example is found in these lines by Thomas Hood. The word *work* is repeated 27 times in five stanzas of the poem (89 lines in 12 stanzas). In the lines below, the word *work* is repeated 6 times only in stanzas 3 (Inglis et al., 1952):

*Work-work-work*,
Till the brain begins to swim;
*Work-work-work*,
Till the eyes are heavy and dim! (Stanza 3)

(The Song of the Shirt: Thomas Hood)

Such kind of repetition is called *anaphora*, a literary term which is defined as a "deliberate repetition of a word or a phrase at the beginning of a sequence of sentences, paragraphs, lines of verse, or stanzas" (Abrams and Harpham, 2009. p. 313). Another good example, in this respect, is given below in which the phrase *soon will* (*shall*) is repeated at the beginning of the three lines in the stanza to create a feeling of splendor and magnificence by emphasizing the device of parallelism (Halliday and Hasan, 1976. p. 4; Leech, 1969 80 cited in Nofal, 2011):

*Soon will* the high Midsummer pomp's come on,
*Soon will* the musk carnations break and swell,
*Soon shall* we have gold – dusted snapdragon.

(Thyrsis: Mathew Arnold)

Another type of lexical deviation is represented by *malapropism*. According to Childs and Fowler (1973), this term refers to the misuse of words. It is any actual word that is wrongly or accidentally used in place of a similar sounding, correct word (Aitchison and Straf, 1982; Zwicky, 1982). In the following text, malapropism is achieved using the word natural instead of national. The two words are similar in their initial and final syllables but different in their medial position where malapropism lies/nætʃrəl/versus/næʃnəl/(Ouameur, 2013. p. 28):

Mr M'Choakumchild was explaining to us about
*Natural* prosperity. "National, I think it must have been," observed Louisa.
Yes, it was. - But isn't it the same? She timidly asked.
You had better say, *National*, as he said so,' returned Louisa, with her dry reserve.

(Book 1, Chap IX: Hard Times: Dickens)

A similar type of this deviation is also present in the speech of Mrs. Malaprop in Sheridan's play The Rivals where she utters the nonsensical words Reprehend, oracular, derangement, and epitaphs in (1) instead of the intended words Apprehend, vernacular, arrangement, and epithets in (2) (Sheridan, 2008 cited in Wikipedia):

1. Sure, if I *reprehend* anything in this world it is
   The use of my oracular tongue, and
   a nice *derangement* of epitaphs*!*
2. If I *apprehend* anything in this world, it is the use
   of my vernacular tongue, and a nice
   *arrangement* of epithets

(Act 3 Scene III: The Rivals: Sheridan)

### B. Semantic Deviation

In accordance with this type of deviation, an ordinary word can have an extraordinary meaning depending on the poet's, novelist's or writer's life, and cultural background (Leech, 1976). It is an irrational element that forces the reader to search the meaning beyond the dictionary meaning. The semantic deviation can be meant as non-sense or absurdity when we consider the literal (denotative) meaning, but it bears non-literal (connotative) meaning:

I am not yet born; O hear me.

(Prayer before Birth Louis: MacNeice)

The child is father of the man.

(My Heart Leaps Up: Wordsworth)

Semantic deviation in literature is well represented by the Welsh poet Dylan Thomas who is known for this type of deviation such as, *once below a time* (rather than its usual form *Once upon a time*) and his famous phrase: *A grief ago* (in a poem entitled *A Grief Ago*) in which *grief* has been given a durational time dimension just such as week, *month,* or *year* (Mansoor, 2013. p. 128):

A grief ago,
She who was who I hold, the fats and the flower,
Or, water-lammed, from the scythe-sided thorn,
Hell wind and sea.

(A grief ago: Dylan Thomas)

To create a poetic effect, Thomas added the characteristic of time-span to the word *grief*; though the noun phrase is abnormal, it induces some emotions (Jain, 2016. p. 456).

This type of deviation is sanctioned or permitted in literary language, but prohibited in the ordinary use of language.

Another type of semantic deviation can take the form of *paradox*. From a literary perspective, it refers to anomalous juxtaposition of inappropriate ideas for the sake of striking exposition or unexpected insight. It involves examining apparently contradictory statements and drawing conclusions either to reconcile them or to explain their presence (Rescher, 2011). According to Abrams and Harpham (2009. p. 239), paradox is a statement which apparently seems to be logically contradictory or absurd, but it can be interpreted in a way that makes sense. Consider the following lines in which the paradoxical meaning is represented by the direct antonyms: *Fight/guard, hate/love:*

Those that I *fight* I do not *hate*,
Those that I *guard* I do not *love.*

(An Irish airman foresees his death: W.B. Yeats)

The so-called *objectification* is another type of semantic deviation. It is a way of considering a person, or sometimes an animal, as an object, or a thing. It is a kind of degradation, treating the person as a tool owned, bought, or sold, without independent or self-determined identity or activity, and without any concern for their experiences or feelings (Arluke, 1988; Nussbaum 1995 cited in Wikipedia). Notice the following citation in which the poet Wordsworth objectifies the female subject (with the semantic features: + *human*, + *animate*, + *concrete*) as a ghost (with the semantic features : – *human*, – *animate*, – *concrete*), calling her an *apparition*, a *phantom*, and a *spirit* (stanzas 1 and 2):

1. She was a *Phantom* of delight
When first she gleamed upon my sight;
A lovely *Apparition*, sent
To be a moment's ornament;
2. I saw her upon nearer view,
A *Spirit*, yet a Woman too!

(She was a Phantom of delight: William Wordsworth)

According to Leech (1969), the figures of speech metaphor, irony, and synecdoche are under the umbrella term semantic deviation. Other terms, such as periphrasis, paradox, metonymy, pun, and hyperbole are also different types of semantic oddity and transference of meaning (ibid), and thus represent linguistic deviations which characterize the literary style.

*Metaphor* is a figure of speech in which a word or a phrase is applied to an object or an action to which it is not literally applicable, or to describe somebody or something in a way that is different from normal use to show that they have the same qualities, and to make the description more impressive as in Burn's words: "*My love is a red, red rose*" (Abrams and Harpham, 2009). One of the most commonly cited examples of metaphor in English literature is Shakespeare's monologue: All the world*'*s a stage from As You Like It.

Lord Tennyson gives us a good example of metaphor in: *I dipt into the future* where it is possible for someone to dip into water (in a river, a lake, or a sea), but not in the future. Here the word *future*, with the semantic feature (+ abstract), is indirectly compared to a concrete noun (− abstract); a river, lake, or sea into which one can dip (Mansoor, 2013. p. 131-32):

When I *dipt into the future* as human eye could see;
Saw the vision of the world and the wonder that
would be.

(Locksley Hall: Alfred Tennyson)

Broadly speaking, *irony* is the use of words to express something contradictory to the literal meaning. It is a rhetorical device or a literary technique in which what appears, on the surface to be the case, differs radically from what is actually the case (Muecke, 1969. p. 80). Irony is mainly intended to make fun of somebody or something, to underestimate his/her or its value as a sign of contempt or scorn.

In literature, Mark Antony's speech following the assassination of Cesar is an excellent classic example of irony. Mark Antony praised Brutus as an *honorable man* while at the same time condemning him. He also praised other conspirators, who were ironically described, as *honorable men* (Mansoor, 2013. p. 290):

Here, under leave of Brutus and the rest
For Brutus is an *honorable man*;
So are they all, all *honorable men*,
Come I to speak in Caesar's funeral.
He was my friend, faithful and just to me;
But Brutus says he was ambitious;
And Brutus is an *honorable* man.

(Julius Caesar: Shakespeare)

*Synecdoche* is a literary device in which a part is used to represent a whole, or a whole is used to represent or signify a part of something. It is a figure of speech in which a term for a part of something refers to the whole of something or vice versa (Clifton, 1983). A good example of this poetic device is found in Tennyson's masterpiece *In Memoriam* where the words *doors* and *hand* are parts which are used by the poet to refer or represent a whole: *house* and *friend* (respectively) (Mansoor, 2013. p. 133):

*Doors*, where my heart was used to beat
So quickly, waiting for a *hand*,
A *hand* that can be clasped no more.

(In Memoriam: Alfred Tennyson)

*Metonymy* is the act of referring to something by the name of something else that is closely connected with it (representative-symbol relationship) (Yule, 1996. p. 122). It is the use of one name for the name of something else with which it is associated based on various logical connections between them (Cowie, 2009. p. 33), for example, *crown/monarch* for *king/queen,* and *the White House* for *US president.* Notice the following example in which the italicized words are indicative of this representative-symbol relationship (Leech, 1969. p. 152):

Mr. Fagin did not seek to conceal his share in
The catastrophe, but lamented with tears in his eyes
That the wrong-headed and treacherous-behavior of
The young person in question, had rendered it
Necessary that he should become the victim of
Certain *evidence for the crown*.

(Oliver Twist: Charles Dickens)

Periphrasis is the use of indirect and circumlocutory speech or writing, i.e., an indirect roundabout detailed way of

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saying something. It is the use of a longer phrasing in place of a possible shorter form of expression. It is an expression of unnecessary length, in that the meaning it conveys could have been expressed more briefly. Relevant examples are found in "The Seasons" by James Thomson include: *The funny tribe* for *fish*, *the bleating kind* for *sheep,* and *from the snowy leg… The inverted silk she drew* for *she took off her silk stocking* (Abrams and Harpham, 2009. p. 269).

In the novel Oliver Twist, there are many examples of periphrasis, one of which is found in Mr. Bumble's speech to Oliver when he mentioned the phrase: *make your eyes red* instead of *cry*:

"Don't *make your eyes red*, Oliver but eat your food
And be thankful," said Mr. Bumble, in a tone
Of impressive pomposity.

(Oliver Twist: Charles Dickens)

Broadly speaking, *hyperbole* means exaggeration or overstatement. As a figure of speech, it refers to "the extravagant exaggeration of fact or possibility. It may be used either for serious, ironic, or comic effect" (ibid, 149). A typical example of this type of exaggeration is represented (by the italicized words) in Othello's words expressing his love to Ophelia (1), and Iago's speech (2):

1. I loved Ophelia; *forty thousand brothers*
*Could not, with all their quantity of love*,
Make up my sum.

(Hamlet: William Shakespeare)

2. *Not poppy nor mandragora*,
*Nor all the drowsy syrups* of the world,
*Shall ever medicine thee* to that sweet sleep
Which thou ow'dst yesterday.

(Othello: William Shakespeare)

*Pun* is a kind of play on words; it is a humorous use of a word that has two meanings (one is explicit, the other is implicit in which the pun lies), or words that have different meanings though they sound the same (homonyms) (Mansoor, 2017. p. 65). A well-known type of pun called *equivoque* is one in which a single word/phrase is used to indicate two different meanings in a certain context where both of them are equally appropriate (Abrams and Harpham, 2009. p. 295): "*His sins were scarlet, but his books were read.*" Here, the pun lies in the word *read* which is pronounced as/red/, but indicates two different meanings.

An interesting example is found in Lewis Carroll's *Alice's Adventures in Wonderland.* Here, Alice confuses *tale* and *tail* since both are similarly pronounced/teil/(Carroll, 2000):

Mine is a long and a sad *tale!"* said the Mouse, turning
To Alice, and sighing. "It is a long *tail*, certainly,"
Said Alice, looking down with wonder at the Mouse's tail;
"but why do you call it sad" And she kept on puzzling
about it while the Mouse was speaking.

(Alice's Adventures in Wonderland: Lewis Carroll)

### *C. Syntactic Deviation*

The syntactic deviation occurs when a writer deviates from the norms of syntax. It is a departure from the normal rules of grammar. It is a kind of deviation in which poets do not follow the rules of grammar and sentence formation. According to Seturaman and Peck (1995. p. 236), "Poets tend to have their own grammar and resort to deviation whenever they have to express a meaning which the normal language cannot." This leads to ambiguity or a lack of understanding on the part of the reader.

In his long poem *Locksley Hall*, Alfred Tennyson used many deviant forms, such as many a night, many a morning, and many an evening in which the singular form is used with many. This represents a violation of the rules of English grammar in which many are used with countable plural nouns, for example, many nights/mornings/evenings. Another instance of syntactic deviation is found in lines 3 and 5 (in the following stanza) where an interrogative (with subject-verb inversion: *Did we hear/watch*) is used within a declarative statement instead of the normal structure: *We heard/we watched* (Mansoor, 2013. p. 126):

*Many a night* I saw the Pleiads rising thro' the
Mellow shade,
Glitter like a swarm of fire-flies tangled in a silver braid.
*Many a morning* on the moorland *did we hear the*
*Copses ring,*
And her whisper throng'd my pulses with the fullness
Of the spring.
*Many an evening* by the waters *did we watch the*
*Stately ships,*
And our spirits rush'd together at the touching of
The lips.

(Locksley Hall: Alfred Tennyson)

Another type of syntactic deviation, which is quite common in literary language, is represented by inversion in word order. This is known as hyperbaton which is deviation from normal word order; that transposes or reverses the natural order in sentences (Cushman et al., 2012). In his poem *We Are Seven,* Wordsworth violated the usual order (SVO) many times as (SOV). Notice the second line in the following stanza in which are we is used instead of we are. The poet has deliberately reversed the usual word order for the requirements of rhyme; to make *we* (in the second line) rhyme with *tree* (in the fourth line). Without such deviation in word order, rhyme will be damaged (Mansoor, 2013. p. 126)

Then did the little maid reply,
Seven boys and girls *are we*;
Two of us in the church-yard lie,
Beneath the church-yard *tree.*

(We Are Seven: William Wordsworth)

The syntactic deviation is also represented using ill-formed (ungrammatical) sentences, in which there is no subject and verb. Notice the first line in which the initial subject + verb (It was) have been deleted (Nofal, 2011):

A clamping cold-figured day,
He, as yet unsearched, unscratched.

(Canticle for Good Friday: Geoffrey Hill)

A clear instance of syntactic deviation in the form of double (sometimes triple) negation is found in literary style. To Labov (1969), multiple negations are not an ungrammatical and illogical phenomenon but a sensible system with consistent rules (Mazzon, 2004. p. 126). In examples (1) and (2) below, a sentence negator (*don't*) cooccurs with a negative quantifier (*never*), and triple negation (*don't, never, no*) are represented, respectively (Nakayama, 2007. p. 82-4):

1. "… But *don't* you *never* find it a little "eating?"
2. "… That's all, old chap, and *don't never* do it *no* more."

(Great Expectation: Charles Dickens)

Another type of syntactic deviation is the use of parentheses, where the normal construction of sentences is violated. This happens when long parentheses, which are usually indicated by the use of round or square brackets, dashes, or commas, are used. A good example in drama is found in Hamlet (2.2.131–35):

But what might you think,
When I had seen this hot love on the wing—
As I perceiv'd it (I must tell you that)
Before my daughter told me — what might you,
Or my dear Majesty your queen here, think…?

(Hamlet: Shakespeare)

Another feature of syntactic deviation is the so-called parallelism or parallel sentence structure, which is a type of foregrounding. Foregrounding is the practice of making something stands out from the surrounding words or images (Leech and Short, 2007). Leech (1969) makes a distinction between parallelism and deviation as two main types of foregrounding. He maintains that parallelism can be seen as unexpected regularity, while deviation can be described as unexpected irregularity. More specifically, parallelism is the repetition of a chosen grammatical structure within a sentence. In addition to, its syntactic function in reflecting the sameness of structure, it also bears sameness of meaning and marks rhythmical language (Ghazala, 1994 cited in Mansoor, 2013. p. 130). Notice the repetition of the parallel phrase *Then*, *came* + (*the*) + *noun:*

*Then, came* the Teetotal Society, who complained
That these same people…
*Then*, *came* the chemist and druggist, with other
Tabular statements…
*Then*, *came* the experienced chaplain of the jail…
*Then, came* Mr. Gradgrind and Mr. Bounderby, the
Two gentlemen…

(Hard Times: Charles Dickens)

A similar example of this type of structure is found in Dylan Thomas's poem *Fern Hill* where the same structure (as indicated by the underlined words) is repeated in the two successive lines reflecting the poet's stylistic and emotional condition forming a unity of exposition (Bold, 1976 cited in Ghazala, 1994. p. 258-9). It is to be noted, here, that either the same word is literally repeated (1: As, I, was, and/2: Golden, in, the, of, his) or a different word but of the same grammatical category (1: Now/and, young/green, easy/carefree, under/among, apple boughs/barns/2: heydays/mercy, eyes/means):

1. Now as I was young and easy under the apple boughs
   And as l was green and carefree among the barns
2. Golden in the heydays of his eyes
   Golden in the mercy of his means

(Fern Hill: Dylan Thomas)

*D. Phonological Deviation*

Phonological deviation is characterized by inadequate use of phonological rules of language, due to a linguistic disorganization, while phonetic deviation is a mechanical change in articulatory production arising from a motor disability involved in sound production (Glaing and Espeland, 2005; Smith et al., 2005 cited in Granzotti et al., 2017). Examples of this kind of deviation are found in prose (novel); in Oliver Twist where the character Barney has a difficulty with the nasal consonants/n/and/m/which he pronounces as/d/and/b/(respectively) (Sadoun, 2014. p. 21):

1. I'*b d*ot certai*d* you ca*d*, said Barney, who was
   The attendant sprite; "but I'll i*d*quire."
2. Frob the cuttry, but subthing in your way, or
   I'*b b*istaked.

(Oliver Twist: Charles Dickens)

In (1) the italicized letters in I'*d*, *d*ot, certai*d*, ca*d,* and i*d*quire are mispronunciations for: I'm, *not*, *certain*, *can*, *inquire* (respectively). In (2) the italicized letters in Fro*b*, su*b*thing, I'b, and *b*istaked are mispronunciations for *from*, *something, I'm*, *mistaken*. Notice also the graphological deviations in the words: *Subthing* for (something) and *bistaked* for (*mistaken*).

A similar example is found in Dickens's Hard Times, where certain consonants are substituted by others. This is attributed to the speaker's inability to produce the sounds correctly due to physical defects (Ouameur, 2013. p. 25). Notice the italicized words which contain two kinds of sound substitution for the consonant/θ/:

1. /θ/for/s/in *voithe*/vɔɪitfor voice/vɔɪi), *huthky*
   /hʌθki/for husky/hʌski/.
2. /θ/for/z/in *eathy*/i:θi/for easy/i:zi/,*ith/i*θ/for is
   /iz/and *ath*/æθ/for as/æz/.
   My *voithe ith* a little *huthky*, Thquire, and not *eathy*
   Heard by them *ath* don't know me;

(Hard Times: Book 1, Chap VI: Charles Dickens)

Another type of phonological deviation in poetry is represented by omission of certain sounds (graphologically indicated by letters): The omission of an initial part of a word or phrase (aphesis): *tis* (it is), the omission of a medial part (syncope): *ne'er* (never), *o'er* (over), *pow'r (*power*)*, or the omission of a final part (apocope): *Oft* (often). These devices are deliberately used by poets as a poetic license to cope with or match the rhyme, to harmonize the meter or as a way of adhering to archaic language.

Examples of these three phonological devices are found in three different works by Shakespeare (1) Aphesis (*scape* for *escape*), (2) syncope (*wat'ry* for *watery, levell'd* for *levelled*), (3) apocope (*ope* for *open*), respectively

1. Who should "*scape* whipping"
   If every man were treated as he deserved.

(Hamlet: Shakespeare)

2. This said, his *wat'ry* eyes he did dismount
   Whose sights till then were *levell'd* on my face,

(A Lover's Complaint: Shakespeare)

3. When I *ope* my lips let no dog bark

(The Merchant of Venice: Shakespeare)

The phonological deviation is sometimes created in verse when the poet intentionally modifies the pronunciation of a word at the line ending for the requirement of rhyme so as to arrange the patterns of sounds in a better and easier way and bring about the communicative effect which he/she intends to have. Notice the italicized words which vary in their pronunciation, yet they are deviantly used to create a rhyming harmony (Abbas, 2017. p. 1709):

Break it not thou! Too surely shalt thou *find*
Thine own well full, if thou returnest home,
Of tears and gall. From the world's bitter *wind*.

(Adonais: Shelley)

### E. Morphological Deviation

According to Crystal (2003. p. 134), any sort of deviant morphological constructions is the product of ill-formed morphemes. This deviation, which is quite common in literary texts, is related to the way words are formed. Morphological deviations involve many things, such as addition of affixes to words which they usually do not take or removal of their usual affixes. A typical example of this type is indicated by the use of the *er*, *est* suffixes (for the comparative and superlative), but with adjectives such as (*grateful*, *ungrateful*, and *thankful*) that require the use of *more* and *most* in example (1) or the use of double superlative as in example (2) below (Brook and Ichikawa, 1954. p. 239):

1. "Well! Of all the *ungratefullest*, and worst-disposed
   Boys as I ever see, Oliver, you are…"
2. "Oliver, you are one of the *most* bare-*facedest*."

(Oliver Twist: Charles Dickens)

Another example is present in the poem *Adonais* by P. B. Shelley (Abbas, 2017). Notice the italicized words which represent deviations from the morphological rules of English (*waked* for *woken*; *airs* for *air*; *nothings* for *nothing*):

1. For whom should she have *waked* the sullen year?
   (Stanza xvi)
2. The *airs* and streams renew their joyous tone;
   (Stanza xviii)
3. Invulnerable *nothings,*--We decay (stanza no. xxxix)
   (Stanza xxxix) (Adonais: Shelley)

In his Complete Poems, Cummings (1972) coins many ill-formed words which violate the rules of morphology. These deviations include (1) ly-suffix (ingly - adverbs) like *kissingly*; (2) the deviant use of the un-prefix like *unlove*; and (3) the modal verb *can* and the quantifier *most* as pure plural nouns (Quoted from Matrood, 2008):

1. *Kissingly,* i will bring you every spring
   Handfuls of little normal worms. (161)
2. *Unlove's* the heavenless hell and homeless home
   Of knowledgeable shadows (quick to seize) (765)
3. Our *can'ts* were born to happen
   Our *mosts* have died in more (537)

(Complete Poems: Cummings)

### F. Graphological Deviation

It is a kind of deviation where rules of legible writing are ignored or neglected. This happens when words are written without any boundaries in lines, space, or punctuation marks. Occasionally, poets and novelists write without putting full stops at the end of sentences. Notice the following three lines from Eliot's *Ash-Wednesday* in which the full stop is missing at the end of lines. Eliot has intentionally done this to provoke some intended esthetic effects (Saleem, 2012):

The right time and the right place are not here
No place of grace for those who avoid the face
No time to rejoice for those who walk among
Noise and deny the voice

(Ash-Wednesday: Eliot)

An extraordinary graphological deviation is exemplified by Carlos Williams in his poem "*As the cat*" in which all the rules of graphology and punctuation are completely ignored and violated. The poem is a deviant one; actually, an ill-formed single sentence (Freeborn et al., 1986 cited in Ghazala, 1994. p. 249):

As the cat climbed over the top of the jam closet
First the right refoot carefully then the hind stepped down
into the pit of the empty flowerpot

(As the cat: Carlos Williams)

Although the use of a capital letter at the beginning of each line in verse is a distinctive graphological device that distinguishes it from other types of language, deviation from this rule may exist in poetry. This is represented by the use of small letters in positions where capital letters are supposed to be used. A typical example is found in Cumming's lines of verses (1) which begin with small letters instead of capitals, and a small form of the first person pronoun "I" instead of the usual capital form "I" (Li and Shi, 2015. p. 37). Conversely, certain words in the middle of the line begin with a capital letter violating the rules of capitalization (2) (Abbas, 2017. p. 1710):

1. somewhere *i* have never traveled, gladly beyond
   Any experience, your eyes have their silence:
   In your most frail gesture are things which enclose
   Me, or which *i* cannot touch because they are too near
   (Somewhere i have never traveled, gladly beyond: Cumming)
2. To that high *Capital*, where kingly *Death*
   (Adonais: Shelley)

### G. Historical Deviation

The historical deviation is well represented when the poet uses archaic (old-fashioned) words which are not found in daily use of language but refer to the language of the past. Poets do this to add an esthetic and emotive effect to the literary text.

This kind of deviation can also be employed by a writer or a public speaker of today if he/she wishes to move the audience by the seriousness and significance of his/her message. A good example, in this respect, is found in the inaugural speech of President Kennedy, 1961, in which he uses the archaic words *forth* (forward) and *foe* (enemy). He also begins his speech with the elevated *let-construction* (Leech and Svartvik, 1985. p. 26):

"*Let* the word go *forth* from this time and place,
To friend and *foe* alike, that the torch has passed to
A new generation of Americans…"

Archaic vocabulary is widely used in literature, especially in poetry. This serves the function of reflecting the formality and conservatism of literary language. George Herbert (19th-century poet) included many archaic words in his poem *Easter Wings*. These words include beginne (begin), thinne (thin), sinne (sin), didst (did), thou/thee (you), thy/thine (your), and victorie (victory) (Ghazala, 1994. p. 248, 279):

My tender age in sorrow did *beginne*.
And still with sickness and shame
Thou *didst* so punish *sinne.*
That I became
Most *thine.* With *thee* let me combine
And feel this day *thy victorie*:
For if I imp my wing on *thine*,
Affection shall advance the flight on me.
(Carter and Long, 1987 cited in Ghazala, 1994)

Shakespeare's plays are full of archaic words and expressions which are not found in today English since they have nearly been forgotten (Rahman and Weda, 2019. p. 42-43). These include, among other things, the following: *hie* (hurry), *thou* (you-subject), *thee* (you-object), *thy* (your), *thine* (yours), *hence* (away), *ere* (before), *doth* (does), *didst* (did), *art* (are), *hath* (has), *shalt* (shall), *liveth* (lives), *anon* (right now), *hark* (listen), *wherefore* (why). Consider the following lines from Tennyson's *Locksley Hall* (Mansoor, 2013. p. 130):

"Yet it shall be; ***thou shalt*** lower to his level day by day,
What is fine within ***thee*** growing coarse to
Sympathize with clay.
As the husband is, the wife is: ***thou art*** mated with
A clown,
And the grossness of his nature will have weight to
Drag ***thee*** down."
(Locksley Hall: Alfred Tennyson)

### *H. Dialectal Deviation*

According to Leech (1976), this type of deviation is frequently noticed in verse written by poets who intend to reveal their emotions and feelings but think that the standard language cannot help in exactly representing such feelings and emotions. Therefore, they resort to the dialect of their mother tongue because they think that it is in a better situation to do this role rather than the standard language.

The term dialectal deviation or *dialectism*, as labeled by Leech (1969. p. 49), indicates the borrowing of certain aspects of socially or regionally defined dialects that deviate from the standard norms of language, for example, *heydeguyes* (a type of dance), *weaned* (a newly weaned kid or lamb), and *rontes* (young bullocks) in Spenser's "The Shepheardes Calender" (ibid). Non-native writers, and poets in particular, employ words from their mother tongues to color their poems with their own culture and traditions.

A good example of dialectal deviation (in prose) is cited from Dickens' Oliver Twist where substandard (Cockney) words are used instead of the standard ones (Brook, 1970. p. 240):

That's *acause* they damped the straw *afore* they
Lit it in the *chimbley* to make *'em* come down *agin*,
Said Gamfield; that's all smoke, and no blaze;
*Vereas* smoke *ain't o"* no use at all in making a
Boy come down, for it only *sinds* him to sleep,
And that's *wot* he likes.
(Oliver Twist Charles Dickens)

The italicized lexical items are dialectal (Cockney) words for the standard ones *Because*, *before*, *chimney*, *them*, *again*, *whereas*, *isn't*, *of*, *sends,* and *what* (respectively).

Another example which typically represents this kind of deviation is seen in a poem entitled *Tizzic* by Edward Brathwaite, the West Indian poet in which he narrates a panic story of a slave. To convey and project the picture of the West Indian culture, he employs words from their own language. Brathwaite's interests in black musical forms and jazz music seem to provide him with basis for an esthetic in *The Arrivants* where he mentions words such as *Calypso*, *banjo*, *limbo*, and *maljo* (George, 2011. p. 53):

Steel drum steel drum
Hit the hot *calypso* dancing
Hot rum hot rum
Who goin' stop this bacchanalling?
For we glance the *banjo*
Dance the *limbo*
Grow our crops by *maljo*
(The Arrivants: Edward Brathwaite)

### *I. Register Deviation*

The register is a language variety used by a particular group of people who share the same occupation, interest, or social situation, such as advertising, church service, and shopping (Stern, 1996). This refers to the area in which vocabulary, grammar, etc., are used by speakers in particular situations or contexts (Mansoor, 2013. p. 13). The term situational dialect, which is also used to refer to register, is only used by a small group of people in society to serve certain needs or requirements.

A chief characteristic of register deviation is the so-called register mixing. This happens when features from different registers are used in the same text (Leech, 1969; Halliday et al., 1964). A good example of this type is quoted from an advertisement term (To Let) to picture Oliver's poor and wretched condition as if he were a real piece of estate (Miller, 1958. p. 36)

The next morning, the public were once more
Informed that Oliver Twist was again *To Let*, and
That five pounds would be paid to anybody who
Would take possession of him.
(Oliver Twist: Charles Dickens)

In Auden's letter to Lord Byron, there is an example of register where *Quorn* (a vegetable substance that can be used in cooking instead of meat) is used (Onu, 2016):

And many a bandit, not so gently born
Kills vermin every winter with the *Quorn*.
(Letter to Lord Byron: Lord Byron)

## IV. Conclusion

In this research paper, we have tried to shed light on literary style as a situational variety of English, and the linguistic deviations occurring in it. It has been found that literary style, basically in poetry, has many deviations (at different levels) which characterize this type of style. These include lexical, semantic, syntactic, phonological, morphological, graphological, historical, dialectal, and register.

Since the paper is of an expository and informative nature, the researchers have tried to investigate and reveal all types of linguistic deviations in literary texts (poems, plays, novels, and miscellaneous) depending on a qualitative method whereby representative samples of this linguistic phenomenon have been located and chosen. The samples were stylistically analyzed and put into well-defined groups depending on Leech's categorization. As for its informative nature, it is hoped that this research paper will be a useful and helpful guide for readers and learners (students of English in particular), researchers, and those interested in the field in that it acquaints them with the irregularities of this linguistic phenomenon which is an outstanding characteristic of literary style. A phenomenon which causes difficulty for readers, and students of English in particular due to its complexity, ambiguity, and deviance from standard norms of ordinary language use.

Linguistic deviation, as a characteristic feature of literary style, occupies an important role in stylistic studies and discourse analyses. This is so because linguistic deviation, with its various types, is a reflection of the poet's, novelist's, or writer's style; his/her individual mode of expression, way of putting conceptions into words; it is a characteristic feature of language which conveys feelings or ideas, or a system of feelings or ideas, that specifically belong to the author (Murray, 1994. p. 65). To Crystal (2003. p. 66), style is viewed as the selection of a group of linguistic features from all the possibilities in language. It overlaps with discourse analysis which is mainly concerned with the study of examples of language use and written forms in particular (Richards et al., 1993. p. 111).

Style is the outcome of distinctive choices and modes of choices among linguistic possibilities (Chatman, 1967. p. 18). It is a variety of language used in a particular social setting (Ottenheimer, 2006). In its general sense, style refers to the manner of doing or presenting things. It refers to the "variations in a person's speech or writing" (Richards et al., 1993. p. 360). In this sense, it is considered as systematic variation of language.

Literary style has a special status since ancient times. It has been considered as elevated and distinctive from all other types of language, one which is characterized by its deviation from ordinary use of language in that it breaks the common norms or standards of language. The deviations in literary language, poetry, in particular, help in creating a style using language that is different from the normal use. Poetic language is quite different from conventional use in that poetry deviations play a significant role when the poet departs from the expected norms of linguistic expression to convey something more than what would be conveyed through the non-deviant language.

The main concern of this research paper is focused on investigating and analyzing the phenomenon of linguistic deviation in literary style, with its different types ranging from graphology, syntax, semantics, phonology, morphology, lexicon, history, and register.

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# Predicting Breast Cancer Survivability: A Comparison of Three Data Mining Methods

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***Abstract*—This study concentrates on predicting breast cancer survivability using data mining, and comparing between three main predictive modeling tools. Precisely, we used three popular data mining methods: Two from machine learning (artificial neural network [ANN] and decision trees) and one from statistics (logistic regression) and aimed to choose the best model through the efficiency of each model and with the most effective variables to these models and the most common important predictor. We defined the three main modeling aims and used by demonstrating the purpose of the modeling. By using data mining, we can begin to characterize and describe trends and patterns that reside in data and information. The preprocessed dataset contents were of 87 variables and the total of the records are 457,389; which became 93 variables and 90308 records for each variable, and these datasets were from the SEER database. We have achieved more than three data mining techniques and we have investigated all the data mining techniques and finally, we find the best thing to do is to focus about these data mining techniques which are ANN, Decision Trees, and Logistic Regression using SAS Enterprise Miner 5.2 which is in our view of point are the suitable system to use according to the facilities and the results are given to us. Several experiments have been conducted using these algorithms. The achieved prediction implementations are comparison-based techniques. However, we have found out that the neural network has a much better performance than the other two techniques. Finally, we can say that the model we chose has the highest accuracy which specialists in the breast cancer field can use and depend on.**

***Keywords*—Predicting breast cancer, Data mining, SEER database, Artificial neural network.**

## I. Introduction

In their worldwide end-user business analytics forecast, IDC, a world leader in the provision of market information, divided the market, and differentiated between “core” and “predictive” analytics (Vesset and Chua, 2017). Breast cancer is cancer that forms in breast tissues and is classed as a malignant tumor when cells in the breast tissue divide and grow without the normal controls on cell death and cell division. We know from looking at breast structure that it contains ducts (tubes that carry milk to the nipple) and lobules (glands that make milk) (Holland, 2008). Breast cancer can occur in both men and women, although breast cancer in men is rarer and so breast cancer is one of the common types of cancer and major causes of death in women in the UK. In the past 10 years, breast cancer rates in the UK have increased by 12%. In 2004, there were 44,659 new cases of breast cancer diagnosed in the UK: 44,335 (99%) in women and 324 (1%) in men. Breast cancer risk in the UK is strongly related to age, with more than (80%) of cases occurring in women over 50 years old. The highest number of cases of breast cancer is diagnosed in the 50–64 age groups. Although very few cases of breast cancer occur in women in their teens or early 20s, breast cancer is the most commonly diagnosed cancer in women under 35. By the age of 35–39 years, almost 1500 women are diagnosed each year. Breast cancer incidence rates continue to increase with age, with the greatest rate of increase before the menopause.

As the incidence of breast cancer is high and 5-year survival rates are over 75%, many women are alive who have been diagnosed with breast cancer (Holland, 2008). The most recent estimate suggests around 172,000 women are alive in the UK having had a diagnosis of breast cancer. Even though in the last couple of decades, with their increased emphasis toward cancer-related research, new and innovative methods of detection and early treatment have developed which help to reduce the incidence of cancer-related mortality (Edwards et al., 2002), cancer in general and breast cancer to be specific is still a major cause of concern in the United Kingdom.

Although cancer research is in general clinical and/or biological in nature, data-driven statistical research is becoming a widespread complement in medical areas where data and statistics driven research is successfully applied.

For health outcome data, an explanation of model results becomes really important, as the intent of such studies is to get knowledge about the underlying mechanisms.

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Problems with the data or models may indicate a common understanding of the issues involved, which is contradictory. Common uses of the models, such as the logistic regression model, are interpretable. We may question the interpretation of the often inadequate datasets to predict. Artificial neural networks (ANN s) have proven to produce good prediction results in classification and regression problems. This has motivated the use of ANN) on data that relate to health results such as death from breast cancer disease or its diagnosis. In such studies, the dependent variable of interest is a class label, and the set of possible explanatory predictor variables – the inputs to the ANN – may be binary or continuous (Allison, 2001).

Predicting the outcome of an illness is one of the most interesting and challenging tasks in which to develop data mining applications. Survival analyses are a section in medical speculation that deals with the application of various methods to historic data to predict the survival of a specific patient suffering from a disease over a particular time period.

With the rising use of information technology powered with automated tools, enabling the saving and retrieval of large volumes of medical data, this is being collected and being made available to the medical research community who are interested in developing prediction models for survivability (Chow et al., 1994).

## II. Methodology

### A. Research Aims and Objectives

The objective of the present presentation is to significantly enhance the efficiency of the accuracy of the three models we chose. Considering the justification of the high efficiency of the models, it was decided to embark on this research study with the intended outcome of creating an accurate model tool that could both build calculate and depict the variables of overall modeling and increase the accuracy of these models and the significance of the variables.

For the purposes of this study, we decided to study each attribute individually and to know the significant of the variables which are strongly built into the models. Furthermore, for the first iteration of our simulation for choosing the best model (Intrator and Intrator, 2001), we decided to focus on only three data mining techniques which were mentioned previously. Having chosen to work exclusively with SAS systems, we also felt it would be advantageous to work with SAS rather than other software since this system is most flexible.

After duly considering feasibility and time constraints, we set ourselves the following study objectives:

a. Propose and implement the three models which are selected and applied, and their parameters are calibrated to optimal values and to measure and predict the target variable (0 for not survive and 1 for survive)
b. Propose and implement the best model to measure and predict the target variable (0 for not survive and 1 for survive)
c. To be able to analyze the models and to see which variables have the most effect on the target variable
d. To visualize the aforementioned target attributes through simple graphical artifacts
e. Built the models that appear to have high quality from a data analysis perspective.

### B. Activities

The steps taken to achieve the above objectives can be summarized as below. As mentioned, the study consisted of building the model, which has the highest accuracy and analyzing the three models we chose.

Points (a) and (b) relate to the data preparation of the study, points (c) and (d) relate to the build of the model, and points (e) through (g) relate to the analyze of the models:

a. To characterize and describe trends and patterns that reside in data and information about the data
b. To choose the records, as well as evaluating these transformation and cleaning of data for modeling tools. Cleaning of data contains the estimate of missing data by modeling (mean, mode, etc.)
c. Selecting modeling techniques and applying their parameters, requirements on the form of data, and applying the dataset of our choosing
d. Evaluation of the model and review of the steps executed to construct the model to achieve the business objectives
e. To be able to analyze the models and to see which variables are more applicable to the target variable
f. Decide on how the decision on the use of the data mining result should be reached
g. SAS software to be able to get the best results and analyze the variables which are most significant to the target variable.

### C. Data Source

We decided to use a dataset which is a compatible with our aim; the data mining task we decided to use was the classification task.

One of the key components of predictive accuracy is the amount and quality of the data (Burke et al., 1997).

We used the dataset contained in the SEER cancer incidence public-use database for the years 1973–2001. The SEER is the surveillance, epidemiology, and end results in data files that were requested through web site (http://www.seer.Cancer.gov). The SEER Program is part of the Surveillance Research Program at the National Cancer Institute and is responsible for collecting incidence and survival data from the participating 12 registries (Item Number 01 in SEER user file in the cancer web), and deploying these datasets (with the descriptive information of the data itself) to institutions and laboratories for the purpose of conducting analytical research (SEER cancer).

The SEER public use data contain nine text files, each containing data related to cancer for specific anatomical sites (i.e., breast, rectum, female genital, colon, lymphoma, other digestive, urinary, leukemia, respiratory, and all other sites). In each file, there are 93 variables (the original dataset before changing) which became 33 variables, and each record in the file relates to a specific incidence of cancer. The data in the file are collected from 12 different registries (i.e., geographic areas). These registries consist of a population that is representative of the different racial/ethnic groups living in the United States. Each variable of the file contains 457,389 records (observations), but we are making some changes to the total of the variables adding some extra variables according to the variables requirements in the SEER file, for instance, the variable number 20 which is (extent of disease) contains (12-digits), the variable field description is denoted to SSSEELPNEXPE and we describe those letters to: SSS are the size of tumor, EE are the clinical extension of tumor, L is the lymph node involvement, PN are the number of positive nodes examined, EX are the number nodes examined, and PE are the pathological extensions for 1995+ prostate cases only. We have had some problems when we converted data into SAS datasets, but we recognized the problem which was with some names of the variables, for instance, the variable “Primary Site” and “Recode _ICD_O_I” are actually character variables: They, therefore, need to be read in using a “$” sign to indicate that the variable is text, we have also read in the variable “Extent_ of_Disease.” There are two types of variables in the dataset which are categorical variables and continuous variables.

Afterward, we explored the data, preparation, and cleansing the dataset, the final dataset which contained 93 variables 92 predictor variables and the dependent variable.

The dependent variable is a binary categorical variable with two categories: 0 and 1, where 0 representing to did not survive and 1 representing to survive. The types of variables are as follows:

The categorical variables are: (1) Race (28 unique values), (2) marital status (6 values), (3) primary site code (9 values), (4) histology (123 values), (5) behavior (2 values), (6) sex (2 values), (7) grade (5 values), (8) extent of disease (36 values), (9) lymph node involvement (10 values), (10) radiation (10 values), (11) stage of cancer (5 values), and (12) site-specific surgery code (11 values).

While the continuous variable is: (1) Age, (2) tumor size, (3) number of positive nodes, (4) number of nodes, and (5) number of primaries.

The dataset is divided into two sets: Training set and testing set. The training set is used to construct the model, and the testing set is employed to determine the accuracy of the model built.

The position of the tumor in the breast may be described as the positions on a clock, as shown in (Fig. 1) (Coding Guidelines Breast, 2007; SEER Program Quality Control Section, 2007; SEER Program Code Manual, 1998).

## III. Overview

### A. Background

We can explain here some research studies which carried out regarding the prediction of breast cancer survivability.

The first paper is “predicting breast cancer survivability: A comparison of three mining methods” (Delen et al., 2004).

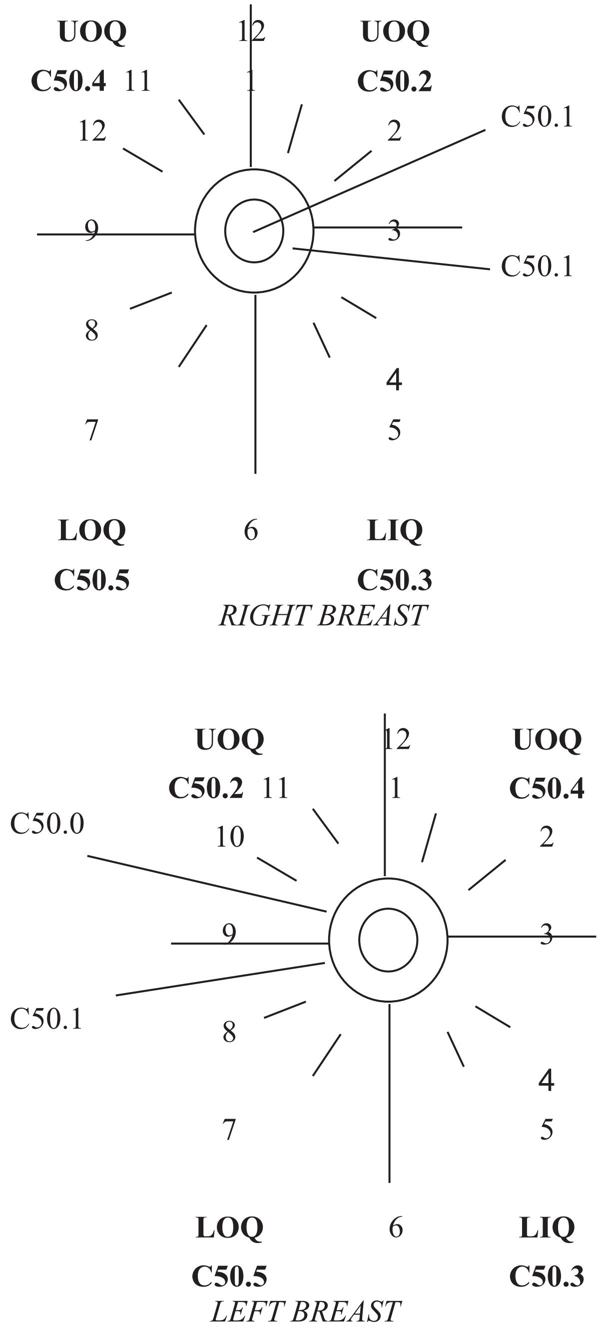


Fig. 1. O’clock positions and codes quadrant of breasts.

They have used three data mining techniques, which are decision tree (C5), ANNs, and logistic regression. They have used the data contained in the SEER cancer incidence public-use database for the years 1973–2000 and obtained the results using the raw data which were uploaded into the MS access database, SPSS statistical analysis tool, statistical data miner, and clementine data mining toolkit. These software packages were used to explore and manipulate the data. The following section describes the surface complexities and the structure of the data. The results indicated that the decision tree (C5) is the best predictor from which they found an accuracy of 93.6% and they found it to be better than the ANNs which had an accuracy of about 91.2%. The logistic regression model was the worst of the three with 89.2% accuracy.

The models for the research study were based on the accuracy, sensitivity, and specificity and evaluated according to these measures. These results were achieved using ten-fold cross-validations for each model. They found according to the comparison between the three models that the decision tree (C5) performed the best of the three models evaluated and achieved a classification accuracy of 0.9362 with a sensitivity of 0.9602 and a specificity of 0.9066. The ANN model achieved accuracy 0.9121 with a sensitivity of 0.9437 and a specificity of 0.8748. The logistic regression model achieved a classification accuracy of 0.8920 with a sensitivity of 0.9017 and a specificity of 0.8786; the detailed prediction results of the validation datasets are presented in the form of confusion matrixes (Hosmer and Lemeshow, 1994).

The second research study was “predicting Breast Cancer survivability using data mining techniques” (Bellaachia and Guven, 2005). In this research, they have used data mining techniques: The Naïve Bayes, the back-propagated neural network, and the C4.5 decision tree algorithms (Huang et al., 2003). The data source which they used was the SEER data (period of 1973–2000 with 433,272 records named as Breast.txt); they pre-classified into two groups of “survived” 93,273 and “not survived” 109,659 depending on the survived time records field. They have calculated the results using the Weka toolkit. The conclusion of the research study was based on calculations dependent on specificity and sensitivity. They also found that the decision tree (C4.5) was the best model with accuracy 0.0867, then the ANN with accuracy 0.865 and finally the Naïve Bayes with accuracy 0.0845. The analysis did not include records with missing data. This research study did not include the missing data, but our research does include the missing data, and this is one of the advances we made when comparing to the previous research.

The third research study was “ANN improve the accuracy of cancer survival prediction” (Burke et al., 1997). They have focused on the ANN and the tumor nodes metastasis (TNM) staging, and they used the same dataset SEER, but for new cases collected from 1977 to 1982. Based on this research study, the extent of disease variables for the SEER dataset was comparable to the TNM variables but not always identical to it. If considering accuracy, they found when the prognostic score is not related to survival and the score is 0.5, indicates a good chance for the accuracy, but if the score is from 0.5, that means this is better on average for the prediction model is at predicting which of the two patients will be alive.

The fourth research study was “prospects for clinical decision support in breast cancer based on neural network analysis of clinical survival data” (Kates et al., 2000). This research study used a dataset for patients with primary breast cancer who were enrolled between 1987 and 1991 in a prospective study at the Department of Obstetrics and Gynecology of the Technische University of Munchen, Germany. They have used two models (neural network and multivariate linear cox). According to the conclusion, the neural network in this dataset does not prove that the neural nets are always better than cox models, but the neural environment used here tests weights for significance, and removing too many weights usually reduces the neural representation to a linear model and removes any performance advantage over conventional linear statistical models.

Fig. 2 shows the survival rates of breast cancer among the states where the lowest rate is highlighted with red color, while, the highest rate where highlighted by yellow color.

### *B. Data Mining Techniques*

*What is data mining? Why use data mining*

Nowadays, data mining is the process of extracting hidden knowledge from large volumes of raw data. Data mining is the main issue at the moment; the main problems these days are how we can to forecast any kind of data to find the best predictive result for predicative our information. Unfortunately, many studies fail to consider alternative forecasting techniques, the relevance of input variables, or the performance of the models when using different trading strategies.

The concept of data mining is often defined as the process of discovering patterns in larger databases that means the data are largely opportunistic, in the sense that it was not necessarily got for the purpose of statistical inference. A significant part of a data mining exercise is spent in an iterative cycle of data investigation, cleansing, aggregation, transformation, and modeling. Another implication is that models are often built on data with large numbers of observations and/or variables. Statistical methods must be able to execute the entire model formula on separately acquired data and sometimes in a separate environment, a process referred to as scoring. Data mining is the process of extracting knowledge hidden from large volumes of raw data. Powerful systems for collecting data and managing it in large databases are in place in all large and mid-range companies (Agilent Technologies, 2005). However, the bottleneck turning this data into valuable information is the difficulty of extracting knowledge about the system studied from the collected data. Data mining automates the process of finding relationships and patterns in raw data and delivers results that can be either utilized in an automated decision support system or assessed by a human analyst (Witten and Frank, 2005). Fig. 3 shows data mining process model:

Data mining is a practical topic and involves learning in a practical, not theoretical; sense (Witten and Frank, 2005). Data mining involves the systematic analysis of large datasets

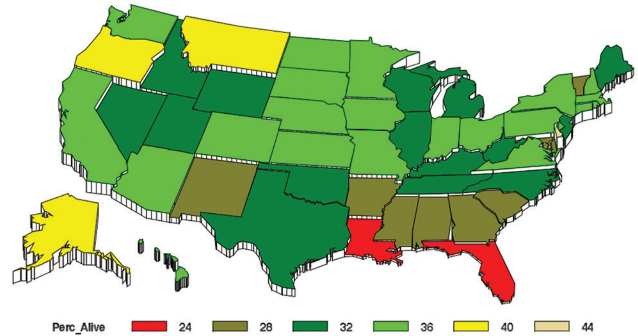


Fig. 2. Breast cancer survival rates by state.

using automated methods. By probing data in this manner, it is possible to prove or disprove existing hypotheses or ideas regarding data or information, while discovering new or previously unknown information. In particular, unique or valuable relationships between and within the data can be identified and used proactively to categorize or anticipate additional data (McCue, 2007). People always use data mining to get knowledge, not just predictions gaining knowledge from data certainly sounds like a good idea if we can do it.

Fig. 4 shows the graph is a 3-D vertical bar chart of 'Laterality', with a series variable of ‘Grade’, and a subgroup variable of 'Alive', and a frequency value, and shows the details of the values by clicking the arrow on the chart as showing in Fig. 5.

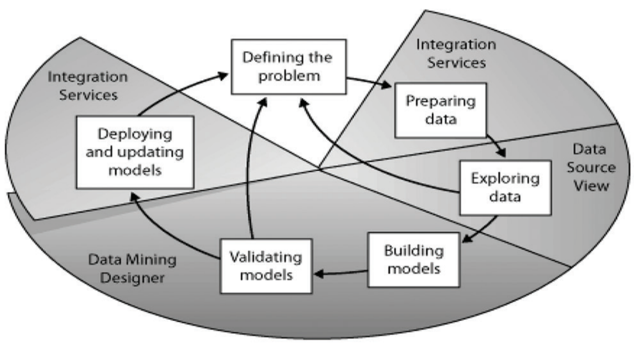


Fig. 3. Data mining process model.

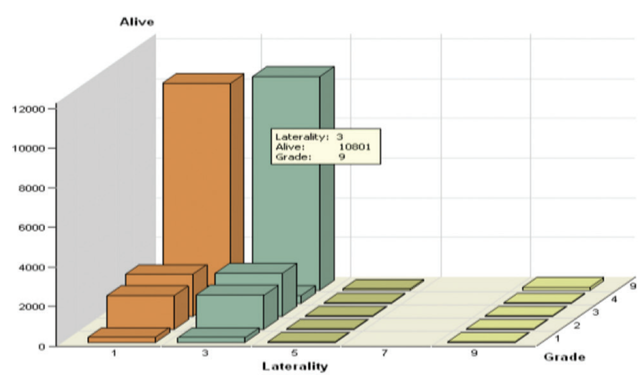


Fig. 4. The graph is a 3-D vertical bar chart of “Laterality,” with a series variable of “Grade,” and a subgroup variable of “Alive,” and a frequency value, and shows the details of the values by clicking the arrow on the chart.

*Classification*

Classification is a key data mining technique whereby database tuples, acting as training samples, are analyzed to produce a model of the given data which we have used to predict group outcomes for dataset instances, and we used it to predict whether the patient will be alive or not alive as our project. It predicts categorical class labels classifies data (constructs a model) based on the training set and the values (class labels) in a classification attribute and uses it in classifying new data. The predictions are the models continuous-valued functions that means predicts unknown or missing values (Chen, 2007). In the classification, each list of values is supposed to belong to a predefined class which considered by one of the attributes, called the classifying attribute. Once derived, the classification model can be used to categorize future data samples and also to provide a better understanding of the database contents. The classification has numerous applications including credit approval, product marketing, and medical diagnosis (Allison's, 2003).

## IV. Testing and Results

Table I. Some statistical information about the interval variables:

As we know the SAS enterprise miner doing all the necessary imputation and transformation to the dataset, then we do not want to be very worried about the data if it is not distributed normally as we said before (Aster, 2005).

Tables II-IV showing the important variables to the Alive (Target Variable):

The SEER historic Stage A Cramer’s V is 0.29 which means the association between SEER historic Stage A and Alive is 0.29 which means there is a relationship between them, Clinical_Ext_of_Tumor_New and Alive is 0.28 and so on, but the association between Alive and First_malignant_prim_ind is almost non-existent because it is close to 0.

Form the basic analysis to the dataset, we see the important variable to the target varaiable (Alive) is the SEER historic Stage A (Stages 0, 1, 2, 4, or 8), for instance, if the stage

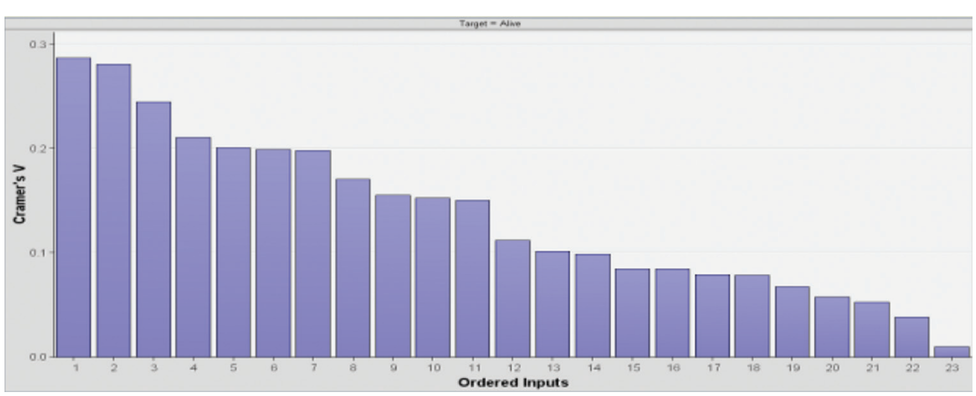


Fig. 5. Chi-square plot.

TABLE I
Interval Variables

| Obs. | Name | Mean | Std. Dev. | Skewness | Kurtosis |
|---|---|---|---|---|---|
| 1 | Age_recodeless | 12.67 | 2.909 | -0.08295 | -0.7114 |
| 2 | Decade_at_Diagnosis | 55.95 | 14.989 | -0.00715 | -0.5608 |
| 3 | Decade_of_Birth | 1919.47 | 16.077 | 0.13791 | -0.369 |
| 4 | Num_Nodes_Examined_New | 11.8 | 16.768 | 3.45426 | 15.0212 |
| 5 | Num_Pos_Nodes_New | 40.2 | 45.521 | 0.45785 | -1.7509 |
| 6 | Number_of_primaries | 1.21 | 0.464 | 2.22851 | 5.2614 |
| 7 | Size_of_Tumor_New | 92.4 | 230.732 | 3.61947 | 11.2935 |

TABLE II
Chi-square and Cramer's V

| Input | Cramer's V | Chi-square | DF | Ordered inputs | Plot | Group count |
|---|---|---|---|---|---|---|
| SEER_historic_stage_A | 0.2872 | 7447.801 | 4 | 1 | 1 | 1 |
| Clinical_Ext_of_Tumor_New | 0.2808 | 2445.714 | 26 | 2 | 1 | 2 |
| Site_specific_surgery_I | 0.2445 | 5164.87 | 23 | 3 | 1 | 3 |
| Reason_no_surgery | 0.2106 | 4004.076 | 6 | 4 | 1 | 4 |
| Tumor_Marker_I | 0.2005 | 3631.661 | 5 | 5 | 1 | 5 |
| Conversion_flag_I | 0.1991 | 3581.374 | 5 | 6 | 1 | 6 |
| Tumor_Marker_II | 0.1982 | 3549.276 | 5 | 7 | 1 | 7 |
| Sequence_number | 0.1707 | 2630.806 | 6 | 8 | 1 | 8 |
| Lymph_Node_Involvement_New | 0.1551 | 617.9745 | 8 | 9 | 1 | 9 |
| Grade | 0.1525 | 2099.662 | 4 | 10 | 1 | 10 |
| Histologic_Type_II | 0.1502 | 2037.371 | 79 | 11 | 1 | 11 |
| Diagnostic_confirmation | 0.112 | 1132.812 | 7 | 12 | 1 | 12 |
| Recode_I | 0.1012 | 921.4222 | 17 | 13 | 1 | 13 |
| Marital_status_at_diagnosis | 0.0986 | 877.4522 | 5 | 14 | 1 | 14 |
| PS_Number | 0.0841 | 639.0324 | 8 | 15 | 1 | 15 |
| Race_ethnicity | 0.0841 | 638.2951 | 23 | 16 | 1 | 16 |
| Radiation | 0.0791 | 564.559 | 9 | 17 | 1 | 17 |
| Birthplace | 0.0784 | 555.4019 | 198 | 18 | 1 | 18 |
| ICD_ Number | 0.0675 | 411.894 | 5 | 19 | 1 | 19 |
| Laterality | 0.0576 | 300.0729 | 4 | 20 | 1 | 20 |
| Behavior recode for analysis | 0.0526 | 250.0972 | 1 | 21 | 0 | 21 |
| Radiation_sequence_with_surgery | 0.0385 | 133.5344 | 5 | 22 | 0 | 22 |
| First_malignant_prim_ind | 0.0097 | 8.478975 | 1 | 23 | 0 | 23 |

is 1 that means the localized stage of an invasive neoplasm confined entirely to the organ of origin.

### *A. The Artificial Neural Network*

From the results, (Figs. 6 and 7) displays the iteration plot with an average squared error at each iteration for the training and validation datasets. The estimation process required 100 iterations. The weights from the iteration were selected. Around iteration, the average squared error flattened out in the validation (the red line) dataset, although it continued to drop in the training dataset (the green line).

As we knew, the objective function is the average error. The best model is the model that gives the smallest average error for the validation data. Table V shows some statistics label, both targets are range normalized. Values are between

TABLE III
Class Variable Summary Statistics

| Variable | Number of unique values |
|---|---|
| Behavior_recode_for_Analysis | 2 |
| Birthplace | 199 |
| Clinical_Ext_of_Tumor_New | 28 |
| Conversion_flag_I | 6 |
| Diagnostic_confirmation | 8 |
| First_malignant_prim_ind | 2 |
| Grade | 5 |
| Histologic_Type_II | 80 |
| ICD_Number | 6 |
| Laterality | 5 |
| Lymph_Node_Involvement_New | 10 |
| Marital_status_at_diagnosis | 6 |
| PS_Number | 9 |
| Race_ethnicity | 24 |
| Radiation | 10 |
| Radiation_sequence_with_surgery | 6 |
| Reason_no_surgery | 7 |
| Recode_I | 19 |
| SEER_historic_stage_A | 5 |
| Sequence_number | 7 |
| Site_specific_surgery_I | 25 |
| Tumor_Marker_I | 6 |
| Tumor_Marker_II | 6 |
| Alive | 2 |

TABLE IV
Interval Variable Summary Statistics

| Variable | Mean | Std. Dev. | Min. | Median | Max. |
|---|---|---|---|---|---|
| Age_recodeless | 12.67 | 2.909 | 4 | 13 | 18 |
| Decade_at_Diagnosis | 55.95 | 14.989 | 10 | 60 | 100 |
| Decade_of_Birth | 919.47 | 16.077 | 1870 | 1920 | 1970 |
| Num_Nodes_Examined_New | 11.8 | 16.768 | 0 | 10 | 98 |
| Num_Pos_Nodes_New | 40.2 | 45.521 | 0 | 9 | 98 |
| Number_of_primaries | 1.21 | 0.464 | 1 | 1 | 6 |
| Size_of_Tumor_New | 92.4 | 230.732 | 0 | 30 | 998 |

0 and 1. The root mean square error for Target 1 is about 43.5%, mean square error is 18.9%. The following table shows that:

### *B. Decision Trees*

The decision trees technique repetition separated observations in branches to make a tree for the purpose of evolving the prediction accuracy. Using mathematical algorithms (Gini index, information gain, and Chi-square test), to identify a variable and corresponding threshold for the variable that divides the input values into two or more subgroups. This step is repetition at each leaf node until the complete tree is created (Neville, 1999).

The aim of the dividing algorithm is to identify a variable-threshold pair that maximizes the homogeneity of the two results or more subgroups of samples. The most mathematical algorithm used for splitting contains entropy-based information gain (used in C4.5, ID3, and C5), Gini index (used in classification and regression tree), and the Chi-squared test (used in Chi-square Automatic Interaction Detector).


Fig. 6. Iteration plot with an average squared error.

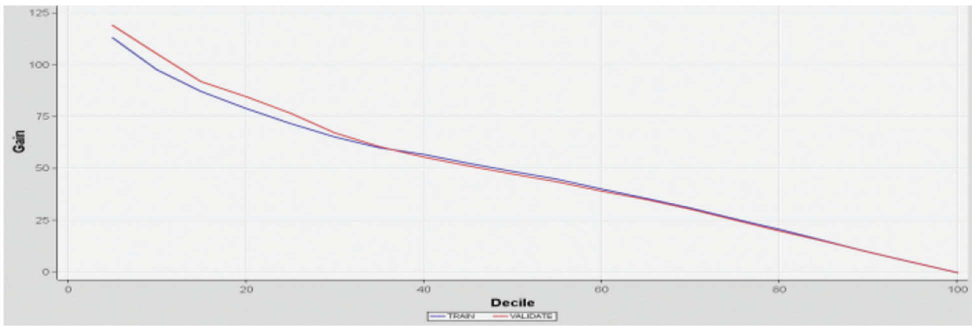


Fig. 7. Score rankings overlay Alive (gain chart).

TABLE V
Fitted Statistics

| Target | Fit statistics | Statistics label | Train | Validation | Test |
|---|---|---|---|---|---|
| Alive | _DFT_ | Total degrees of freedom | 30167 | 0 | 0 |
| Alive | _DFE_ | Degrees of freedom for error | 29831 | 0 | 0 |
| Alive | _DFM_ | Model degrees of freedom | 336 | 0 | 0 |
| Alive | _NW_ | Number of estimated weights | 336 | 0 | 0 |
| Alive | _AIC_ | Akaike's information criterion | 33753.85 | 0 | 0 |
| Alive | _SBC_ | Schwarz's Bayesian criterion | 36547.52 | 0 | 0 |
| Alive | _ASE_ | Average squared error | 0.187201 | 0.1868483 | 0.187468 |
| Alive | _MAX_ | Maximum absolute error | 0.987512 | 0.99525055 | 0.990725 |
| Alive | _DIV_ | Divisor for ASE | 60334 | 45190 | 45048 |
| Alive | _NOBS_ | Sum of frequencies | 0.191418 | NaN | 22524 |
| Alive | _RASE_ | Root average squared error | 0.18931 | 0.1868483 | 0.432976 |
| Alive | _SSE_ | Sum of squared errors | 0.437513 | NaN | 8445.057 |
| Alive | _SUMW_ | Sum of case weights times freq. | 0.435097 | 0.43225953 | 45048 |
| Alive | _FPE_ | Final prediction error | 0.548312 | 0.54876668 | NaN |
| Alive | _MSE_ | Mean squared error | 33081.85 | 24798.7662 | 0.187468 |
| Alive | _RFPE_ | Root final prediction error | 0.30066 | 0.29161319 | NaN |
| Alive | _RMSE_ | Root mean squared error | 9070 | 6589 | 0.432976 |
| Alive | _AVERR_ | Average error function | 0.18931 | 0.1868483 | 0.550722 |
| Alive | _ERR_ | Error function | 0.437513 | NaN | 24808.94 |
| Alive | _MISC_ | Misclassification rate | 0.435097 | 0.43225953 | 0.293598 |
| Alive | WRONG | Number of wrong classifications | 0.548312 | 0.54876668 | 6613 |

We have used the entropy technique and summarized the results according to the most common variables to choose the most and important predictor variables. In appendix (4), the decision tree property criterion is entropy, one of the results examples is as follows:

If Site_specific_surgery_I = 09 and SEER_historic_stage_A = 4 and Lymph_Node_Involvement_New = 0 and Clinical_Ext_of_Tumor_New = 0 then node: 140, N (number of values in the node): 1518, not survived (0): 94.8%, survived (1): 5.2%, or if the decision tree property criterion is Gini, one of the example is; IF Site_specific_surgery_I = 90 and SEER_historic_stage_A = 4 AND Lymph_Node_Involvement_New = 0 and Clinical_Ext_of_Tumor_New = 0 then node: 130, N: 1272, survived: 85.4% and not survived: 14.6%. and finally if the Decision tree property criterion is ProbChisq, one of the exaplme is; Grade is one of: 9 or 2 and Sequence_number is one of: 00, 02, or 03 and Reason_no_surgery is one of: 0 or 8 and SEER_historic_stage_A = 4 then node: 76, for the number of the values is 2310, survived is 86.3%, and not survived is 13.7%.

The most important variables participate for the largest numbers of the observations to the target variable if used Entopy are:

Clinical_Ext_of_Tumor_New, Site_specific_surgery_I, Histologic_Type_I, Size_of_Tumor_New, Grade, Lymph_Node_Involvement_New, Sequence_number, SEER_historic_stage_A, Age_recodeless, Conversion_flag_I, Decade_of_Birth and Age_recodeless.

We can say the most important variables to the target variables are: Grade, Size of Tumor New, SEER historic stage A, Clinical Ext of Tumor New Lymph Node Involvement New, Histologic Type II, Sequence number Age recodeless, Decade of Birth and Conversion flag I.

Table VI view displays a list of variables in the order of their importance in the tree.

These results from the (autonomous decision tree) icon when we used the interactive property, the table shows that the prognosis factor "SEER historic stage A" is by far the most important predictor, which is not consistent with the previous research, the previous research was the prognosis factor "Grade" the most important predictor and "Stage of cancer" secondly! But from our table, we see the second most important factor is "clinical extension of tumor new," then "Decade (Age) at diagnosis" and "Grade." However, we noticed that the size of the tumor in the eighth in the standings.

### C. The Logistic Regression

Firstly, let us start with the logistic regression figure as shown in Fig. 8:

The intercept and the parameters in the regression model shows that bar number one represents the intercept with value (–1.520597), bar 2, the value of the parameter which represent the variable (SEER historic stage A) with value (–1.378877), the second bar is and so on.

The Table VII shows the regression model explanation, and it's very clear in this model as the variable (SEER historic stage A) one of the most important variables to the target variable, the intercept of Alive = 1 is equal to −1.5206 which means the amount of change for the target variable (Alive = 1), the coefficient of the variable (SEER historic stage A) is −1.38 which means the amount of change in this variable on the Alive by −1.38; also, the t-test is to calculate the significance of the independent variable with the target variable, t = −28.66 means (SEER historic stage A = value 4) is insignificant because if we compare it with level of statistical significance equal to −0.05 > −28.66 that means to reject the null hypothesis and accept the alternative hypothesis instead, and this depends to the hypothesis that we want to test it, might be we want to use this hypothesis:

$H_0$: $\mu$=0 against $H_1$: $\mu\neq0$ or $H_0$: $\sigma\neq1$ against $H_1$: $\sigma\neq1$.

However, this difference if we choose another value of SEER historic stage A = value 0 because the t value = +9.31, at this stage, the variable is significant to the target variable.

TABLE VI
THE MOST IMPORTANT VARIABLES BY USING ENTROPY CRITERION

| Variable | Nodes | Training | Validation |
|---|---|---|---|
| SEER_historic_A | 1 | 1 | 1 |
| Clinical_Ext_of_turnor_New | 1 | 0.938 | 0.929 |
| Decade_at_Diagnosis | 12 | 0.477 | 0.389 |
| Grade | 24 | 0.47 | 0.399 |
| Sequence_number | 5 | 0.41 | 0.409 |
| Histologic_Type_II | 14 | 0.381 | 0.261 |
| Num_Pos_Nodes_New | 15 | 0.309 | 0.183 |
| Size_of_Turnor_New | 20 | 0.303 | 0.151 |
| Site_specific_Surgery_I | 11 | 0.296 | 0.15 |
| Raeson_no_surgery | 3 | 0.295 | 0.309 |
| PS_Number | 36 | 0.286 | 0.106 |
| Num_Nodes_Examined_New | 11 | 0.244 | 0.129 |
| Birthplace | 5 | 0.241 | 0.028 |
| Radiation | 14 | 0.189 | 0.088 |
| Turnor_Marker_I | 2 | 0.183 | 0.183 |
| Conversion_flag_I | 2 | 0.168 | 0.168 |
| Laterality | 28 | 0.141 | 0.091 |
| Number_of_primaries | 9 | 0.139 | 0.137 |
| Turnor_Marker_II | 2 | 0.1 | 0.014 |
| Lymph_Node_Involvement_New | 4 | 0.094 | 0 |
| Recode_I | 3 | 0.089 | 0 |
| Decade_of_Birth | 3 | 0.083 | 0.038 |
| Age_recodeless | 3 | 0.073 | 0.007 |
| Marital_status_at_diagnosis | 1 | 0.062 | 0 |
| Diagnostic_confirmation | 2 | 0.043 | 0.012 |
| Behaviour_recode_for_Analysis | 0 | 0 | 0 |
| ICD_Number | 0 | 0 | 0 |
| Race_ethincity | 0 | 0 | 0 |
| SEEr_modified_ICCC_Site_recode | 0 | 0 | 0 |
| Scheme | 0 | 0 | 0 |
| Radiation_sequence_with_surgery | 0 | 0 | 0 |
| First_malignant_prim_ind | 0 | 0 | 0 |

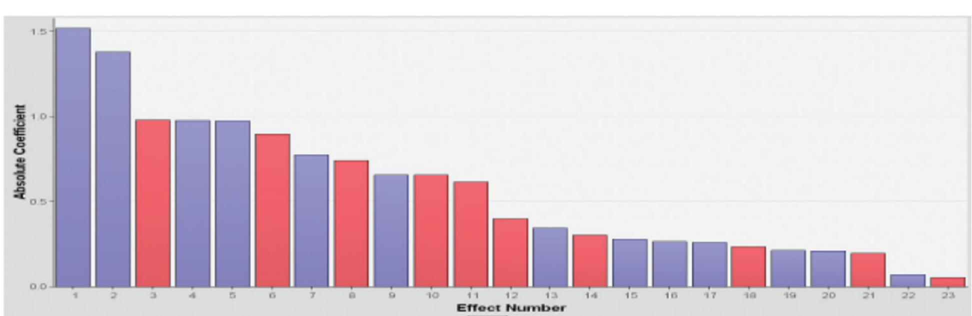


Fig. 8. Bar charts for logistic regression.

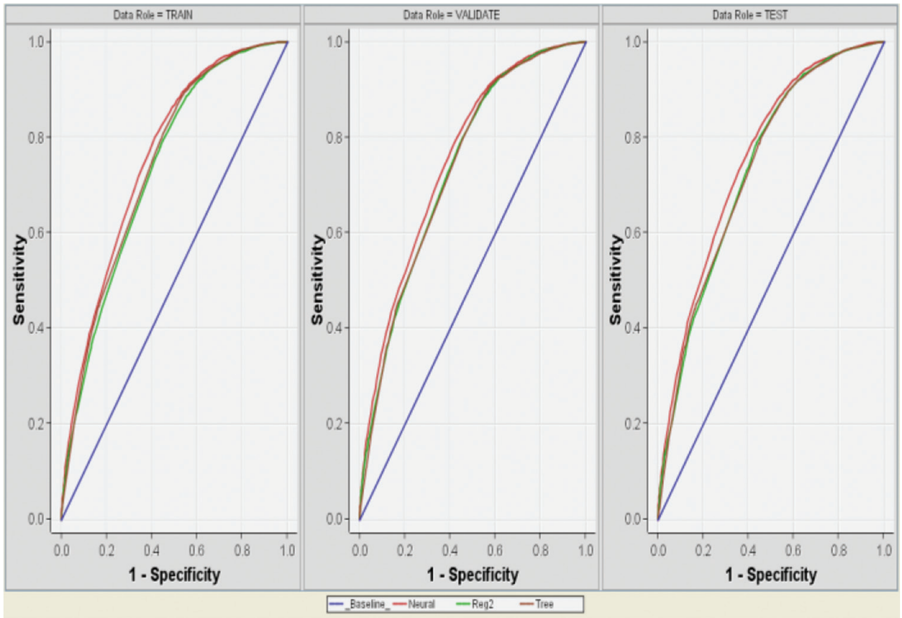


Fig. 9. Model comparison chart.

TABLE VII
Regression Most Important Variables

| Variable | Level | Effect | Effect label |
|---|---|---|---|
| Intercept | 1 | Intercept | Intercept:Alive=1 |
| SEER_historic_stage_A | 4 | SEER_historic_stage_A4 | SEER_historic_stage_A 4 |
| IMP_Site_specific_surgery_I | 2 | IMP_Site_specific_surgery_I02 | Imputed Site_specific |
| IMP_Site_specific_surgery_I | 0 | IMP_Site_specific_surgery_I00 | Imputed Site_specific _surgery_I 00 |
| IMP_Site_specific_surgery_I | 9 | IMP_Site_specific_surgery_I09 | Imputed Site_specific _surgery_I 09 |
| Tumor_Marker_I | 2 | Tumor_Marker_I2 | Tumor_Marker_I 2 |
| Grade | 3 | Grade3 | Grade 3 |
| Tumor_Marker_I | 8 | Tumor_Marker_I8 | Tumor_Marker_I 8 |
| Sequence_number | 0 | Sequence_number00 | Sequence_number 00 |
| Grade | 4 | Grade4 | Grade 4 |
| Tumor_Marker_I | 0 | Tumor_Marker_I0 | Tumor_Marker_I 0 |
| IMP_Site_specific_surgery_I | 40 | IMP_Site_specific_surgery_I40 | Imputed Site_specific_surgery_I 40 |
| SEER_historic_stage_A | 2 | SEER_historic_stage_A2 | SEER_historic_stage_A 2 |
| IMP_Site_specific_surgery_I | 58 | IMP_Site_specific_surgery_I58 | Imputed Site_specific_surgery_I 58 |
| SEER_historic_stage_A | 0 | SEER_historic_stage_A0 | SEER_historic_stage_A 0 |
| IMP_Site_specific_surgery_I | 20 | IMP_Site_specific_surgery_I20 | Imputed Site_specific_surgery_I 20 |

TABLE VIII
Event Classification

| Obs. | Model | FN | TN | FP | TP |
|---|---|---|---|---|---|
| 1 | Step.Reg TRAI | 5867 | 16131 | 3224 | 4945 |
| 2 | Step.Reg VALI | 4368 | 12174 | 2470 | 3583 |
| 3 | Back.Reg TRAI | 6624 | 16490 | 2865 | 4188 |
| 4 | Back.Reg VALI | 4815 | 12564 | 2080 | 3136 |
| 5 | Forw.Reg TRAI | 6624 | 16490 | 2865 | 4188 |
| 6 | Forw.Reg VALI | 4815 | 12564 | 2080 | 3136 |
| 7 | Neural TR | 6124 | 16409 | 2946 | 4688 |
| 8 | Neural VA | 4375 | 12430 | 2214 | 3576 |
| 9 | Tree TRAI | 7469 | 20477 | 3270 | 4907 |
| 10 | Tree VALI | 5527 | 15491 | 2485 | 3589 |

### D. Model Comparison using SAS

The model comparison node belongs to the assessment category in the SAS data mining process of the sample, explore, modify, model, and assess. The model comparison

TABLE IX
Confusion Matrix

| Obs. | Model | FN | TN | FP | TP | Accuracy | Sensitivity | Specificity |
|---|---|---|---|---|---|---|---|---|
| 1 | Step.Reg TRAI | 5867 | 16131 | 3224 | 4945 | 0.69864 | 0.45736 | 0.83343 |
| 2 | Step.Reg VALI | 4368 | 12174 | 2470 | 3583 | 0.69737 | 0.45064 | 0.83133 |
| 3 | Back.Reg TRAI | 6624 | 16490 | 2865 | 4188 | 0.68545 | 0.38735 | 0.85198 |
| 4 | Back.Reg VALI | 4815 | 12564 | 2080 | 3136 | 0.69484 | 0.39442 | 0.85796 |
| 5 | Forw.Reg TRAI | 6624 | 16490 | 2865 | 4188 | 0.68545 | 0.38735 | 0.85198 |
| 6 | Forw.Reg VALI | 4815 | 12564 | 2080 | 3136 | 0.69484 | 0.39442 | 0.85796 |
| 7 | Neural TR | 6124 | 16409 | 2946 | 4688 | 0.69934 | 0.43359 | 0.84779 |
| 8 | Neural VA | 4375 | 12430 | 2214 | 3576 | 0.70839 | 0.44975 | 0.84881 |
| 9 | Tree TRAI | 7469 | 20477 | 3270 | 4907 | 0.70271 | 0.39649 | 0.8623 |
| 10 | Tree VALI | 5527 | 15491 | 2485 | 3589 | 0.70427 | 0.3937 | 0.86176 |

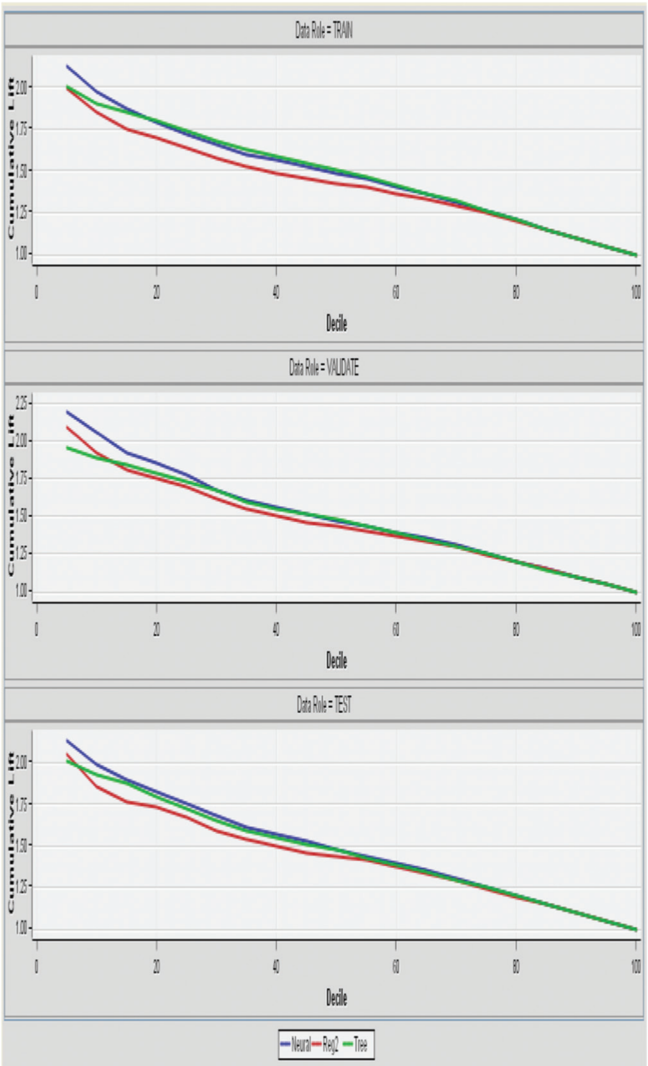


Fig. 10. Score rankings overlay: Alive (cumulative lift).

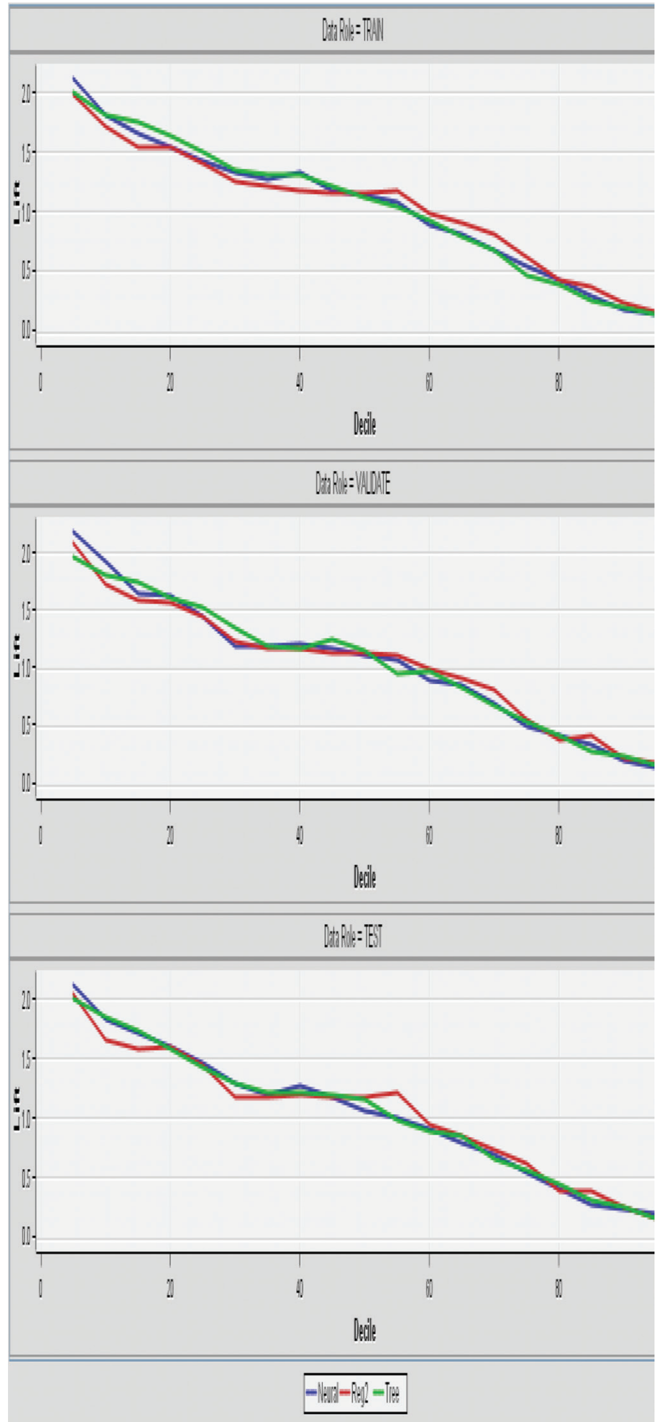


Fig. 11. Score rankings overlay: Alive (lift).

node enables us to compare models and predictions from the modeling nodes using various criteria (Han and Kamber, 2001).

A common criterion for all modeling and predictive tools is a comparison of the expected survival or not survival to actual survival or not survival getting data from model results.

The criterion enables us to make cross-model comparisons and assessments, independent of all other factors (such as sample size, modeling node, and so on).

When we train a modeling node, assessment statistics are computed on the train (and validation) data. The model comparison node calculates the same statistics for the test set when present. The node can also be used to modify the number of deciles and/or bins and recomputed assessment statistics used in the score ranking and score distribution charts for the train (and validation) dataset (Intrator and Intrator, 2001).

In addition, it computes for binary targets the Gini, Kolmogorov–Smirnov, and Bin-Best Two-Way Kolmogorov–Smirnov statistics and generates receiver operating characteristic charts for all models using the train (validation and test) datasets.

We have used the program to run the results of the accuracy, sensitivity, and specificity, between the neural network, the decision trees, and the logistic regression (stepwise, backward, and forward). The steps we will have to run, 1. We must run the model comparison to get the event classification table as shown in Table VIII.

And then, we put the results table in the program number (10) using SAS code to get the confusion matrix. Table IX shows the results of the event classification and the confusion matrix.

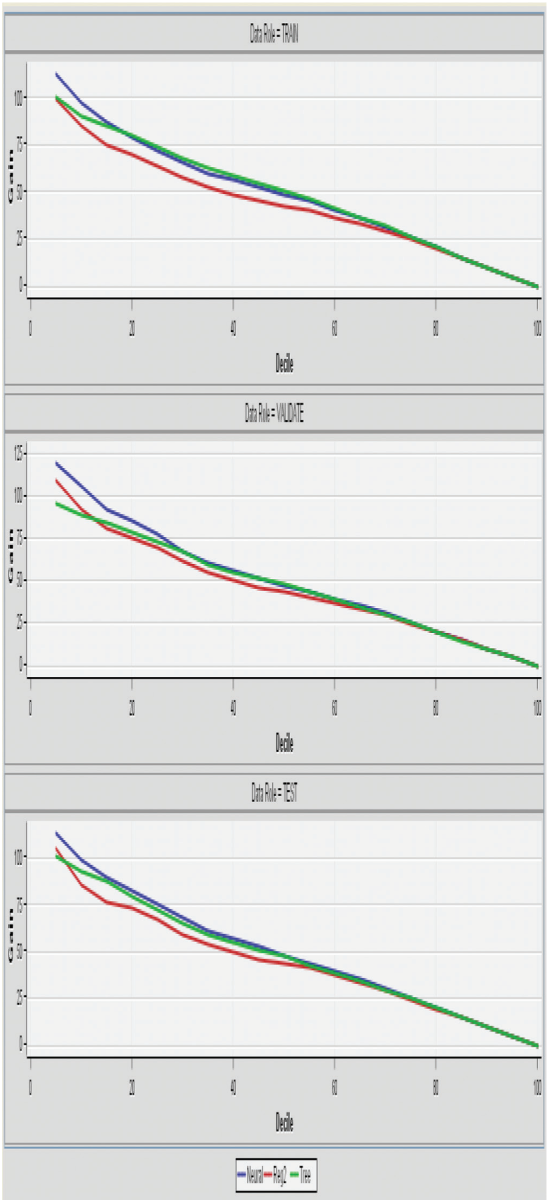


Fig. 12. Score rankings overlay: Alive (gain).

Table IX shows that the neural network model is the best model because the accuracy of the model is 0.70839 and the error rate is: 1−0.70839 = 0.29161, for sensitivity is 0.44975, and for specificity is 0.84881, these are for the validation data, and all the values for this model are bigger than the other models. The second important model is the decision tree with accuracy of 0.70427 with error rate 0.29573, sensitivity is 0.3937, and for specificity is 0.86176 and the third important model is the logistic regression (step-wise regression) with accuracy of 0.69737 with error rate 0.30263, for sensitivity is 0.45064 and for specificity is 0.83133; these results are for the validation, and so on for the backward and forward regression (Figs. 9-12).

The following table shows the results of the k-fold cross-validation:

The accuracy of the measurement model and calculated the average number of 10 times of performance. We repeated this process for each of the three prediction models. Provided us with the least bias to predict as shown in Table X the performance measures compared to the tree models. We removed two of them because of unreasonable results (The Basics of SAS Enterprise Miner, 2018).

### E. Future Work

When we want to talk about future research related to our current dissertation, there are a lot of ideas and work to do in the future, one of these ideas is whether there is a relationship between breast cancer and other tumor diseases in terms of survival or response to the treatment. Using other data mining models, we could see if the new model is appropriate or not to other models. The previous models did not use the SAS system to analyses the dataset and I think SAS software has many more facilities than the other software; as a result, more useful information and results are obtained which are more efficient than the other packages.

We are thinking to do more work relate to cancer disease, because we should all be helping serve the public interest, especially when concerning Cancer. We have a lot of ideas to do more research and analysis of the data in more sectors

TABLE X
K-FOLD CROSS-VALIDATION RESULTS

| First fold | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Obs. | Model | FN | TN | FP | TP | Accuracy | Sensitivity | Specificity |
| 1 | Tree TRAI | 6569 | 18498 | 3007 | 4437 | 0.70545 | 0.40314 | 0.86017 |
| 2 | Tree VALI | 5084 | 13926 | 2247 | 3126 | 0.69934 | 0.38076 | 0.86106 |
| 3 | Neural TR | 4988 | 13875 | 2565 | 4268 | 0.70606 | 0.46111 | 0.84398 |
| 4 | Neural VA | 3845 | 10508 | 1919 | 3012 | 0.7011 | 0.43926 | 0.84558 |
| 5 | Step.Reg.TRAI | 5374 | 13777 | 2663 | 3882 | 0.68723 | 0.4194 | 0.83802 |
| 6 | Step.Reg.VALI | 4016 | 10383 | 2044 | 2841 | 0.68575 | 0.41432 | 0.83552 |
| Second fold | | | | | | | | |
| 1 | Tree4 TRA | 7127 | 18818 | 2690 | 3876 | 0.69804 | 0.35227 | 0.87493 |
| 2 | Tree4 VAL | 5327 | 14030 | 2085 | 2941 | 0.69602 | 0.35571 | 0.87062 |
| 3 | Neural4 TR | 5393 | 14242 | 2646 | 4024 | 0.69439 | 0.42731 | 0.84332 |
| 4 | Neural4 VA | 4078 | 10469 | 2029 | 3057 | 0.68894 | 0.42845 | 0.83765 |
| 5 | Step.Reg.TRAI | 6230 | 14742 | 2146 | 3187 | 0.68158 | 0.33843 | 0.87293 |
| 6 | Step.Reg.VALI | 4698 | 10876 | 1622 | 2437 | 0.67809 | 0.34156 | 0.87022 |

(*Contd...*)

TABLE X
(Countiued)

| First fold | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Third fold | | | | | | | | |
| 1 | Neural6 TR | 5316 | 14482 | 2593 | 4158 | 0.7021 | 0.43889 | 0.84814 |
| 2 | Neural6 VA | 4009 | 10638 | 1961 | 3193 | 0.6985 | 0.44335 | 0.84435 |
| 3 | Step.Reg.TRAI | 5886 | 14709 | 2366 | 3588 | 0.68918 | 0.37872 | 0.86143 |
| 4 | Step.Reg.VALI | 4397 | 10823 | 1776 | 2805 | 0.68825 | 0.38948 | 0.85904 |
| 5 | Tree6 TRA | 7305 | 18919 | 2615 | 3672 | 0.69487 | 0.33452 | 0.87856 |
| 6 | Tree6 VAL | 5464 | 14025 | 2020 | 2874 | 0.69306 | 0.34469 | 0.8741 |
| Fourth fold | | | | | | | | |
| 1 | Neural5 TR | 4994 | 13853 | 2675 | 4197 | 0.70182 | 0.45664 | 0.83815 |
| 2 | Neural5 VA | 3788 | 10184 | 2038 | 3289 | 0.69812 | 0.46474 | 0.83325 |
| 3 | Step.Reg.TRAI | 5465 | 14016 | 2512 | 3726 | 0.68984 | 0.4054 | 0.84802 |
| 4 | Step.Reg.VALI | 4214 | 10402 | 1820 | 2863 | 0.68734 | 0.40455 | 0.85109 |
| 5 | Tree5 TRA | 6920 | 18596 | 2960 | 4035 | 0.6961 | 0.36832 | 0.86268 |
| 6 | Tree5 VAL | 5315 | 13775 | 2213 | 3080 | 0.69126 | 0.36689 | 0.86158 |
| Fifth fold | | | | | | | | |
| 1 | Neural7 TR | 5403 | 14569 | 2586 | 4197 | 0.7014 | 0.43719 | 0.84926 |
| 2 | Neural7 VA | 4215 | 10854 | 1936 | 3065 | 0.69352 | 0.42102 | 0.84863 |
| 3 | Step.Reg.TRAI | 5878 | 14800 | 2355 | 3722 | 0.69228 | 0.38771 | 0.86272 |
| 4 | Step.Reg.VALI | 4515 | 10995 | 1795 | 2765 | 0.6856 | 0.37981 | 0.85966 |
| 5 | Tree7 TRA | 6463 | 17930 | 3536 | 4582 | 0.69244 | 0.41485 | 0.83527 |
| 6 | Tree7 VAL | 4916 | 13368 | 2673 | 3426 | 0.68876 | 0.41069 | 0.83336 |
| Sixth fold | | | | | | | | |
| 1 | Neural8 TR | 5392 | 14367 | 2728 | 4222 | 0.69598 | 0.43915 | 0.84042 |
| 2 | Neural8 VA | 4031 | 10855 | 2004 | 3189 | 0.69944 | 0.44169 | 0.84416 |
| 3 | Step.Reg.TRAI | 5939 | 14630 | 2465 | 3675 | 0.68535 | 0.38226 | 0.85581 |
| 4 | Step.Reg.VALI | 4387 | 11097 | 1762 | 2833 | 0.69376 | 0.39238 | 0.86298 |
| 5 | Tree8 TRA | 7030 | 18598 | 2816 | 4067 | 0.69715 | 0.3665 | 0.8685 |
| 6 | Tree8 VAL | 5277 | 13914 | 2141 | 3051 | 0.69577 | 0.36635 | 0.86665 |
| Seventh fold | | | | | | | | |
| 1 | Neural9 TR | 5093 | 14090 | 2462 | 4115 | 0.70672 | 0.44689 | 0.85126 |
| 2 | Neural9 VA | 3918 | 10560 | 1932 | 3005 | 0.69869 | 0.43406 | 0.84534 |
| 3 | Step.Reg.TRAI | 5557 | 14251 | 2301 | 3651 | 0.69495 | 0.3965 | 0.86098 |
| 4 | Step.Reg.VALI | 4211 | 10673 | 1819 | 2712 | 0.68942 | 0.39174 | 0.85439 |
| 5 | Tree9 TRA | 6373 | 18330 | 3236 | 4572 | 0.70444 | 0.41772 | 0.84995 |
| 6 | Tree9 VAL | 4799 | 13582 | 2562 | 3440 | 0.69811 | 0.41753 | 0.8413 |
| Eighth fold | | | | | | | | |
| 1 | Neural10TR | 5193 | 14008 | 2669 | 4189 | 0.6983 | 0.44649 | 0.83996 |
| 2 | Neural10VA | 3915 | 10474 | 2055 | 3145 | 0.69524 | 0.44547 | 0.83598 |
| 3 | Step.Reg.TRA | 5728 | 14327 | 2350 | 3654 | 0.69001 | 0.38947 | 0.85909 |
| 4 | Step.Reg.VAL | 4309 | 10738 | 1791 | 2751 | 0.6886 | 0.38966 | 0.85705 |
| 5 | Tree10 TR | 7099 | 18723 | 2730 | 3959 | 0.69767 | 0.35802 | 0.87275 |
| 6 | Tree10 VA | 5359 | 13985 | 2153 | 2886 | 0.69192 | 0.35003 | 0.86659 |

such as financial analyses, population analysis, and health analysis ….

## V. Conclusion

This research study emphasized on a dissertation effort where we developed three main prediction models for breast cancer survivability. Specifically, we used three popular data mining methods: ANN, decision trees, and logistic regression. We obtained a full and large dataset (457,389 cases with 93 prognosis factors) from the SEER program and after going through a long process of data cleansing, aggregation, transformation, and modeling by SAS, we used it to develop the prediction models. In this research, we have identified cases of breast cancer survival when a person is still alive after 5 years (60 months) from the date of diagnosis. We used a binary categorical survival variable, which was computed from the variables in the raw dataset, to assimilate the survivability where survival is represented with a value of "1" and non-survival is represented with "0." The assembly results indicated that the ANN performed the best with a classification accuracy of 70.8%, the decision tree induction method model (with multi-layered perceptron architecture) came out to be second best with a classification accuracy of 70.4%, and the logistic regression model came out to be the worst with a classification accuracy of 69.5%.

From all the models results, the common thing between the models is that some important factors are the same effectiveness to the target variable, for instance, the prognosis factor "SEER historic Stage A" is by far the most common important predictor, which is not consistent with the previous research, the previous research was the prognosis factor “Grade” the most important predictor and “Stage of cancer” secondly! But from our research, the second most important factor is “clinical extension of tumor new,” then “decade (age) at diagnosis” and “Grade.” However, we noticed that the size of the tumor has ranked eighth in the overall standings.

It will be possible to extend this research in the future and to do further research. In addition to, the most useful future results can be listed as follows: First, in the study of breast cancer survivability, we have not considered the potential relation (correlation) to other tumor sorts. It would be an interesting study to scrutinize if there is a specific cancer which has a worse survivability rating. This can be done by including all possible cancer types and their prognostic factors to investigate the correlations, commonalities and differences among them. Second, new methods as an example to support vector machines and rough sets can be used to find out if the prediction accuracy can be further improved. Another applicable option to improve the prediction accuracy would be shown that the gathering mean-square error of forecasts constructed from a particular linear combination of independent and incompletely correlated predictions is less than that of any of the individual predictions. The weights to be attached to each prediction are determined by the Gaussian method of least squares and depend on the covariance between independent predictions and between prediction and verification.

In terms of predicting accuracy in the measurement of non-biased of the three methods, we repeated this process for k (10) times so that each data point that will be used in the training and test data. We repeated this process for each of the three prediction models. This provided us with the least bias to predict performance measures compared to the tree models. If we see the Table X, the best model for most of the k-folds cross-validation is the ANN, then the decision trees and the worst is the logistic regression. The prognosis factor “SEER historic Stage A” is by far the most important predictor, which is consistent with the previous research, followed by “size of tumor,” “Grade,” and “lymph node involvement new.”

Why these prognostic factors are more important predictors than the other is a question that can only be answered by the medical clinician and their work from further clinical studies.

We asked some specialist clinicians specializing in breast cancer and they made the following comments:

Dr. Rebecca Roylance, a Senior Lecturer and Honorary Consultant who is based at the Barts and the London (NHS Trust), comments about the most important prognosis factors:

1. Size of tumor (bigger size worse)
2. Grade of tumor, there are 3 Grades, I, II, and III, and Grade III being the worst
3. Receptor status, i.e., ER, PR, and HER2, +ve ER and PR better than ER/PR- HER2 + being the worst
4. Amount of lymph node involvement
5. Age of pt – younger worse
6. Presence of lymph vascular invasion and 5, 6 both play a role but are less important than the other predictor factors.

Increasing the accuracy of the model, for instance, increasing the accuracy of neural network classification using filtered training data, the accuracy performed by a supervised classification is to a large extent dependent on the training data provided by the analyst. The training datasets represent significant importance for the performance of all classification methods. However, this situation is more important for neural network classifiers from them to take each sample into consideration in the training stage. As we said in the neural network results, we can change the number of iterations that we want to allow during network training to give us the highest accuracy. The representation is related to the quality and size of the training data that they are very important in evaluating the accuracy. Quality analysis of training data helps to identify outlier and extreme values that can undermine the fineness and accuracy of a classification resulting from not true class limits definition. Training data selection can be thought of as a repetition process to form a representative dataset after some improvements. Unfortunately, in many applications, the quality of the training data is not required, and the dataset is directly used in the training step. With a view to increase the representativeness of the training data, a two-stage approach is applied, and completion tests are assumed for a selected region. Results show that the use of representative training data can help the classifier to make more accurate and effective results. An amendment of several percents in classification accuracy can significantly improve the reliability of the quality of the classified image.

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# Perception and Opinion of Customers toward Automated Teller Machine Services with Special Reference to Kurdistan Region

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***Abstract*—Modern technology has changed human life by making it faster and easier. Technology innovation emerged as a source of competitive strength and can achieve success through new innovation. Automated teller machine (ATM) plays a vital role in the banking industry by providing all necessary banking facilities in an easy and handy way to their customers at their doorstep. As Kurdistan is growing economy, therefore, to assess the perception and expectation of ATM customers, 315 respondents from different places of the Kurdistan Region were taken into consideration. This study is based on the personal approach and observation. The structured questionnaire administered after taking opinion and modification by banking personal, customer discussion, and review of literature. For the convenience of respondents, Likert measurement scales were used. To identify most service quality dimensions in connection with overall customer satisfaction, reliability test, descriptive analysis, correlation and coefficient, and regression analysis test and ANOVA tests are done through SPSS 25.0. In the end, it is concluded that most of the factors are positively, significantly correlated with overall customer satisfaction. Based on personal discussion with customers and bank officials and literature reviews, recommendations are mentioned at the end.**

***Keywords*—Automated teller machine, Challenges, Cost, Satisfaction, Security, Service quality.**

## I. Introduction

Automated teller machine (ATM) is like a banking outlet. It provides variety of facilities (as banking) include cash deposit, cash withdrawal, immediate cash transfer, mini statement, balance inquiry, password change, bill payment, cheque book request, receipt for transactions, and many more at customers convenient places. For this customer need not go physically in bank, ATM is placed at all important places, namely, hospitals, hotels, malls, and all types of market in short place. Customers save their precious time by avoiding to go at the bank, no need to carry cash which may cause any kind of threat, insecurity, crime, saves transportation cost, immediate service and get 24 × 7 non-stop banking services and facilities at their near places.

Due to the high potential for banking sector in Kurdistan Region, many foreign banks started opening their branches in the region. BBAC, Byblos Bank, Turkey's Vakifbank, IBL Bank, and Bank Asya are few names of foreign banks in regions (Reform and Investment Finance). Seven state-own banks, 47 private sector banks (15 foreign and 9 Islamic) consist in the banking sector. About 87% banking sector hold by the largest three banks, namely, Rafidain Bank, Rasheed Bank, and Trade Bank of Iraq (Reform and Investment Finance).

The number of research studies has been carried out on issues concerned with internet banking in countries such as UK, USA Malaysia, Australia, Finland, and Singapore (Sathye, 1999). No satisfactory work has been worked out in Kurdistan Region. Therefore, this research has intention to find out various determinants/dimensions/criteria to satisfy customer need pertaining to ATM services. Cost effectiveness, easiness, convenience, system availability, E-fulfillment, security and responsiveness, efficiency, and contact are most important service quality dimensions of ATM service (Sathye, 1999).

## II. Due to the Importance of ATM Services Study, the Following are the Objectives of the Study

- To determine significant factors of ATM services qualities that create an impact on customer satisfaction
- To measure the customer satisfaction level
- To recommend necessary suggestions being observed during the study for further improvement in service quality of ATM in the Kurdistan Region.

## III. Limitation of the Study

- Primarily survey was conducted at different places of the Kurdistan Region

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TABLE I
Respondents Demographic Information Statistics

| | | Gender | Age (in years) | Marital status | Education qualification | Occupation/ economic activity | Family monthly income | Purpose of using automated teller machine card | How many times do you use in a week? |
|---|---|---|---|---|---|---|---|---|---|
| N | Valid | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| | Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II
Respondents Demographic Profiles (%)

| | | Frequency | Percent |
|---|---|---|---|
| Gender | | | |
| | Male | 134 | 42.5 |
| | Female | 181 | 57.5 |
| | Total | 315 | 100 |
| Age (in years) | | | |
| | 18–20 | 47 | 14.9 |
| | 21–30 | 140 | 44.4 |
| | 31–40 | 77 | 24.4 |
| | 41–50 | 38 | 12.1 |
| | Above 50 | 13 | 4.1 |
| | Total | 315 | 100 |
| Marital status | | | |
| | Unmarried | 43 | 13.7 |
| | Married | 119 | 37.8 |
| | Divorced | 70 | 22.2 |
| | Widow | 52 | 16.5 |
| | Separated | 31 | 9.8 |
| | Total | 315 | 100 |
| Educational qualification | | | |
| | School level | 68 | 21.6 |
| | High school | 84 | 26.7 |
| | 10+2 | 36 | 11.4 |
| | Graduation | 47 | 14.9 |
| | Post-graduation | 71 | 22.5 |
| | Other | 9 | 2.9 |
| | Total | 315 | 100 |
| Educational qualification | | | |
| | School level | 68 | 21.6 |
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| | 10+2 | 36 | 11.4 |
| | Graduation | 47 | 14.9 |
| | Post-graduation | 71 | 22.5 |
| | Other | 9 | 2.9 |
| | Total | 315 | 100 |
| Occupation/economic activity | | | |
| | Student | 84 | 26.7 |
| | Employee government job | 72 | 22.9 |
| | Employee private job | 81 | 25.7 |
| | Businessman | 47 | 14.9 |
| | Other | 31 | 9.8 |
| | Total | 315 | 100 |
| Family monthly income | | | |
| | Below $500 | 62 | 19.7 |
| | Between $ 501 and $1000 | 64 | 20.3 |
| | Between $1001 and $ 1500 | 110 | 34.9 |
| | Between $1501 and $ 2000 | 64 | 20.3 |
| | Between $2001 and $ 2500 | 13 | 4.1 |
| | Above $2500 | 2 | 0.6 |
| | Total | 315 | 100 |
| Purpose of using automated teller machine card | | | |
| | Cash withdrawal | 51 | 16.2 |
| | Balance check | 105 | 33.3 |
| | Shopping | 69 | 21.9 |
| | Other | 90 | 28.6 |
| | Total | 315 | 100 |
| How many times do you use in a week? | | | |
| | <3 times | 88 | 27.9 |
| | 3–5 times | 105 | 33.3 |
| | 6–8 times | 76 | 24.1 |
| | More than 8 times | 46 | 14.6 |
| | Total | 315 | 100 |

Source: Author calculation in SPSS

TABLE III
Reliability Statistics

| Cronbach's alpha | Cronbach's alpha based on standardized items | N of items |
|---|---|---|
| 0.816 | 0.817 | 15 |

TABLE IV
Case Processing Summary

| | | *n* | % |
|---|---|---|---|
| Cases | Valid | 315 | 100.0 |
| | Excluded[a] | 0 | 0.0 |
| | Total | 315 | 100.0 |

[a]Listwise deletion based on all variables in the procedure

- Sample size was limited due to time constraint
- Results are based on information provided by the respondents.

## IV. Literature Review

Shakhawat et al. (2015) did analysis on significant factors affecting the quality of ATM services in Dhaka city. After collecting primary data results show that ATM network, cost of ATM services, security in transactions at ATM, ATM location centers, and limit on maximum withdrawal per day are the core factors affecting customer satisfaction. Worako (2018) assessed customers satisfaction and prominent constraints and challenges of ATM services. Descriptive statistical tools were used. Assessment shows negative influence on customer saving rate. Customers found moderately satisfied. The major problems were network interruption, limited amount withdrawal per day, retention of card, and non-suitability of installation place for disability people. Studied on impact on ATM services on the customers savings/withdrawal of commercial banks of Ethiopia, Akaki branch. Kaur and Gupta (2013) predicted customers behavior intentions with concern to ATM services (Self-Service Technologies). At the results found that bank customers are less optimistic to try new technologies. Issahaku (2013) investigated the experiences of Ghana Commercial Bank and Barclays Banks customers with ATM in Tamale Metropolis. Descriptive statistics and multiple regression analysis used for data analysis. As per customers opinion, ATM is convenient, speedy, secured, reliable, and cost effectiveness. ATM challenges are machine running out of cash, link failure, and taking long time to dispensing cash. Based on beta values, three most important dimensions of satisfaction were promptness of card issue, safety-security, and cost effectiveness. Ivica et al. (2015) present step-by-step cost-benefit analysis (CBA) of automatic deposit service of ATM. In first steps author determine users' attitude toward ATM

TABLE V
Item-total Statistics

| | Scale mean if item deleted | Scale variance if item deleted | Corrected item-total correlation | Squared multiple correlations | Cronbach's alpha if item deleted |
|---|---|---|---|---|---|
| Cost of services of ATM | 44.15 | 75.104 | 0.398 | 0.446 | 0.809 |
| ATM network capacity | 44.03 | 75.216 | 0.473 | 0.566 | 0.803 |
| Location of ATM centers | 44.11 | 76.740 | 0.381 | 0.441 | 0.809 |
| Security in transactions of ATM | 44.10 | 77.602 | 0.306 | 0.369 | 0.815 |
| Sufficient number of ATMs | 44.20 | 75.239 | 0.440 | 0.476 | 0.805 |
| Screen language of your ATM | 43.75 | 80.176 | 0.242 | 0.266 | 0.817 |
| Processing of transaction | 43.76 | 75.158 | 0.472 | 0.396 | 0.803 |
| Keypad of ATM machine | 43.96 | 75.495 | 0.427 | 0.484 | 0.806 |
| Maximum withdrawal limit per day | 43.92 | 73.806 | 0.548 | 0.606 | 0.798 |
| Quality of notes (currency) | 43.86 | 74.433 | 0.497 | 0.559 | 0.801 |
| The behavior of ATM personnel or guard | 43.79 | 76.052 | 0.442 | 0.514 | 0.805 |
| Instruction clarity to operate ATM | 43.89 | 75.281 | 0.464 | 0.543 | 0.803 |
| Availability of power back up/generator/inverter | 44.12 | 75.540 | 0.450 | 0.509 | 0.804 |
| Cash availability | 43.99 | 74.815 | 0.516 | 0.609 | 0.800 |
| Claim (technical) complaint | 44.15 | 76.333 | 0.408 | 0.495 | 0.807 |

ATM: Automated teller machine

TABLE VI
Scale Statistics

| Mean | Variance | Standard deviation | Number of items |
|---|---|---|---|
| 47.13 | 85.888 | 9.268 | 15 |

Source: Author calculation in SPSS

automatic deposit service using technology acceptance model (TAM). Second step to determine ATM location priorities using analytic hierarchy process (AHP) model. Research resulted with highly efficient application of CBA for evaluating cost and benefits of automatic deposit services. Genevois et al. (2015) emphasized on efficient cash management system at ATM. To forecast demand model historical cash demand data pertaining to ATM location is very important. Rameshkumar and Shanmugananda (2016) attempted to find awareness and satisfaction among the ATM users. Results revealed that customers are not satisfied with grievance settlement. Sadekin and Shaikh (2017) emphasized on practice, impact, and security status of ATM booths at Bangladesh. From 120 respondents, 38 bankers and 72 were bank customers. Major findings are ATM cardholders feels insecurity from hijacker in Bangladesh while using card at ATM center. Kumbhar (2011) tried to find out key factors which influence customer satisfaction toward ATM services provided by public and private sector banks. In comparison it is observed that private banks are providing better satisfactory services in comparison with public sector banks. Cost effectiveness, easy to use, and responsiveness at ATM creates significant influence in customer satisfaction. Vladislav (2015) evaluated proposed system design (predictive encashment strategy) on real-world data from one Russia Bank. Author proposed a strategy which can decrease total expenses on ATM network management by 18% and could be adopted for bank operations and many other industry-oriented tasks which deals with supply chain management. Lewis et al. (1994) assessed students' attitudes toward their bank services. Graphic positioning scale was used to measure students' expectations and perceptions and found huge shortfalls in service quality. Dilijonas et al. (2009) discussed on quality management of self-service and its evaluation framework. By the improvement in quality of operation, resources and marketing services it is tried to ensure sustainable service provision to banking clients. ATM replenishment specifics, ATM service quality delivery, and ATM service delivery structure, these three factors were evaluated. It is found that social responsibility is the key point for sustainable development and improves loyalty of users. For this, it is necessary to apply conceptual models which consist of marketing, operations, and resources. Komal and Sultan (2009) has done comparative study on impact of ATM on customer satisfaction of State Bank of India, ICICI Bank, and HDFC Bank. It is briefed about services provided by these three banks. Primary data have been collected through questionnaire and interview. Sivakumar et al. (2017) examined the public sector banks ATM service quality. It is suggested that banks must be take care of customers' preferences with regard to the transaction fee, promptly ATM card delivery, and reissue another new card in case of first misplaced timely. Osaremwinda (2018) investigated queuing modeling approach on ATM service optimization. Three queuing models (a single-queue and single-server model, single-queue and multi-server model, and multiple queue and multi-server mode) were analyzed. It concluded 1–5 min could be waiting time. Using two server system provides least cost to bank. Weerasiri and Koththagoda (2017) did survey to find out impact of ATM service quality toward the customers satisfaction. Structured questionnaire was used to collect data. Regression, ANOVA, and *t*-test used to determine significant factors and frequency analysis used to analyze customer satisfaction level. In analysis, it is found that ATM service quality has positive impact on customer satisfaction level and also found age and education qualification have moderate relation with ATM service quality. According to Surjadjaja et al., (2003), growth of internet has provided quality services to service sector industries. The author did a critical study of existing literature to find out essential determinants to obtain better insights. This may help to companies for

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TABLE VII
Descriptive statistics

| | Statistic | | | Std. Error | Median | 95% Confidence interval for mean | |
|---|---|---|---|---|---|---|---|
| | *n* | Mean | Std. Deviation | | | Lower bound | Upper bound |
| Cost of services of ATM | 315 | 2.97 | 1.314 | 0.074 | 3.00 | 2.83 | 3.12 |
| ATM network capacity | 315 | 3.10 | 1.141 | 0.064 | 3.00 | 2.98 | 3.23 |
| Location of ATM centers | 315 | 3.02 | 1.167 | 0.066 | 3.00 | 2.89 | 3.15 |
| Security in transactions of ATM | 315 | 3.03 | 1.249 | 0.070 | 3.00 | 2.89 | 3.17 |
| Sufficient number of ATMs | 315 | 2.92 | 1.205 | 0.068 | 3.00 | 2.79 | 3.06 |
| Screen language of your ATM | 315 | 3.38 | 1.059 | 0.060 | 3.00 | 3.26 | 3.50 |
| Processing of transaction | 315 | 3.37 | 1.150 | 0.065 | 3.00 | 3.24 | 3.50 |
| Keypad of ATM machine | 315 | 3.17 | 1.206 | 0.068 | 3.00 | 3.04 | 3.31 |
| Maximum withdrawal limit per day | 315 | 3.21 | 1.145 | 0.065 | 3.00 | 3.08 | 3.33 |
| Quality of notes (currency) | 315 | 3.27 | 1.175 | 0.066 | 3.00 | 3.14 | 3.40 |
| The behavior of ATM personnel or guard | 315 | 3.34 | 1.115 | 0.063 | 3.00 | 3.21 | 3.46 |
| Instruction clarity to operate ATM | 315 | 3.23 | 1.152 | 0.065 | 3.00 | 3.11 | 3.36 |
| Availability of power back up/generator/inverter | 315 | 3.01 | 1.1.54 | 0.065 | 3.00 | 2.88 | 3.13 |
| Cash availability | 315 | 3.13 | 1.104 | 0.062 | 3.00 | 3.01 | 3.26 |
| Claim (technical) complaint | 315 | 2.97 | 1.154 | 0.065 | 3.00 | 2.97 | 2.85 |
| Overall customer satisfaction | 315 | 2.97 | 1.249 | 0.070 | 3.00 | 2.97 | 3.11 |
| Valid *n* (listwise) (total mean) | 315 | 3.13 | 1.17 | 0.066 | 3 | 3.02 | 3.25 |

Source: Author calculation in SPSS

better design of e-service operations. Yeliz et al. (2019) says managing network of ATMs becoming difficult because increasing greater rate of users. It requires efficient inventory and preparing replenishment optimal policies. The author introduced an approach for optimal replenishment amounts which help in minimizing the total cost of money holding. The planner must take care of historical cash demand at the time of planning.

## V. Rationality of Study

In July 2018, a survey was conducted in Kurdistan Region Iraq and according to demographic report, 35% are young population (<15 years) active age is 61% and only 4% above 65 years. The population of working age is improved in comparison with 1987. As per the report shows 100 males per 100 females, it means population is gender balanced. Services are considered a key element in any form of production and for regional connectivity. The region could become a better platform for transition and provision of services and it has large potential markets (Demographic Survey Report of Kurdistan Region, July 2018; World Bank Group, 2016). Uses of ATM services became very popular throughout the world because of its wide adoption of electronic financial transactions and efficient access to financial services in most countries (Kumbhar, 2012). Uses of ATM services cater to effective services on behalf of the banking industry. Customer is the king of the market and they have infinite expectations from various services industries as per their convenient. For uses of ATM income level, region, culture does not matter. Hence, to attract more customers toward the banking industry and use of the ATM banking industry must know customers opinions and expectations. Keeping this point in mind this research work has been carried out in Kurdistan Region.

## VI. Method of Conducting Research

For the study purpose, primary data from 315 ATM users of public and private sectors bank belongs to different places of the Kurdistan Region were collected through a convenience sampling method. Extensive literatures were reviewed, personal discussion made with ATM users, banking official opinion and recommendation was considered while designing the questionnaire. It was segregated into two parts, namely, first in demographic information of ATM users and second in various perceptions about ATM service quality from them. To save precious time of respondents, the Likert scale (1=strongly disagree to 5=strongly agree) used to measure the different parameters of satisfaction. To analyze collected data SPSS 25.0 software is used. Reliability test conducted and whose parameters were above 0.70 in Cronbach's alpha only those parameters are considered for further study. Multiple regression and correlation analysis performed to identify significant factors affecting respondent's satisfaction.

## VII. Data Analysis and Discussion

### *A. Respondents Demographic Information*

Table I shows the validity of responses. All respondents responded to all the questions, and no question answer is missing. Table II shows the demographic presentation of respondents. About 42.5% and 57.5% respondents are male and female, respectively. Highest users, i.e., 59.3% are at very young age between 18 and 30 years. About 13.7% and 37.8% are unmarried and married, respectively. Almost all have taken their basic education qualification. It should be noted that most, i.e., 26.7% of users are students, 22.9 Govt. job employees, and 25.7% are private job employees. Maximum users belong to the monthly income levels between $1001 and $1500 (34.9%). Only 16.2% respondents are using ATM for cash withdrawal due to feeling of insecurity in the ATM

TABLE VIII
ATM Service Qualities Correlations Coefficient

| Correlations | | Cost of services of ATM | ATM network capacity | Location of ATM centers | Security in transactions of ATM | Sufficient number of ATMs | Screen language of your ATM | Processing of transaction | Keypad of ATM machine | Maximum withdrawal limit per day | Quality of notes (currency) | The behavior of ATM personnel or guard | Instruction clarity to operate ATM | Availability of power back up/ generator/ inverter | Cash availability | Claim (Technical) Complaint | Overall Customer Satisfaction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cost of services of ATM | Pearson correlation | 1 | 0.618** | 0.318** | 0.195** | 0.363** | 0.092 | 0.268** | 0.276** | 0.209** | 0.178** | 0.069 | 0.027 | 0.120* | 0.064 | 0.164** | 0.176** |
| | Sig. (two-tailed) | | 0.000 | 0.000 | 0.001 | 0.000 | 0.105 | 0.000 | 0.000 | 0.000 | 0.002 | 0.223 | 0.632 | 0.033 | 0.258 | 0.004 | 0.002 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| ATM network capacity | Pearson correlation | 0.618** | 1 | 0.274** | 0.159** | 0.538** | 0.311** | 0.352** | 0.406** | 0.177** | 0.141* | 0.046 | 0.067 | 0.123* | 0.101 | 0.135* | 0.168** |
| | Sig. (two-tailed) | 0.000 | | 0.000 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.012 | 0.419 | 0.239 | 0.029 | 0.075 | 0.016 | 0.003 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Location of ATM centers | Pearson correlation | 0.318** | 0.274** | 1 | 0.522** | 0.329** | 0.180** | 0.339** | 0.443** | 0.104 | 0.033 | 0.046 | 0.030 | 0.047 | 0.082 | 0.045 | 0.099 |
| | Sig. (two-tailed) | 0.000 | 0.000 | | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.065 | 0.554 | 0.411 | 0.598 | 0.404 | 0.146 | 0.423 | 0.080 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Security in transactions of ATM | Pearson correlation | 0.195** | 0.159** | 0.522** | 1 | 0.368** | 0.078 | 0.267** | 0.168** | 0.140* | 0.025 | 0.011 | 0.026 | 0.095 | 0.096 | 0.144* | 0.162** |
| | Sig. (two-tailed) | 0.001 | 0.005 | 0.000 | | 0.000 | 0.169 | 0.000 | 0.003 | 0.013 | 0.664 | 0.851 | 0.648 | 0.093 | 0.088 | 0.010 | 0.004 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Sufficient number of ATMs | Pearson correlation | 0.363** | 0.538** | 0.329** | 0.368** | 1 | 0.377** | 0.330** | 0.208** | 0.122* | 0.068 | −0.012 | 0.068 | 0.232** | 0.154** | 0.111* | 0.149** |
| | Sig. (two-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 | 0.000 | 0.030 | 0.226 | 0.837 | 0.229 | 0.000 | 0.006 | 0.049 | 0.008 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Screen language of your ATM | Pearson correlation | 0.092 | 0.311** | 0.180** | 0.078 | 0.377** | 1 | 0.301** | 0.218** | 0.009 | 0.070 | 0.094 | 0.180** | −0.028 | 0.028 | −0.070 | −0.147** |
| | Sig. (two-tailed) | 0.105 | 0.000 | 0.001 | 0.169 | 0.000 | | 0.000 | 0.000 | 0.873 | 0.217 | 0.095 | 0.001 | 0.620 | 0.625 | 0.213 | 0.009 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Processing of transaction | Pearson correlation | 0.268** | 0.352** | 0.339** | 0.267** | 0.330** | 0.301** | 1 | 0.551** | 0.153** | 0.191** | 0.196** | 0.235** | 0.056 | 0.152** | 0.091 | 0.099 |
| | Sig. (two-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | 0.000 | 0.007 | 0.001 | 0.000 | 0.000 | 0.323 | 0.007 | 0.107 | 0.079 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Keypad of ATM machine | Pearson correlation | 0.276** | 0.406** | 0.443** | 0.168** | 0.208** | 0.218** | 0.551** | 1 | 0.147** | 0.179** | 0.213** | 0.221** | −0.047 | 0.155** | 0.042 | −0.001 |
| | Sig. (two-tailed) | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | | 0.009 | 0.001 | 0.000 | 0.000 | 0.410 | 0.006 | 0.457 | 0.991 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |

*(Contd...)*

TABLE VIII
*(Continued)*

| Correlations | | Cost of services of ATM | ATM network capacity | Location of ATM centers | Security in transactions of ATM | Sufficient number of ATMs | Screen language of your ATM | Processing of transaction | Keypad of ATM machine | Maximum withdrawal limit per day | Quality of notes (currency) | The behavior of ATM personnel or guard | Instruction clarity to operate ATM | Availability of power back up/ generator/ inverter | Cash availability | Claim (Technical) Complaint | Overall Customer Satisfaction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum withdrawal limit per day | Pearson correlation | 0.209** | 0.177** | 0.104 | 0.140* | 0.122* | 0.009 | 0.153** | 0.147** | 1 | 0.698** | 0.509** | 0.378** | 0.544** | 0.482** | 0.380** | 0.417** |
| | Sig. (two-tailed) | 0.000 | 0.002 | 0.065 | 0.013 | 0.030 | 0.873 | 0.007 | 0.009 | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Quality of notes (currency) | Pearson correlation | 0.178** | 0.141* | 0.033 | 0.025 | 0.068 | 0.070 | 0.191** | 0.179** | 0.698** | 1 | 0.520** | 0.474** | 0.445** | 0.405** | 0.301** | 0.351** |
| | Sig. (two-tailed) | 0.002 | 0.012 | 0.554 | 0.664 | 0.226 | 0.217 | 0.001 | 0.001 | 0.000 | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| The behavior of ATM personnel or guard | Pearson correlation | 0.069 | 0.046 | 0.046 | 0.011 | −0.012 | 0.094 | 0.196** | 0.213** | 0.509** | 0.520** | 1 | 0.635** | 0.362** | 0.388** | 0.264** | 0.232** |
| | Sig. (two-tailed) | 0.223 | 0.419 | 0.411 | 0.851 | 0.837 | 0.095 | 0.000 | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Instruction clarity to operate ATM | Pearson correlation | 0.027 | 0.067 | 0.030 | 0.026 | 0.068 | 0.180** | 0.235** | 0.221** | 0.378** | 0.474** | 0.635** | 1 | 0.356** | 0.529** | 0.302** | 0.149** |
| | Sig. (two-tailed) | 0.632 | 0.239 | 0.598 | 0.648 | 0.229 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 | 0.000 | 0.008 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Availability of power back up/ generator/ inverter | Pearson correlation | 0.120* | 0.123* | 0.047 | 0.095 | 0.232** | −0.028 | 0.056 | −0.047 | 0.544** | 0.445** | 0.362** | 0.356** | 1 | 0.565** | 0.517** | 0.489** |
| | Sig. (two-tailed) | 0.033 | 0.029 | 0.404 | 0.093 | 0.000 | 0.620 | 0.323 | 0.410 | 0.000 | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 | 0.000 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Cash availability | Pearson correlation | 0.064 | 0.101 | 0.082 | 0.096 | 0.154** | 0.028 | 0.152** | 0.155** | 0.482** | 0.405** | 0.388** | 0.529** | 0.565** | 1 | 0.653** | 0.373** |
| | Sig. (two-tailed) | 0.258 | 0.075 | 0.146 | 0.088 | 0.006 | 0.625 | 0.007 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Claim (technical) complaint | Pearson correlation | 0.164** | 0.135* | 0.045 | 0.144* | 0.111* | −0.070 | 0.091 | 0.042 | 0.380** | 0.301** | 0.264** | 0.302** | 0.517** | 0.653** | 1 | 0.532** |
| | Sig. (two-tailed) | 0.004 | 0.016 | 0.423 | 0.010 | 0.049 | 0.213 | 0.107 | 0.457 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | 0.000 |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |
| Overall customer satisfaction | Pearson correlation | 0.176** | 0.168** | 0.099 | 0.162** | 0.149** | −0.147** | 0.099 | −0.001 | 0.417** | 0.351** | 0.232** | 0.149** | 0.489** | 0.373** | 0.532** | 1 |
| | Sig. (two-tailed) | 0.002 | 0.003 | 0.080 | 0.004 | 0.008 | 0.009 | 0.079 | 0.991 | 0.000 | 0.000 | 0.000 | 0.008 | 0.000 | 0.000 | 0.000 | |
| | n | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 | 315 |

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (two-tailed). Source: Author calculation in SPSS. ATM: Automated teller machine system and 33.3% use only to check bank account balance. About 61.2% respondents are using ATM up to 5 times in a week.

### *B. Result of Reliability Statistics*

To test the validity of dimensions used in the survey Cronbach's alpha reliability test is used. Cronbach's alpha should be >0.700 (Hendrickson et al., 1993). Table III shows no missing value (validity of data). Table IV shows that all dimensions Cronbach's alpha value are >0.801>standard coefficient alpha value 0.700. Table V shows dimensions individual Cronbach's alpha value, where all found above 0.801. Table VI shows scale statistics where mean is 47.13, variance is 85.888 and the standard deviation found here is 9.268.

### *C. Descriptive Analysis*

Table VII gives information about all dimensions of service quality; means are between 2.79 and 3.46. Users are neutral opinions about all the service quality (standard deviation mean is 1.17). Service qualities to be considered for improvement are the cost of service, sufficient number of ATMs, taking care of technical complaint, and overall satisfaction (<3.00).

Hypothesis:

$H_{01}$: No significance relationship observed between service quality and overall customer satisfaction about ATM services.

$H_{a1}$: Significance relationship observed between service quality and overall customer satisfaction about ATM services.

According to Komal and Sultan (2009); Mobarek (2007); Mcandrews (2003); and Dilijonas et al. (2009), service qualities have a significant relation with overall customer satisfaction in ATM service. However, present research does not fully support this. Table VIII indicates overall customer satisfaction is 85.71% correlates with other dimensions and 14.29% does not correlate. Cost of services of ATM, ATM network capacity, security in transaction of ATM, sufficient number of ATMs, screen language of your ATM, maximum withdrawal limit per day, quality of notes (currency), the behavior of ATM personnel guard, instruction clarity to operate ATM, availability of power back up/generator/inverter, cash availability, and technical complaint correlation is significant at 0.01 level (two-tailed); location of ATM centers, processing of transaction, and keypad of ATM machine are not significant with overall customer satisfaction.

Hence,

$H_{01}$ was accepted in case of location of ATM centers, processing of transaction and keypad of ATM machines are not significant with overall customer satisfaction.

### *D. Result of Factor Statistics*

$H_{a1}$ was accepted in case of cost of services of ATM, ATM network capacity, security in transaction of ATM, sufficient number of ATMs, screen language of your ATM, maximum withdrawal limit per day, quality of notes (currency), the behavior of ATM personnel guard, instruction clarity to operate ATM, availability of power back up/generator/inverter, cash availability, and technical complaint.

Factor analysis used to recognize important factors/dimensions of customer satisfaction toward ATM services. It facilitates reduction in data. Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity determine levels of adequacy of factor analysis. KMO measure score is 0.777 which is well above than the recommended level, i.e., 0.50 (Table IX) (Malhotra and Dash, 2007), while Chi-square value indicating as 2054.669 at degree of freedom 120. Bartlett's test of sphericity is significant at $P < 0.001$ level. Eigenvalues >1.0, the data "spread-out" into five factors. The extraction method used with principal component factoring with Varimax rotation (Table X).

Factor analysis: The purpose of this analysis is to measure the relative effect of each independent variable on the dependent variable.

### *E. Hypothesis*

$H_{02}$ (null hypothesis): Customer satisfaction is not dependent on ATM services.

$H_{a2}$ (alternative hypothesis): Customer satisfaction is dependent on ATM services.

Model: In this research, overall customer satisfaction considered as dependent variable and other dimensions of ATM service quality, namely, cost of services of ATM, ATM network capacity, location of ATM Centers, security in transactions of ATM, sufficient number of ATMs, screen language of your ATM, processing of transaction, keypad of ATM machine, maximum withdrawal limit per day, quality of notes (currency), behavior of ATM personnel or guard, instruction clarity to operate ATM, availability of power back up/generator/inverter, cash availability, and claim (technical) complaint as independent variables.

The regression model can be formulated as follows:

$$Y = \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+\beta_9X_9+\beta_{10}X_{10}+\beta_{11}X_{11}+\beta_{12}X_{12}+\beta_{13}X_{13}+\beta_{14}X_{14}+\beta_{15}X_{15}+e_i$$

Where,

$Y$ = Overall customer satisfaction

$X_1$ = Cost of services of ATM

$X_2$ = ATM network capacity

$X_3$ = Location of ATM centers

$X_4$ = Security in transactions of ATM

$X_5$ = Sufficient number of ATMs

$X_6$ = Screen language of your ATM

$X_7$ = Processing of transaction

$X_8$ = Keypad of ATM machine

$X_9$ = Maximum withdrawal limit per day

$X_{10}$ = Quality of notes (currency)

$X_{11}$ = The behavior of ATM personnel or guard

$X_{12}$ = Instruction clarity to operate ATM

$X_{13}$ = Availability of power back up/generator/inverter

TABLE IX
KAISER-MEYER-OLKIN AND BARTLETT'S TEST

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin measure of sampling adequacy. | | 0.777 |
| Bartlett's test of sphericity | Approx. Chi-square | 2054.669 |
| | Df | 120 |
| | Sig. | 0.000 |

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TABLE X
Total Variance Explained

| Component | Initial eigenvalues | | | Extraction sums of squared loadings | | | Rotation sums of squared loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % Of variance | Cumulative % | Total | % Of variance | Cumulative % | Total | % Of variance | Cumulative % |
| 1 | 4.592 | 28.697 | 28.697 | 4.592 | 28.697 | 28.697 | 2.963 | 18.516 | 18.516 |
| 2 | 2.780 | 17.372 | 46.069 | 2.780 | 17.372 | 46.069 | 2.683 | 16.768 | 35.284 |
| 3 | 1.560 | 9.752 | 55.821 | 1.560 | 9.752 | 55.821 | 2.027 | 12.671 | 47.955 |
| 4 | 1.150 | 7.187 | 63.008 | 1.150 | 7.187 | 63.008 | 1.976 | 12.349 | 60.304 |
| 5 | 1.024 | 6.398 | 69.406 | 1.024 | 6.398 | 69.406 | 1.456 | 9.102 | 69.406 |
| 6 | 0.865 | 5.406 | 74.812 | | | | | | |
| 7 | 0.650 | 4.060 | 78.873 | | | | | | |
| 8 | 0.553 | 3.453 | 82.326 | | | | | | |
| 9 | 0.518 | 3.241 | 85.567 | | | | | | |
| 10 | 0.484 | 3.027 | 88.594 | | | | | | |
| 11 | 0.411 | 2.570 | 91.164 | | | | | | |
| 12 | 0.357 | 2.234 | 93.398 | | | | | | |
| 13 | 0.309 | 1.932 | 95.330 | | | | | | |
| 14 | 0.280 | 1.749 | 97.079 | | | | | | |
| 15 | 0.251 | 1.567 | 98.645 | | | | | | |
| 16 | 0.217 | 1.355 | 100.000 | | | | | | |

Extraction method: Principal component analysis. Source: Author calculation in SPSS

TABLE XI
ANOVA[a]

| Model | | Sum of squares | Df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 205.62 | 15 | 13.708 | 14.429 | 0.000[b] |
| | Residual | 284.062 | 299 | 0.95 | | |
| | Total | 489.683 | 314 | | | |

[a]Dependent variable: Overall customer satisfaction, [b]Predictors: (Constant), claim (technical) complaint, keypad of ATM machine, security in transactions of ATM, screen language of your ATM, cost of services of ATM, the behavior of ATM personnel or guard, quality of notes (currency), sufficient number of ATMs, processing of transaction, location of ATM centers, availability of power back up/generator/inverter, instruction clarity to operate ATM, ATM network capacity, maximum withdrawal limit per day, cash availability. Source: Author calculation in SPSS

TABLE XII
Model Summary[b]

| Model | R | R-square | Adjusted R square | Std. Error of the estimate |
|---|---|---|---|---|
| 1 | 0.648[a] | 0.42 | 0.391 | 0.975 |

[a]Predictors: (Constant), claim (technical) complaint, keypad of ATM machine, security in transactions of ATM, screen language of your ATM, cost of services of ATM, the behavior of ATM personnel or guard, quality of notes (currency), sufficient number of ATMs, processing of transaction, location of ATM centers, availability of power back up/generator/inverter, instruction clarity to operate ATM, ATM network capacity, maximum withdrawal limit per day, cash availability. [b]Dependent variable: Overall customer satisfaction. Source: Author calculation in SPSS

$X_{14}$ = Cash availability
$X_{15}$ = Claim (technical) complaint
$e_i$ = Error

The overall regression model and its ANOVA are summarized as follows:

Table XI shows the ANOVA test. The significance level is 0.000 and calculated value of ANOVA test is 14.429 which is greater than the critical value. Therefore, it is proved that the given null hypothesis is rejected and an alternative hypothesis is accepted. It shows there is a significant relationship between ATM services criteria and overall customer satisfaction in Kurdistan Region. Table XII of model summary, it is interpreted that 42% ATM services factors have an impact on overall customer satisfaction.

TABLE XIII
Coefficients[a]

| Model | | Unstandardized coefficients | | Standardized coefficients | *t* | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.752 | 0.305 | | 2.466 | 0.014 |
| | Cost of services of ATM | −0.036 | 0.056 | −0.038 | −0.648 | 0.517 |
| | ATM network capacity | 0.131 | 0.073 | 0.119 | 1.785 | 0.075 |
| | Location of ATM centers | 0.073 | 0.063 | 0.068 | 1.151 | 0.251 |
| | Security in transactions of ATM | 0.033 | 0.055 | 0.033 | 0.587 | 0.558 |
| | Sufficient number of ATMs | 0.036 | 0.063 | 0.035 | 0.576 | 0.565 |
| | Screen language of your ATM | −0.199 | 0.061 | −0.169 | −3.289 | 0.001 |
| | Processing of transaction | 0.080 | 0.062 | 0.073 | 1.293 | 0.197 |
| | Keypad of ATM machine | −0.110 | 0.064 | −0.107 | −1.738 | 0.083 |
| | Maximum withdrawal limit per day | 0.098 | 0.077 | 0.090 | 1.285 | 0.200 |
| | Quality of notes (currency) | 0.144 | 0.070 | 0.135 | 2.039 | 0.042 |
| | The behavior of ATM personnel or guard | 0.065 | 0.071 | 0.058 | 0.917 | 0.360 |
| | Instruction clarity to operate ATM | −0.124 | 0.071 | −0.114 | −1.756 | 0.080 |
| | Availability of power back up/generator/inverter | 0.216 | 0.068 | 0.200 | 3.180 | 0.002 |
| | Cash availability | −0.068 | 0.080 | −0.060 | −0.848 | 0.397 |
| | Claim (technical) complaint | 0.408 | 0.067 | 0.377 | 6.077 | 0.000 |

[a]Dependent variable: Overall customer satisfaction. Source: Author calculation in SPSS

*Interpretation of R*

- In table, the value of R is = 0.648
- Hence, there is a high volume of positive correlation among the independent variables and dependent variables.

TABLE XIV
Overall Customer Satisfaction

| Valid | Frequency | Percent | Valid percent | Cumulative percent |
|---|---|---|---|---|
| Highly dissatisfied | 40 | 12.7 | 12.7 | 12.7 |
| Dissatisfied | 96 | 30.5 | 30.5 | 43.2 |
| Neutral or cannot say | 47 | 14.9 | 14.9 | 58.1 |
| Satisfied | 98 | 31.1 | 31.1 | 89.2 |
| Highly satisfied | 34 | 10.8 | 10.8 | 100.0 |
| Total | 315 | 100.0 | 100.0 | |

Source: Author calculation in SPSS

*Model fit*

- In table value of $R^2 = 0.420$ or 42%
- As per regression model up to 42% variation observed in dependent variable.

*Adjusted $R^2$*

- Adjusted $R^2 = 0.391$ or 39%.

### *F. The Regression Equation*

The customer satisfaction $(Y) = 0.752+(-0.036)(X_1) +0.131(X_2)+0.73(X_3)+0.33(X_4)+0.036(X_5)+(-0.199)(X_6)+0.80(X_7)+(-0.110)(X_8)+0.098(X_9)+0.144(X_{10})+0.065(X_{11})+(-0.124)(X_{12})+0.216(X_{13})+(-0.068)(X_{14})+0.408\ (X_{15})$.

Interpretation on significance: Table XIII shows that ATM network capacity, location of ATM centers, security in transaction of ATM, sufficient number of ATMs, processing of transaction, maximum withdrawal per day limit, quality of notes (currency), behavior of ATM guard, availability of power back up/generator/inverter, and technical complaint have positive impact in the mindset of customers. In oral communication, users expressed about it. Cost of services of ATM, ATM screen language, keypad of ATM machine, instruction clarity to operate ATM, and cash availability also has second priority impact in the mindset of users.

Interpretation: Table XIV reflects overall customer satisfaction. If we do a comparison of satisfaction and dissatisfaction, it is found that the percentages of dissatisfaction are more than satisfaction, i.e., 43.5%>41.9%. About 14.9% they have a neutral opinion about the ATM services.

## VIII. Conclusion

As the statistical report of Kurdistan says, it has drastically increased the population of region, due to potential in the market many foreign banks opened their branches in the region. ATM provides faster and easier services at a convenient place of users. To keep away customers from bank to get provided facilities at ATM, banks need to provide them qualitative services at ATM centers because customers have some expectations from ATM services. In the above study, it is observed users are feeling insecure in cash withdrawal whether their account and transaction may hi-jack by hackers and they may lose their money from the bank account. Apart from users are lacking some services at ATM centers such as slow ATM network, location of ATM centers, no sufficient number of ATMs, long processing time in transaction, limited withdrawal limit per day, quality of notes (currency), behavior of ATM guard, non-availability of sufficient power back up/generator/inverter, and no quick consideration of technical complaint.

## IX. Recommendations

After discussing with users of ATM and bank official users need the following improvement in ATM service quality. (a) ATM network: Banks should ensure network connection for which they can keep ATM centers upgraded with new internet speed spectrum; (b) location of ATM centers: Bank should do general public survey at least once in a year and can find place where ATM are necessary and can install ATM center after seeing feasibility report; (c) security in transaction of ATM: For security and to gain confidence of users, banks can use SteganoPIN (Priyanka, 2017), verification of finger print using real-time constraint notation (Vivek and Agarwal, 2011), radio frequency identification and mobile fusion for authentication ATM transaction (Srivatsa et al., 2010), secured ATM transaction using Raspberry PI Processor, (Taha, 2018) etc., (d) sufficient number of ATM: To increase the number of ATMs, bank must do general public survey to find out most populated area, populated markets, near to headquarters, offices, educational institutes, etc., with the help of local government body where people can get faster and easier ATM service; (e) long processing time: Bank can use cardless ATM practices (Cardless ATM service, 2019), Fingereye: Iris-scan authentication (Oludare et al., 2019), error monitor system (f) limited withdrawal limit per day: Bank must create awareness among their users through marketing about importance of cashless transaction in various fields (g) quality of notes (currency): With the help of cashless transaction this problem can get solve, bank can decide the expiry year of printed notes. Expired notes can be exchanged with new notes. (h) Behavior of ATM guard: Organize soft skill development program such as communication workshop, create awareness about ATM facilities, tackling the ATM technical and nontechnical problems, and counseling etc. will help in improvement in behavior of ATM guard. (i) Non-availability sufficient power back up: Use of solar panel for power generation can reduce this problem (j) cost of ATM services: TAM, to understand location priorities AHP model, predictive encashment strategy which can reduce total expenses on ATM network management by 18%, queuing modeling approach on ATM service optimization, namely, three queuing model (a single-queue and single-server model, single-queue and multi-server model, and multiple queue and multi-server mode) can reduce cost of ATM services, optimal replenishment policy, CBA can help to reduce cost of ATM services. Skimming Scam Prevention Strategies may be use like video surveillance, cover ATM keypad, check if any camera, should not take help from anybody who are hanging around the ATM machine.

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# Consumer Loyalty Indicator as Drivers to Satisfaction

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***Abstract*—This study focuses on understanding the leading indicators of loyalty among food and nourishments shoppers in two Syrian Malls, Cham City Center, and Massa Plaza, both located in Damascus, the capital of Syria. The research uses a descriptive approach; the data were collected from a questionnaire distributed to 110 shoppers in the two shopping malls, 100 valid responses divided (50 answers from Cham City Center, and 50 from Massa Plaza Mall). The data were analyzed using Statistical Package for the Social Sciences to test the hypothesis. The result showed that shopper attitudes toward the store positively related to his fulfillment and loyalty. Furthermore, shoppers call to the store is an indicator of his satisfaction and commitment toward the store. Finally, the perceived value is positively related to the four loyalty indicators. The novelty of this article comes from the analysis of the four loyalty indicators as an essential factor for sustainable customer. Loyal customers are free marketing tools that keep business running and can increase market share.**

***Keywords*—Action loyalty, Attitude, Loyalty indicators, Satisfaction, Shopper loyalty.**

## I. Introduction

Shopper loyalty is a vital issue in the retail business of all industries. Loyalty takes a long time and devotion for the brand to be recognized, and the customer can purchase it without any hesitation.

Retailors focus on building a lasting relationship with their customer by hiring marketing experts to understand the mentality of the customer and how the company can sustain the customer's purchase of their brand and prevent their competitors from sharing their customers. Consequently, shedding light on loyalty and testing, the vital relationship between customers and retailers is the essence of good marketing. This relationship can lead the company either to succeed and prosper or to dwindle and disappear. The vital issue here is how to revive customer relationship management (CRM), it means strengthening the relationship with customers by offering him all the requirement to fulfill his need and wants.

Earlier studies addressed the issues of loyalty and satisfaction. Such reviews like (William and Nauman, 2011; Keiningham et al., 2009, and Reinartz and Kumar, 2000) have talked about customer loyalty and profitability, satisfaction and business performance, and CRM role in gaining customers. Based on the above points, the researcher's main objective is to test the effects of loyalty on customer satisfaction and how to implement loyalty indicators to achieve the purpose of the firm. In this article, the critical indicators of shopper's commitment in retail stores will be debated, and the link between loyalty and shopper devotion to the store. The study was applied in the two biggest malls in Damascus, Cham City Center, and Massa Plaza.

Customer loyalty depends on both attitude and behavior, leaning toward a special brand and ignoring others. This leaning is related to product fulfillment, suitability, or merely the awareness of the brand. Customer loyalty inspires shoppers to visit the store more frequently, devote large some of the shopper's personal income, and appeal to customers to identify brands in comparison to its competitors.

According to Keiningham et al. (2005), loyalty is a feeling or a possibility that a shopper will buy a particular brand when he goes shopping. For example, the probability that a shopper will purchase a specific brand is 70% of the time, substitute brand is 20%, and a generic brand is 10% of the time. This indicates that no complete 100% shopper loyalty in today's business environment. In typical situations, it is impossible to make shopper entirely loyal. A more practical aim for retailers is to make shoppers as devoted to the brand as possible and also to increase shopper spending, the regularity of obtaining the brans, and overall success. Therefore, every retailer must pay more considerable attention to loyalty programs, as well as, reserving a portion of marketing budget toward loyalty programs. This article

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will analyze grocery and food shopper's loyalty in two Syrian shopping malls.

## II. Literature Review

Earlier studies have defined the concept of satisfaction as an assessment decision regarding a precise purchase decision (Farris et al., 2010). Customer satisfaction is the difference between customers' anticipation before purchasing and awareness after the purchasing decision was made. Customer satisfaction is a complex issue to define because, generally, it is related to expectation. Customers will be content if the product or service exceeds their request or belief (Goodman, 2009). Esaki, (2013) propose that affective procedures can donate the estimation of customer satisfaction. Kotler and Keller (2006) provided an inclusive definition of satisfaction as shoppers sense of pleasure or discontent when relating a product's perceived performance to his expectations. This indicates that shopper satisfaction in the retail business is directly connected to service quality. Rai (2008) concluded that the basic formula of customer satisfaction is the difference between shopper perception and shopper expectation of service. Other studies such as Massoudi and Salahaddin (2017) showed that Satisfaction of Employees toward overall Workplace Environment leads to productivity.

The notion of loyalty is complicated to clarify. Several studies addressed the issue of loyalty. Nevertheless, no unified definition has emerged as a standard. Massoudi (2018) defined loyalty as the reliable identification of people with their organization. Loyalty is the act of nonstop purchasing of goods or services for a certain brand no matter what the competition offers. Walsh et al. (2008) specified that loyalty has three prevailing principles: an attitude toward the brand; as articulated in relations with behavior; and as purchasing by specific features, circumstances, or the buying condition. Reichheld et al. (2000) describes loyalty as an expressive preference resulting in the behavior of an impulsive individual approval and acquisition. Loyalty is a pledge to repurchase an ideal product or service steadily in the future, which is the basis for repetitive actions. Dick and Basu (1994) contributed to discovering the phases of loyalty. However, Oliver (1997) has provided the utmost in explaining the loyalty concept. They considered four-comprehensive outlines of loyalty: First, cognitive loyalty indicates the existence of opinions or beliefs that an object is desirable over others (Han et al., 2011). Second, effective loyalty contains a satisfactory attitude created by the fulfilled practice of an object (Han et al., 2011). Third, conative loyalty entails the progress of the purposes created by an advanced level of commitment (Han et al., 2011). Finally, action loyalty is moving from the intentions stage into the actions stage (Harris and Goode, 2004). According to Dick and Basu (1994), customer loyalty is a mixture between the attitude of a shopper toward a brand and the number of purchases to the same brand. The shopper attitude is based on a strong desire to get the brand, and the level of brand differentiation from its competition (Dick and Basu, 1994).

Contented customers are expected to create an assured brand feeling that results in loyalty. Loyalty means further recurrent buying, acquisitions in larger quantity, and other products that the firm sell (Howard, 1994). A satisfactory emotion toward the brand increases the status of the store. Furthermore, it creates a lasting relationship between the shopper and the store. Thus, devoted shopper typically has a positive feeling toward the store. Repeated shopper means the number of visits the shopper make to the store. Several studies have established the presence of a relationship between shopper and the store. Thus, repeated shopper spends more money at this favorite store and becomes loyal. Shopper loyalty is sorted into two groups, attitude and behavior. When the two groups are joined together, they can result in four possible results: No loyalty; loyalty, latent loyalty, and spurious loyalty. Loyal shoppers are often repeated the purchase of a brand from the same retailers. They endorse and mention the store to his acquaintances and do not fall out to the competitor's advertisement. No loyalty means that shoppers have sick feelings toward specific retailers. They base their purchasing decisions on convenience, brand discounts, and product placement. In Spurious Loyalty, the shopper has a positive feeling toward certain retailers and might buy some products from that retailer. Although they can buy the same product from a different place, they might seem loyal to certain brand they also might be influenced by the price and brand discount. Finally, in latent loyalty, the shopper has a positive feeling toward certain retailor, but does not have the desire to repeat purchase. These shoppers are very difficult to persuade because the purchasing decision is based on other factors such as salary, unemployment, and economic hardship (Harvey, 2017).

Oliver (1997) contended that shopper loyalty has three types of intention: Cognitive, affective, and behavioral intentions. Oliver (1999) extended this model to four phases and specified that shopper loyalty can be divided into four types: Cognitive, affective, loyalty, and action loyalty. In conclusion, Oliver stated that purchaser behavior changes to attitude and behavioral loyalty. Oliver claims that a shopper convert to a loyal one in a cognitive manner; he gains affective loyalty then conative loyalty, finally converts loyal shopper in action (Oliver, 1999). Cognitive loyalty, according to Oliver (1999), is the observed qualities of a brand that makes it desirable more than other choices. Affective loyalty is the attitude shopper shows to the brand; this attitude is created when the shopper is satisfied with the brand. Emotional loyalty is created when shopper becomes committed to the brand. Cognitive loyalty is created when the shopper is affected by the brand and changing his mine becomes very difficult. Conative loyalty is a profound commitment to obtaining a particular brand. Action loyalty is created when shopper reaches his popular brand. According to Oliver (1999), the action is the shopper final act in becoming loyal.

A study by Homburg and Giering (2001) debated the importance of individual features as mediators between shopper satisfaction and loyalty. The study revealed that shopper's age, product differentiation, and salary are significant factors of the relationship between the two, whereas shopper's gender was found less significant. Several studies, relating to age, have focused on variances in the shopper's capabilities in evaluating a brand. Gilly and Zeithaml (1985) determined that shopper comprehension about the product decreases with age. Therefore, older shoppers are having a limited ability to process brand information. According to a study by East et al. (1997), shoppers who are under 45 years old showed greater loyalty than older shoppers. Therefore, age is likely to play an essential role in the relationship between shopper's satisfaction and loyalty. Finally, previous studies such as Mittal, 1995; Burton and Netemeyer, 1992, indicated that Shopping involvement also plays a significant role in shopper's loyalty. A widely held opinion by researchers stated that shopper involvement does conform to the degree of individual attention (Celsi and Olson, 1988; Flynn and Goldsmith, 1993).

## III. Methodology

This article uses a descriptive-analytical approach; the primary data were collected through a questionnaire surveyed 112 traditional mall shoppers to recognize the connection between shopper's satisfaction and loyalty and their leading indicators. Hundred valid responses were received, and 12 were discarded. The questionnaire was divided into two sections, demographic variables such as age, gender, marital status, income, family size, and the number of visits to your favorite store. The second section included five shopper satisfaction statements, five loyalty statements, five perceived value statements, and 12 loyalty indicators. A seven-degree Likert scale from one to seven was used, where one is very low and seven is very high. The researcher formulated the following hypothesis:

- H1: Shopper satisfaction is positively related to shopper's attitude toward the mall.
- H2: Shopper's satisfaction is positively affected by the shopper's visits to the mall.
- H3: Shopper loyalty is positively affected by shopper visits to the mall.
- H4: Shopper's perceived value toward the mall has a significant positive effect on the four stages of loyalty.

Statistical Package for the Social Sciences was used to analyze the data and test the hypothesis, including frequency and percent, mean, Pearson correlation, and regression analysis. Table I describes the demographics profile for the study sample.

In Table I, 62% of respondents are women and 38% are men. The majority of respondents are between the ages of 31 and 40. Furthermore, the majority of respondents are married with a monthly income of <$1,000. Finally, 48% of respondents have four members in their household. In Table II, the number of shoppers who visited Cham City Centre last month was 48 shoppers and 41 shoppers have visited Massa Plaza mall last month. The average mean score for the shopper who visited Cham City Center last month was (7.39) times. Meanwhile, the shopper average visit to Massa Plaza was (5.8). Maximum visits per shopper to Cham City Center were ten visits while the minimum visits were two visits. Massa Plaza shoppers' maximum visits by shoppers were nine visits while minimum visits were 2/month.

## IV. Discussion and Finding

The objective of this study is to point out the indicators that cause shoppers to be loyal and satisfy in two shopping malls in Damascus, Syria.

Shopper attitude and number of visits to the mall can be predicters to a satisfied shopper. To measure the satisfaction from shopper attitude and shopper's visits to the mall point view, Table III shows the attitude of Cham City Center shoppers that mean score was (5.73) and the attitude of Massa Plaza mean score was (5.89). This indicates that Massa Plaza shoppers have more attitude toward Massa Plaza mall that Cham City Mall Shoppers. Regarding the number of visits to both malls is shown in Table III.

Furthermore, the mean score of the shoppers showed that the satisfaction level of Massa Plaza is 5.98 and Cham City Center (539) which is considered a high level of satisfaction for both mall shoppers.

Table IV indicates that the attitude to the mall store has a positive effect on shoppers' satisfaction at the significant level of 0.05. Massa Plaza shoppers have a higher level of satisfaction compared to Cham City Center. This result supports the first hypothesis. Thus, shopper satisfaction is positively related to shopper's attitude toward the mall.

Another driver of shopper's satisfaction is the number of visits to the mall, as shown in Table III. We can predict that

TABLE I
Respondents Demographic Profiles (%)

| | Frequency | Percent |
|---|---|---|
| Gender | | |
| Male | 38 | 38 |
| Female | 62 | 62 |
| Total | 100 | 100.0 |
| Age (in years) | | |
| 18–30 | 26 | 26 |
| 31–40 | 62 | 62 |
| 41–50 | 10 | 10 |
| Above 50 | 2 | 2 |
| Total | 100 | 100.0 |
| Marital status | | |
| Unmarried | 26 | 26 |
| Married | 70 | 70 |
| Divorced | 2 | 2 |
| Widow | 2 | 2 |
| Total | 100 | 100.0 |
| Family monthly income | | |
| Below $1000 | 74 | 74 |
| Between $1001 and $2000 | 24 | 24 |
| Between $2001 and $3000 | 2 | 2 |
| Total | 100 | 100.0 |
| Family size | | |
| 2 Members | 10 | 10 |
| 3 Members | 26 | 26 |
| 4 Members | 48 | 48 |
| More than four members | 16 | 16 |
| Total | 100 | 100.0 |

TABLE II
Number of Visits by Shoppers

| Store | N of respondents who visited the store last month | The mean N of respondents visit last month | Minimum N of respondents visit last month | Maximum N of shopper's visit last month |
|---|---|---|---|---|
| Cham City Center | 48 | 7.39 | 2 | 10 |
| Massa Plaza | 41 | 5.82 | 2 | 9 |

TABLE III
The Mean Score of Attitude and Shoppers Visit

| Store | Attitude to the grocery store | Number of visits to the grocery store | Satisfaction at the grocery store |
|---|---|---|---|
| Cham City Center | 5.73 | 7.47 | 5.39 |
| Massa Plaza | 5.89 | 5.89 | 5.98 |

Numbers shown are the means of the respondents' ratings with a maximum of seven

TABLE IV
Attitude Regression Analysis for Attitude (Unstandardized Coefficient B)

| Variable | Satisfaction with Cham city center | Satisfaction with Massa Plaza Mall |
|---|---|---|
| Attitude toward the mall predict shoppers' satisfaction | 596.0** | 0.629** |

Customer satisfaction measured by the average of the scores on the thirteen satisfaction indicators **=*P*<.05

TABLE V
Attitude Regression Analysis for the Number of Visits (Unstandardized Coefficient B)

| Variable | Satisfaction with Cham City Center | Satisfaction with Massa Plaza Mall |
|---|---|---|
| Number of visits to the mall predict shoppers' satisfaction | 017.0** | 0.069** |

Customer satisfaction measured by the average of the scores on the 13 satisfaction indicators **=*P*<.05

TABLE VI
The Score of Loyalty

| Store | Cognitive loyalty | Affective loyalty | Conative loyalty | Action loyalty | Average loyalty |
|---|---|---|---|---|---|
| Cham City Center | 4.71 | 7.48 | 5.16 | 3.90 | 4.80 |
| Massa Plaza | 5.84 | 5.86 | 4.82 | 4.05 | 4.75 |

The means of the respondents' ratings with a maximum of seven, higher score indicates higher loyalty

TABLE VII
Regression Analysis of Attitude to Predict Loyalty

| | Cham City Center | Massa Plaza |
|---|---|---|
| Attitude to the grocery store | Cognitive=0.591** | Cognitive=0.844** |
| | Affective=0.589** | Affective=0.545** |
| | Conative=0.476** | Conative=0.543** |
| | Action=0.439** | Action=0.956** |

Dependent variable: The four types of customer loyalty. ***P*<.05

Massa Plaza has more frequent shoppers It can be seen that Carrefour has the most frequent customers, while City Centre is the second tan Cham City Center.

Table V illustrates the number of shoppers' visits to the mall, the two malls shoppers have a slightly positive impact on shopper satisfaction, Table 7 shows that Massa Plaza shoppers' visits to the mall have an effect on their satisfaction at a significant level of (0.05). Therefore, only one store supported the second hypothesis, which is Massa Plaza (0.069**). Thus, shopper's satisfaction is positively affected by his visits to the mall.

TABLE VIII
Value, Trust, and Satisfaction at Both Malls

| Store | Perceived value | Trust | Satisfaction |
|---|---|---|---|
| Cham City Center | 5.15 | 4.89 | 5.29 |
| Massa Plaza | 4.88 | 4.62 | 5.12 |

The means of the respondents' scores. Higher numbers indicate higher scores (maximum 7)

### *A. Predicting Customer Loyalty by Shopper Attitude and Number of Mall Visits*

As noted, shopper loyalty has four types. Cognitive, affective, conative, and action type. Table VI illustrates loyalty scores for both shopping malls in regard to the mall visits and attitude of shoppers.

Table VI shows a higher loyalty for Came City Centre shoppers, an average of 4.8 compared to 4.75 the average loyalty of Massa Plaza shoppers.

In Table VII, shoppers' attitude to the mall has a positive and significant effect on the four types of loyalty at both malls. Therefore, we accept hypothesis 3.

### *B. The effect of apparent value, trust and satisfaction on shopper's loyalty*

Before the possible effect of perceived value, trust, and satisfaction on customer loyalty can be discussed, some general numbers about this variable must be handled. In Table VIII, the scores for these three drivers on the two grocery stores are shown.

Table VIII indicates that Cham City Center has the highest score in all three categories, while Massa Plaza had lowered rating. This indicates that Came City Centre shoppers have high apparent value, trust, and satisfaction. Based on the literature review, the results show that the perceived value of shoppers toward the shopping mall has a significant effect on all four loyalty indicators. The result is valid for the two shopping malls and thus accept hypothesis 4.

## V. Conclusion

This study aimed to examine the relationship between shopper satisfaction and loyalty. The empirical data were collected from two shopping malls in Damascus, Syria. The researcher tested various indicators as likely bases of shopper loyalty and satisfaction. The outcomes of this research could give retail managers, especially shopping malls, an idea on how to build loyal and satisfied shopper. The result of this study showed that shopper satisfaction is associated with the attitude of the shopper toward the mall. Furthermore, shopper loyalty is related to the number of visits by the shopper to the mall. Finally, the perceived value is positively related to the four loyalty indicators. This conclusion will help retail managers to learn how is satisfaction and loyalty are created. Therefore, the researcher suggests that managers and marketers must train and exercise these concepts for the good of their organizations. This study covered a reasonably small number of respondents and only two shopping malls in Damascus. Further studies can inspect a bigger sample and more stores in all parts of Syria. Shopping mall products are low involvement products. It is essential to examine other products such as high-tech products to see if loyalty indicators can be applied and can be influenced by the same drivers in this article.

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# Client's Satisfaction Regarding Family Planning in Some of Primary Health Care Centers in Erbil City

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***Abstract*—Today mothers or the clients who attending to hospitals or primary health care (PHC) centers prefer high-quality care services. The objectives of the study are to identify the client's satisfaction with family planning. This was a descriptive, cross-sectional design. The study conducted in the main PHC Centers in Erbil from September 2015 to September 2016. The data collection was collected by the interview technique with clients and women depending on the questionnaire. The study revealed three levels of client's satisfaction (good 23%, fair 44%, and 33% bad), there was no significant association between most of the variables and their satisfaction except their level of education and age; so there was highly significant association between age, education level, and their satisfaction. The study revealed that there were three levels of satisfaction about family planning, and there was no significant association between most of the variables and client's satisfaction.**

***Keywords*—Family planning, Satisfaction, Client, Primary health care centers.**

## I. Introduction

Today mothers prefer high-quality care services in primary health care (PHC) centers (William et al., 2000). Clients may satisfy with good health services in PHC centers if they do properly (Blans et al., 2002). High satisfaction creates an emotional bond with the hospital in the mind of the patients, mothers, or clients (World Health Organization, 2006). Studies of contraceptive discontinuation have indicated that the desire to become not pregnant and the principal reason for discontinuing is dissatisfaction with the quality of services of family planning (Zwi et al., 2001). Both the public and private sectors supply many methods of family planning in developing countries, so all sectors try to do the best services in family planning to satisfy mothers or clients (Mills et al., 2002). Studies raveled that most clients cannot pay sufficient money for private services for family planning (Lin et al., 2008). Poor health care services and lack of staffs in primary health care services may affect women to be pregnant (WHO, 2001). While good health care and sufficient professional staff and new medical technology increase the desire of women to be pregnant (Hanson et al., 2004). Economic status in every government has an effect on quality and standards of care for families and communities as general (Agha and Do, 2009). Private facilities and non-governmental or governmental services may face many challenges in the quality of health care in family planning or other health services, due to social culture, religions, mission, and vision of society regarding family planning and other social and community factors (National Bureau of Statistics, 2005). Studies revealed that evidence-based practice is beneficial to decrease differences between private and public health care centers (Central Bureau of Statistics, 2003). Client's or mother's satisfaction regarding family planning linked to height quality services from public and private sectors (Ghana Statistical Services, 2004). Three countries Kenya, Tanzania, and Ghana were chosen for a range of family planning process for two sectors public and private, so studies indicated that women who received contraceptive range from 12.7% to 7.7% in Tanzania, in Kenya about 24.2%, and in Ghana about 53.7% (National Bureau of Statistics et al., 2006). The prevalence of family planning among women aged 49 nearly about 20.9%. Family planning and prevalence percentage are 20.9% of women aged 49 in these countries (Discrete Data in Principal, Component Analysis, 2004). The client's satisfaction at each type of family planning in public and private care services depending on the quality and other standard measures of health system services in each of African country especially family planning providers in PHC centers. The outcome of some studies indicated that good items, good drugs and professional staff may affect to change the attitudes of women to be pregnant and decrease complication (Discrete data of principle, 2004).

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### A. Objectives

The objectives of the study were as follows:

1. To identify client's satisfaction regarding family planning done for them in PHC Centers in Erbil City
2. To identify an association between variables and overall knowledge and practices of clients regarding family planning.

## II. Methodology

- Design of the study: This was a descriptive and cross-sectional study design
- Sample study: A non-probability convenient purposive sampling was used for selecting sample size that included (100) women who attended to PHC Centers in Erbil City depending on online calculating for sample size, so the value of parameters was 95% for confidence level and 5% for margin error while the total population was 140 individuals
- Setting of the study included the main PHC Centers in Erbil according to the geographical area as (west, east, north, and south of Erbil in Kurdistan Region/Iraq)
- Time of the study: The study began in September 1, 2015–September 1, 2016
- Tools of the study/the questionnaire was used for data collection, including three parts (part one sociodemographic characteristics for sample study, part two included questions related to client's satisfaction regarding practices about family planning methods, and part three questions related to their satisfaction regarding knowledge of family planning methods, so depending on scoring system and liker scale for data collection as 1 for Yes and 2 for No
- Validity of the questioner: The questionnaire was viewed to a panel of experts in the nursing field and statistical field
- Ethical consideration: Permission was taken from the general directorate of health for conducting the study, and approval was taken from the scientific committee in the College of Nursing/Hawler Medical University
- Data analysis: SPSS program version 23 was used for data analysis
- Data collection/data were collected by cooperation with female nurses who are working in the family planning departments in the centers by interview technique with each woman
- Inclusion criteria included all women who have the desire to participate in the study
- Exclusion criteria included women who dislike participating g in the study
- Limitation of the study/there was some limitation so most of the women have no time to participate in the study
- Importance of the study/the study was important because it focused to an important issue in the community to increase the education level (knowledge and practices) and women's satisfaction regarding family planning to avoid any complication or misuse of items of family planning.

## III. Result

Table I shown that majority of sample study were between 20 and 29 of age, most of them from urban (72%), most of them were married (88%), and regarding educational level majority of them were illiterate (39%) while most of them have low profession work (51%).

Table II shown overall client's or mother's satisfaction regarding family planning practice done for them in PHC centers in Erbil, so there were three levels of satisfaction regarding family planning services done for them as followings (good 23%, fair 44%, and bad 33%).

Table III shown overall client's satisfaction regarding family planning knowledge given for them in PHC centers in Erbil, so there were three levels of satisfaction regarding family planning services given for them as follows (good 25%, fair 20%, and bad 55%).

Table IV shown the association between variables and overall client's satisfaction about family planning practice, so there was no significant association between most of the variables and overall satisfaction, while there was a significant association between age, educational level, and their variables; $P = 0.003\%$ and 0.020%.

TABLE I
Sociodemographic Characteristics of Sample Study

| Variables | Frequency | Percentage |
|---|---|---|
| Age | | |
| 20–29 | 41 | 41 |
| 30–39 | 38 | 38 |
| 40–49 | 20 | 20 |
| 50 and over | 1 | 1 |
| Total | 100 | 100 |
| Address | | |
| Urban | 72 | 72 |
| Rural | 22 | 22 |
| Suburban | 6 | 6 |
| Total | 100 | 100 |
| Marital status | | |
| Married | 88 | 88 |
| Separated | 3 | 3 |
| Widow | 7 | 7 |
| Divorce | 2 | 2 |
| Total | 100 | 100 |
| Educational level | | |
| Illiterate | 39 | 39 |
| Primary | 14 | 14 |
| Secondary | 25 | 25 |
| Institute | 11 | 11 |
| College | 10 | 10 |
| Others | 1 | 1 |
| Total | 100 | 100 |
| Mother occupation | | |
| High profession | 7 | 7 |
| Low profession | 51 | 51 |
| Unskilled work | 42 | 42 |
| Total | 100 | 100 |
| Father occupation | | |
| High profession | 5 | 5 |
| Low profession | 48 | 48 |
| Unskilled work | 47 | 47 |
| Total | 100 | 100 |

Table V shown the association between variables and overall client's satisfaction about family planning knowledge given for them in the health centers, so there was no significant association between most of the variables and overall satisfaction regarding family planning knowledge except educational level that shows highly significant association with variables.

## IV. Discussion and Finding

The findings of the study revealed that there were three levels of satisfaction among clients regarding family planning services included practices and knowledge given to them during visiting PHC centers in Erbil City, so most of them have fair satisfaction regarding family planning practice while some of them have good satisfaction with family planning practice, other findings indicated that there were three levels of satisfaction about family planning knowledge given to them in the health centers as followings (good 25%, fair 20%, and bad 55%), so majority of them have not good satisfaction with family planning knowledge done for them, these findings of the study were agreed with study done by Hutchinson et al., 2011. In Tanzania, the level of satisfaction about family planning depending on the training of staff in the health centers, decrease the gap between client's knowledge and family planning and increase the professional staff for educating women about family planning (knowledge and practices). Findings of the study indicated that there was significant association between level of education and mothers knowledge and practices regarding family planning, this findings were accepted with the study done by Williams et al., 2000. This findings were agree with the study done by Vijaykumar and Rashmi, 2010 who said that client's satisfaction depending on quality of services in PHC Services by doctors and staff and their capacity of understanding knowledge or practices given to them by nurses or other staff in PHC Centers not depending on time and old age of women because family planning items, practice, and knowledge needs to update new information and understanding by clients.

TABLE II
Overall Client's Satisfaction Regarding Family Planning Practice

| Levels of practice satisfaction | Frequency | Percentage |
|---|---|---|
| Good | 23 | 23 |
| Fair | 44 | 44 |
| Bad | 33 | 33 |
| Total | 100 | 100 |

TABLE III
Overall Client's Satisfaction Regarding Family Planning Knowledge

| Levels of knowledge satisfaction | Frequency | Percentage |
|---|---|---|
| Good | 25 | 25 |
| Fair | 20 | 20 |
| Bad | 55 | 55 |
| Total | 100 | 100 |

TABLE IV
Association between Variables and Overall Practice of Client's Satisfaction

| Variables | Value | df | *P*-value |
|---|---|---|---|
| Age | 14.982 | 8 | 0.020 |
| Address | 2.897 | 4 | 0.575 |
| Marital status | 11.543 | 6 | 0.073 |
| Level of education | 26.539 | 10 | 0.003 |
| Mother's occupation | 4.156 | 4 | 0.380 |
| Father's occupation | 3.742 | 4 | 0.442 |

TABLE V
Association between Variables and Overall Knowledge of Client's Satisfaction about Family Planning

| Variables | Value | df | *P*-value |
|---|---|---|---|
| Age | 9.004 | 8 | 0.173 |
| Address | 8.931 | 4 | 0.063 |
| Marital status | 5.638 | 6 | 0.465 |
| Level of education | 12.150 | 10 | 0.005 |
| Mother's occupation | 7.477 | 4 | 0.113 |
| Father's occupation | 8.498 | 4 | 0.075 |

## V. Conclusion

The study revealed that there were three levels of satisfaction about family planning as good 23%, fair 44%, and 33% bad and there was no significant association between most of variables and clients satisfaction regarding family planning, while there was a highly significant association between age and level of education and client's satisfaction regarding practices of family planning and there was significant association between their knowledge and level of education.

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# Impact of the Information Technology on the Accounting System

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***Abstract*—This research aims to study the impact of information technology on the accounting information system (AIS) in companies and measure the role of information technology in enhancing the quality and performance of accounting transactions transparently and safely. The researchers review many resources and related literature about the impact of information technology on the accounting profession to determine the main effects, enhance the development of these technologies to strengthen the AIS, and reduce the errors in this system. The researchers conclude that information technology innovation contributed to the development of corporate accounting systems, improved business performance, and helped the emergence of cloud accounting, and one of the most important downsides of employing information technologies in AISs is the lack of standardized technologies used in all systems, as companies are usually selective in choosing technologies that suit their activities and this weakens the transparency of the outputs of AISs. Hence, they recommend that all companies should invest part of their profits in developing software for accounting systems, developing human resources, and training accountants for important accounting software and they must use accounting software efficiently and effectively to obtain the highest level of advantages of this software to overcome the disadvantages of implementation of information technology in an AIS.**

***Keywords*—Accounting system, Audit, Decision making, E-system, Information Technology, Security**

## I. Introduction

The accounting system is one of the most important foundations for the success of any company, as the correct and efficient application of the accounting system contributes to enhancing the economic efficiency of the company, reduces the excess costs, and reduces the risks that the company can be faced (Kamal, 2015. p. 13).

Therefore, the development of the accounting system was largely coincident with the continuous development in corporate management and the emergence and great development of information technologies had a major impact on the company's accounting system and its efficiency (Cavalluzzo and Ittner, 2003. p. 247). The accounting system still faces many obstacles due to poor implementation or delay by accountants (Rahman et al., 2017. p. 9). As a result, it was necessary to strengthen the partnership between information technologies and the accounting system to reach the optimum point in the implementation of the accounting system in the company.

## II. Research Problem

This research focuses on the impact of information technology on the accounting system; therefore, the problem of research can be summarized as follows:

1. Does information technology help to make accounting transactions more efficient and effective?
2. Does information technology have good security aspects to journalize accounting transactions safely?

## III. Research Objectives

The main objectives of this research can be illustrated as follows:

1. Present a detailed hypothetical coverage of the topic studied, with a focus on the concepts in companies as general and accounting disclosures.
2. Study the impact of information technology on the accounting information system (AIS) in companies.
3. Achieve adequate research results consisting of the problem examined and the conclusions of this study in an appropriate way.

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4. Determine the security role that information technology performs in the AIS.

Therefore, the researchers will focus on methodological measures to achieve the aforementioned goals, which will be addressed in the next paragraphs, especially during the research methods meet.

## IV. Research Significance

The significance of this research stems from the explaining of the impact of information technologies on the accounting system and the role of information technologies in enhancing the level of efficiency and effectiveness of the accountant's skills. In addition, this research can provide researchers with a perspective to understand the importance of information technology.

## V. Research Hypothesis

The fundamental hypotheses of this research are as follows based on the research problem and objectives:

- Hypothesis$_1$: The evaluation of information technology put up to minimize the time and cost of transactions journalizing.
- Hypothesis$_2$: Information technology can increase the level of security in accounting books.

## VI. Research Scope

The following restrictions apply to the research:

- Period: The years between 1990 and 2013.
- Scientific scope: The impact of information technology and accounting system.

## VII. Literature Review

### *A. Information Technology*

Information technology is a treaty with the operation of the data storage, processing, dissemination, and exploitation by computers and telecommunications systems (Hamlen et al., 2010. p. 40). This may do also be defined as anything that gives data or perceived information through any multimedia allocation mechanism in any visual format (Ghasemi, 2011. p. 114).

It is designed for managers, assist administrative in their daily activities and decision-making in the sense of industry. In 1880, computers for the accounting system were invented (Smith and Weingart, 1999. p. 841).

Over the past years, developments in information technology have also changed the shape of management and accounting activities in the company; many departments were created such as information technology department, information technology maintenance department, and technical support department (Granlund, 2011. p. 7). Furthermore, many jobs were formed due to the inflection of the information technology impact on the company and its management and accounting system (Hall, 2018. p. 78).

Hence, the result of the inflection of information technology in the accounting profession is the creation of the AIS which has undergone several changes over the years (Salehi and Abdipour, 2011. p. 80). This is directed at promoting the operation and regulation of the economic and financial operations of the companies (Alles et al., 2008. p. 209). For the majority of companies, an accounting system is necessary and technological developments must lead to the establishment of a computerized accounting system commonly employed by companies (Bagaeva, 2008. p. 158). Therefore, companies need to improve their systems to meet their information needs for better decision-making.

### *B. The AIS Concepts*

An information system is an assortment of connected branches that gather, process, preserve, convert, and allocate preparation, decision-making, and handle information jointly (Dandago and Rufai, 2013. p. 656), (Al-Delawi, 2015. p. 442). Hence, computers can enhance data collection, retrieval, storage, transmission, and delivery performance in information systems (Moscove et al., 1999. p. 285).

In the field of information and technology, the AIS is a resource integrated. Thus, to companies, it is very critical due to its function in generating credible financial information for decision-making purposes (Salehi et al., 2010. p. 25).

There are numerous different systems because they need to take into account factors that influence how information is collected and recorded (Thabit and Jasim, 2019. p. 34). The information and the diverse kinds of decisions they are expectant to do will continue to depend on expected users based on company size, size of transaction data, nature of businesses, institutional structure, and investment formation, the system design can also depend (Jameel et al., 2017. p. 16).

*General AIS model*

The general accounting system model is shown in Fig. 1. This is a common model because, whatever the technological architecture it applies to all information systems (Hall, 2018. p. 90). Terminal, data sources, data gathering, data processing, data database control, data generation, and input are included in the study.

Data collecting is the first operational phase in AIS. It aims to behove the entry of data is valid, complete, and material-free. This process encourages pertinence and efficacy. The program only needs to collect and store relevant data once. Both internal and external sources can be data sources (Xu, 2015. p. 6). After obtaining data, it is stored and analyzed in database control. The analysis functions range from basic to sophisticated, including algorithms, statistical techniques, revenue allocation, and accounting summarization procedures (Thabit, 2013. p. 77).

The information generated is then transmitted to external users and internal end-users. Terminals outside of this sector include creditors, shareholders, investors, regulators, provisioners, and clients (Thabit and Jasim, 2017. p. 45). On the other hand, the main terminal is the organization's

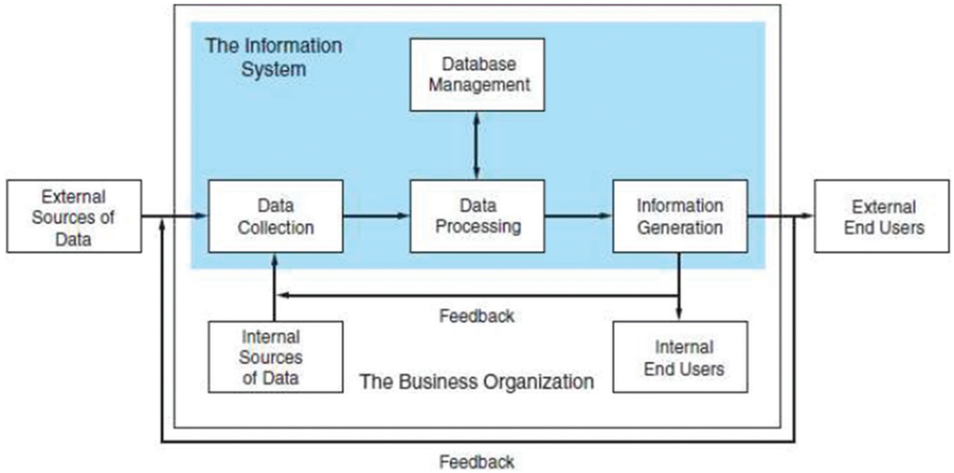


Fig. 1. Model of general accounting information system.
Source: Hall (2018). Accounting Information System, 10th Edition, Cengage Learning.

administration at all levels. Feedback is then sent back to the company to learn what to maintain and what to change.

*Information accounting system types*

In general, companies employ three kinds of IT systems, including unautomated systems, IT systems, and computer systems (Ballada and Ballada, 2008. p. 91).

- Unautomated system

This is the first portion of the accounting system. Where this system uses papers and books written on paper, computers have replaced some paper records with electronic processing structures of computer records (Li, 2013. p. 96). An unautomated system relies on human work and is labor-intensive. The manual system can be susceptible to errors because of human processing.

- Computer-based transaction system

In their AISs, organizations use multiple forms of information technology. A computer-based payment system was developed because of advances in information technology (Li, 2013: 97).

Accounting data are preserved independently from other processing data in this system. At this point, the work is more divided to maintain the integrity of the AIS (Arasteh et al., 2010. p. 414).

Information processing is the same as manual system processing, but the only distinction is that the accountant will register the text as the basis of the transaction on the computer screen, which can be processed automatically (Al-Delawi, 2019. p. 181).

There are many advantages of a machine transaction system, so transactions can be sent to specific accounts easily and bypassed by logging; comprehensive transaction records can be written to be checked at any time; internal reviews and change checks can be used for error avoidance and tracking, and the development of a large range of reports can be used (Thabit and Abbas, 2017. p. 843).

The market offers accounting services. These modules are comprised corporate accounting application modules. A basic accounting kit may also have a plugin or a stand-alone module. However, it consists of more than one module most of the time. The QuickBooks and Peachtree are reminders of this.

- Database systems

This minimizes inefficiencies and excess in the information. The accounting process form of business management deviates from quantitative database systems, such as enterprise resource planning (ERP) systems.

This program apprehends both financial and non-financial information and then stores it in the database (Al-Delawi, 2015. p. 444). The benefits of this method contain market understanding rather than merely accounting; help to reduce organizational inefficiencies and removal of data duplication.

*AIS objectives*

To be considered as successful, an accounting system must fulfill the basic requirements of IT systems (Amidu et al., 2011: 150).

- First, the cost-benefit or cost-benefit equation must be embraced. Financial information is paid and not free; even other businesses expend millions each year gathering and organizing financial information to store them. In accordance with this principle, financial reporting costs in the financial statements should not prevail over the advantage for users of that information. If the company plans to improve its IT system, the cost-benefit principle must be considered.
- Second, the protection of the assets of companies ensures reliability of data, minimization of waste and the risk of robbery or fraud. The principle of control is also known.
- The third goal is to harmonize the operational and human aspects of the organization. The principle of consistency can also be called this.
- Ultimately, the versatility theory is also named, to respond to increases in transaction volume and organizational changes.

*Process of accounting*

The average speed of the accounting process is shown in Fig. 2. The four key stages involved are the review of sales, the documentation of results, and the processing of

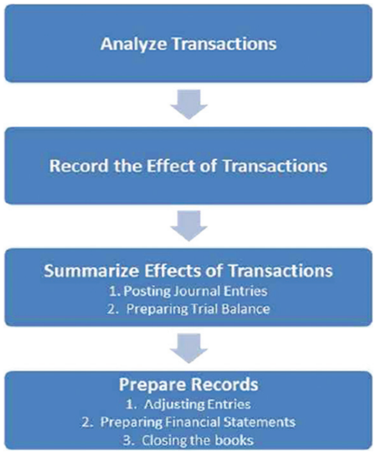


Fig. 2. Process of accounting.
Source: Hall (2018). Accounting Information System, 10th Edition, Cengage Learning.

documents. This is a balanced method, which ensures that the procedures can be used manually and technically.

First, it is to evaluate transactions, to understand the financial aspects of the transaction, to distinguish recordable and unrecordable transactions (Hall, 2018. p. 93). The purchase is evaluated in this phase on how it impacts the balance of accounts. In this point, source documents such as invoices, instructions, and controls are useful.

The second step is the transaction impact. Transactions are documented by recording. These journal entries are the means by which an accountant records the impression of simple and complicated transactions (al-Delawi, 2015. p. 443). All journals record business transactions chronologically. The transaction dates, the amounts involved and the specific accounts stilted by the transactions are shown. Sometimes the transaction is also described in detail. The books with original records are also known.

The third stage involves summing up the effects of the exchange and then inserting the journal entries in the ledger and planning a trial balance (Emeka-Nwokeji, 2012. p. 87). On evaluating purchases and recording them in a diary, all related products must be listed and categorized. This is achieved by adding all the journal entries to the correct accounts in the bookkeeping system. Both accounts are kept in a book entitled directory. A notebook is known as the invoice book. The next step is to identify each account's total balance. Typically, a check balance is planned once the balances of the account have been calculated. Each account with debit or credit balance is listed in a test balance (Galani et al., 2010. p. 419).

The last step includes reviewing the accounts, including the correction of records, review, and closing of the financial statements (Grabski et al., 2011. p. 54). Many change entries appropriate for the duration will be recorded and posted. After that, the check equilibrium is repopulated again. The financial statements are then compiled from the check balance data (Haug et al., 2011. p. 172). The financial statement, the income statement, the cash flow report, and comments are included in the report. The closing of the books is the last procedure.

Today, most businesses use their accounting systems for computers and electronic technology; computers helped the company to quantify millions of transactions per second (Jameel, 2018. p. 198). The time it takes to complete the work manually is far from the time it takes for computerized programs to be used.

In addition, all four processes are the same. The only distinction is that in manual processes the accountant estimates and checks the records manually while only the results are analyzed and placed in a computerized system and the computer measures the balances automatically.

The fact settles that machines are unable to think, and this is the responsibility of the accountant (Li, 2013. p. 100). The job of the accountant is only the two first activities in the accounting process in the computerized method. The accountant just has to evaluate the transactions and report their consequences. The machine is faced with key computations.

Fig. 3 illustrates how economic activities pass into the accounting process that generates the accountable outcomes, and then the information produced is applied to economic decision-making and initiatives by stakeholders (Ballada and Ballada, 2008. p. 96).

With a touch of information technology, fast communication is built. This can lead to increased management decision-making and organizational productivity. Communication channels such as e-mail servers, switches, internal company signs, and chat facilities may help facilitate communication with the client. Use computer-based communication systems, routine and critical business knowledge can be transmitted quickly and effectively (Thabit and Raewf, 2017. p. 61).

Information technology infrastructure can be used to submit corporate status reports to executives, to educate employees on key business initiatives, and to communicate with clients and consumers.

*Information technology impact in accounting*

The way businesses operate has modified computers, the internet, applications, or even personal digital gadgets. Advancements of information technology and the accounting system have also changed. As business information is managed by accounting, any change in this sector will have a positive impact on the company, especially in the accounting department (Hall, 2018. p. 108).

*A. Competitive Props*

The use of IT resources let businesses to retain their rival's competitive benefits (Abadi et al., 2013. p. 2410). IT can be used to generate and differentiate new and improved goods from the existing market. The implementation of IT systems at the organization will reduce costs. This can boost productivity and reduce overhead demands for workers. Businesses should incorporate IT into their offerings, too, making moving systems, or goods impossible for consumers.


Fig. 3. Economic activity flow.
Source: Hall, J. (2018). Accounting Information System, 10th Edition, Cengage Learning.

*Economic efficiencies*

The IT services were able to reduce accounting costs significantly (Thabit et al., 2016: 40). Within one location, multiple activities can be consolidated using IT resources. Based on high-cost functions transitioning in an online platform, economic productivity can be accomplished.

Organizations can also provide a less costly online e-mail service than a live customer service call. Cost savings could be achieved by recycling, remote working opportunities, and economic connectivity as well (Jameel and Ahmed, 2018: 44).

*B. Improved Instruments*

Another approach to see technological progress in businesses is through their information processing systems. The availability in offices with computers, printers, routers, faxes, or other creative technology provides a competitive advantage over those who do not. Nevertheless, basic devices like computers can be bought at inexpensive and fair rates in today's situation (Li, 2013: 101).

*C. Accounting Process Software Tools*

The software is an immaterial commodity from a commercial point of view. This is a collection of systems-related programs or procedures. Common business software includes software for accounting, auditing software, software for word processing, multimedia software, and electronic data exchange.

*Software for accounting*

Accounting software packages for payments and expenses handled in usable systems such as accrued, payable, compensation, and evaluation balance. It is included in the financial information report. Now it is possible to purchase simple online accounting software.

They contact their trusted programming companies for software used in large companies. This software is used to organize and centralize data. Hence, three different forms of company accounting software exist (Amidu et al., 2011. p. 152):

- Core applications are fully completed and tested. We are designed for business system execution. ERP, Oracle, and SAP are examples of this framework.
- Backbone systems consist of basic device architectures. The main logic for this approach is programmed and the seller designs the user interface that meets customer requirements.
- Customized systems are known as custom systems supported by vendors.

*Software for audit*

As computers are incorporated by the accounting process, in a computerized environment auditors may also be able to conduct audits (Thabit, 2019. p. 3). Software packages for auditors are available only. Electronic auditing trails for auditors are also created by digital technology (Thabit et al., 2016. p. 37).

*Software for word processing*

This is the software application for word document formation. This also allows the editing, storing, and printing of textual data. In the exchange of information, accountants and other organizations use tools for word processing. In the planning of papers, billings, and memos, they are using word processing tools (Ghasemi, 2011. p. 115).

*Workbooks*

A workbook is a type of active and dynamic computer application system that is typically used for tabular data structure and analysis. The paper worksheets have been developed as computerized simulations.

Today, Excel and SPSS are the two most popular tablets. This may be for computer or electronic functions (Amidu et al., 2011. p. 153). The financial statements of the end-off period could be issued to a table and submitted to the board of directors graphically.

*Graphics software*

To better understand the issue, this program produces pictures, graphs, and charts from the data input (Hamlen et al., 2010: 44). It is also used to report financially.

*Electronic data interchange (EDI)*

This is the swap of business information in a standard format by computer-processed companies. It is an inter-agency endeavor because two or more entities are involved (Ghasemi, 2011. p. 115). There is no human agent in the mere EDI system to accept or sanction transactions.

*Security*

Informatics is broadly used in the security of accounting. When accessing secret information on the company, the use of identification and passwords provides powerful control. Instead of ties and papers, the safety with the correct computer programs is greatly enhanced (Hamlen et al., 2010. p. 46). The use of a system will encrypt accounting information in such a way that it is not illegal and secure. For example, the security software obtained by the company will control a missing, damaged or faulty laptop or desktop computer.

*Internet*

The internet offers massive information sources that can be used by organizations, in particular in the field of accounting. This allows document sharing, research, and taxation in certain countries to be filed online (Dandago and Rufai,

2013. p. 671). This means that documents can be shared by a wireless and easy internet connection.

Malls and department stores are widely used for the point of sale method. The internet assists customers in the payment process through a real-time credit card connected to their banks. The employ of bar codes aids to improve the processing process and correct inventory information automatically.

*Cloud*

The latest trend for accounting software is online hosting off-site or named as the cloud. The program remains on a server at a different location instead of running a program on the machine of the organization (Hamlen et al., 2010. p. 48). The cloud technology also connects to the internet and stores the files or documents online. The term "worked in the cloud" may also be used (Al-Nasrawi and Thabit, 2020. p. 71). It allows companies to save money on their sales of software and hardware by registering with their cloud providers and employing their data saving systems and resources. This does not mean a greater hard drive or device versions have to worry around.

The other advantage of the cloud is that you have access to information everywhere. This new cloud technology combines enhanced security of accounting information. Data cannot be accessed by all citizens; managers could restrict information access. There may be limited information.

*Adequacy*

Adequacy is the main attribute in every program or operation (Amidu et al., 2011. p.154). Adequacy means that limited resources are the best possible outcomes. In the accounting system, streamline management processes, shared storage, and group practices are the aspects that increase efficiency. This also helps employees to work at a higher level in less time. IT solutions can be used in the management of standard tasks to enable data analyses and store data in a way that is easy to access for future use (Al-Nasrawi and Thabit, 2020. p. 71). Customer inquiries may also be answered by technology. The entity can communicate with clients by e-mail, in an interactive chat session or through a phone standard system to make it more efficient.

*Velocity*

Velocity is an essential feature of IT. The use of many innovations contributes to quicker purchases and performance (Thabit and Jasim, 2017. p. 53). Multiple computations can be achieved in a second by means of the integration of information technology which leads to the acceleration of system information production.

*Accuracy*

Calculation encourages the technology of information. The consistency of documentation and documenting is critical because of the very thorough accounting work (Thabit and Jasim, 2017. p. 70). One of the system's positive effects is that statistical error probability reduces, which is one of the problems of the management program.

*Internal and external reporting strengthened*

It is easy to generate and send financial reports to internal and external customers based on increasing data processing speed and accuracy. External users can use these reports for an entity status assessment. Public customers supervising this infrastructure profit from knowing the details when making economic decisions.

Nickels et al. pointed out that computers make the job much easier and allow administrators and other workers to access their financial reports precisely when they want them (Bae and Ashcroft, 2004. p. 3).

*Flexibility*

In accounting departments, flexible technology is critically needed. The accounting system must be able to adapt to business practices changes (Thabit, 2015. p. 45). Accounting-related information technology provides opportunities for transition adaptation. Certain systems can upgrade the transaction volume of the entity.

*Paper use reduction*

The use of accounting systems in paper envelopes and accounts reduces the use of books (Thabit and Raewf, 2016. p. 22). It reduces costs and removes the entity's environmental concerns about the use of trees and paper.

## VIII. Conclusions

Based on the related literature and previous studies, the researchers can conclude the following:

- The use of information technologies to simplify accounting processes and reduce the effort of the accountant started more than 140 years ago.
- One of the most important bases on which the organization depends on managing its business and organizing its accounts is information technology.
- Information technology innovation contributed to the development of corporate accounting systems, improved business performance, and helped the emergence of cloud accounting.
- The simplification of accounting procedures while enhancing their efficiency and effectiveness due to the use of information technologies has resulted in greater opportunities for companies to expand their commercial deals and enhance public confidence in them.
- The employment of information technology mechanisms in the AIS contributed to reducing unintended errors and thus contributed to the development of the auditing profession.
- The efficient application of information technologies contributed to the flow of information effectively, which facilitated the taking of management decisions, and improved the company's ability to meet strategic and commercial goals.
- The application of information technologies in AISs will not make them systems free of defects but make them systems capable of development and continuous updating.
- One of the most important downsides of employing information technologies in AISs is the lack of standardized technologies used in all systems, as companies are usually selective in choosing technologies that suit their activities and this weakens the transparency of the outputs of AISs.

## IX. Recommendations

According to the conclusions of the research, the researchers recommend the following:

- The use of information technologies in accounting must be determined by international standards issued by relevant professional organizations.
- Companies should invest part of their profits in developing software for accounting systems, developing human resources, and training accountants for important accounting software.
- All companies must use accounting software efficiently and effectively to obtain the highest level of advantages of this software to overcome the disadvantages of the implementation of information technology in an AIS.

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# The Impact of Human Resources on the Banking Sector Performance in Syria

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*Abstract*—**This research deals with the relationship between some of the general characteristics of human resources in the Syrian banking sector, such as the level of education, training and experience, and the operational financial efficiency of this sector. The data for the human resources are collected from the employees of several private banks in Syria, then testing the relationship with the financial data derived from the annual financial statements published by those banks for year 2019, the same year of data collection. This study is the cornerstone of complementary studies, which is more specialized in the field of human resources and financial performance. The study concluded that there is no effect of the human resources efficiency on financial performance for year 2019, which raises the urgent need of conducting similar research for a range of years and more comprehensive study on the factors that affect financial performance whether in the Syrian market or other markets as a part of behavior analysis on financial market.**

***Keywords*—Banks financial performance, Human resources, Syria.**

## I. Introduction

Intellectual capital has recently become in the center of most organizations, it represents the most important role in achieving their competitive advantage. Intellectual property is the enhanced value of the organization's assets, which often has an intangible nature, this value is derived from the following elements: Organizational function, information technology, human resource competency and competitiveness, and the strength of the organization's relationship with its clients. Intellectual capital is defined as a set of intangible knowledge assets that act as an integrated system to create value for the enterprise and enhance its competitiveness (Karier, 2010). Human capital is one of the basic components of intellectual capital. Human capital is the sum of the experience, knowledge, energies, enthusiasm, creativity, and qualities that workers have and invest in work (Fonseca and Fratesi, 2017). Contemporary organizations increasingly rely on human capital to achieve their goals. The optimal use of physical investments depends on the efficiency of employees. Today, focus on these resources for their active contribution to success and competitive advantage.

## II. Research Importance

Although many senior leaders do not pay adequate attention to human resources, especially in the annual reports issued by their organizations, where the focus is on the economic and financial performance and the amount of the company's profits or the amount of services provided by the beneficiaries, but many studies conducted over the years have shown that one of the most important success factors for enterprises is the presence of scientifically qualified and well-trained human forces. Where the human element is the most important resource for the enterprises, since the performance of employees to perform their activities and tasks optimally ensures the establishment of strength and the survival of competitiveness.

## III. Research Objective

This study attempts to reveal what is the nature of human resources (or the appropriate mix of manpower) that improve the work of banks and achieve the best returns for the bank.

The study will also serve as a guide for human resources managers in the banking sector to help select banking

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professionals to achieve the objectives set, as they may reveal some errors in human resource policies regarding the selection of employees to increase the effectiveness of the individual in the organization.

## IV. Research Problem

The entry of private banks to Syria has formed a major change in the Syrian banking sector, and even the Syrian economy as a whole, which was dependent on the whole on the government banks, and with the entry of private banks to the Syrian market and the spread of large, the competition between them, on the one hand, and with banks, on the other hand, is a remarkable phenomenon.

And since the nature of operation in commercial banks depends on the human factor to deal directly with customers, that is to figure out the customers needs and demands, accompanied with the human factor importance in marketing the services of the bank, this fact has made the human factor an indispensable element for the success of commercial banks, no matter how developed technical means these banks are using.

Because of this great importance of the human factor in the banking sector, the study of this factor in detail and analytical has become an urgent necessity, especially in the Syrian labor market, which raises many questions about the relationship between the nature of human resources working in the banking sector and the growing success achieved by this sector, and the level of specialized scientific qualification for cadres working in the banking sector has a positive impact on the profitability of the bank. What is the relationship between some of the characteristics of human resources in terms of gender, age level, level of training received, and the quality of the profits achieved by the bank.

## V. Research Hypotheses

Considering that this research will include the most of the human resources aspects in the Syrian banking market, the following hypotheses will be tested.

### A. Hypotheses 1

$H_0$: The specialized education in the Syrian banking sector has no impact on banking performance.

$H_1$: The specialized education in the Syrian banking sector has an impact on banking performance

### B. Hypotheses 2

$H_0$: The level of training for the employees in the Syrian banking sector has no impact on banking performance.

$H_1$: The level of training for the employees in the Syrian banking sector has an impact on banking performance

### C. Hypotheses 3

$H_0$: The banking experience in the Syrian banking sector has no impact on banking performance.

$H_1$: The banking experience in the Syrian banking sector has an impact on banking performance.

## VI. Research Methodology

### A. Data Source

**Primary Data:**
- A distributed questionnaire to bank employees.

**Secondary Data:**
- Disclosed financial statement in the Syrian banking sector.
- Journals and books.

### B. Population and Sampling

The population of this research includes the bankers of the registered commercial banks in the private Syrian market. Since the private Syrian banks have huge similarity in their organizational hierarchy and their provided services as well, the research was conducted in the following banks:

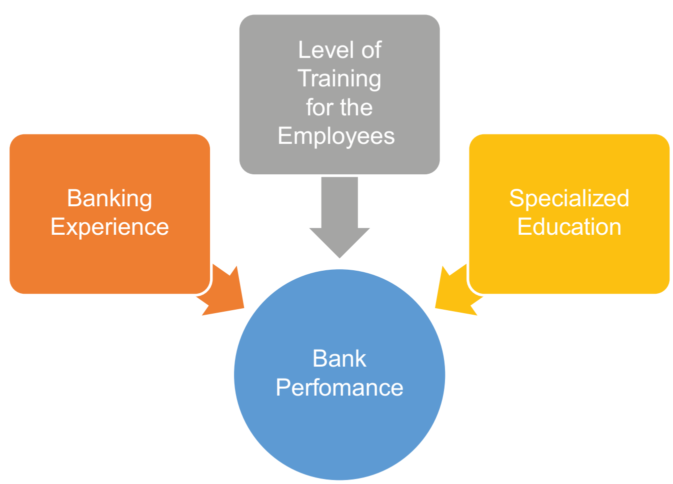
| | |
|---|---|
| Arab Bank Syria (ARBS) | Bank of Jordan Syria (BOJS) |
| Bank of Syria and overseas (BSO) | Cham bank (CHB) |
| Syria International Islamic Bank (SIIB) | Baraka Bank Syria (BAS) |
| Fransabank Syria (FRBS) | Qatar International Bank Syria (QNBS) |
| Sharq Bank Syria (SHRQ) | International Bank for Trading and Financing (IBTF) |

### C. Data Collection Tool

The primary data collection tool is a questionnaire that was distributed to bankers working in private commercial banks in the banking sector that were mentioned earlier, this questionnaire includes questions related to the level and type of education and years of experience. After collecting the answers, the data will be sorted according to the bank name.

The secondary data are financial data that were disclosed by the banks of the sample, those data are disclosed though the various means of media (the banks' publications, Damascus Stock Exchange, the central bank of Syria, etc.)

### D. Research Variables




### E. Data Analysis Methodology

The researchers conducted the analyses using developed equations and then applying correlation and regression analysis to examine the impact of the independent variables on the bank performance and the level of that relationship in case there was any impact.

## VII. Literature Review

Human resource management as defined by Professor Eduardo Filippo in his book Principles of Personnel Management as "planning, organizing, guiding and controlling the process of selecting, developing, caring for and maintaining individuals with a view to contributing to achieving the established organizational goals set by the administration" (Odeh, 1994), another definition of human resources is the art of obtaining, developing, and maintaining a specialized workforce in ways that achieve the organization's goals and functions with maximum efficiency and maximum degree of economic (Snell and Morris, 2018); thus, the element of human resources has a huge role in achieving the organization objectives, and this requires having specialized workforce and for that purpose, this study was conducted.

Many researches explained the necessity of selecting and assigning academically qualified personnel to various types of organizations including financial organizations, for the employee's selection process to be carried out correctly, it must begin with an analysis of functions within the organization and its planning. The job planning process can be explained as the process of collecting information on each job to identify the job description and requirements, specifications, characteristics, and the primary purpose of collecting information on each job (Durrah and Al-Sabbagh, 2008).

There are many sources for personnel to recruit, but most human resources managers agrees that these sources can categorized intro internal and external; where internal sources of personnel are when the management of the organization uses the available personnel inside the organization, as they possess the necessary qualifications to meet the job needs, internal recruitment is done through either promotions, employee transferring, and internal announcements as well. Otherwise, the organization will go for external sources – from outside the firm – to recruit qualified personnel to fill the vacancies in the organization (Snell and Morris, 2018).

The educational background of the candidate is considered to be one of the important factors for any recruitment decisions, whether regarding the field of education or the level of education, as many studies have resulted that there is a high impact of the educational background of the candidate –internal or external alike – on the decision of employment (Chen and Wu, 2007), while Aparicio, 2014, emphasizes of the significance of the educational level in the employment decision, and according to OECD, 2014, more than 80% of the population of the OECD countries who hold university education are employed, where this average falls to less than 60% for those who did not obtain any upper secondary education. As a result, educational background is a very significant element in human resources management.

Training is a term than is usually used when an organization is providing a certain kind of learning to improve the efficiency of its personnel; however, many HR experts differentiate between training and development, while training refers to be oriented towards short-term concerns, development tends to focus more for enhancing the skills of the staff for long-term responsibilities. It has been shown in many researches that firms' indicators of revenues and profitability have a positive correlation with the given amount of training and development to increase the knowledge and skills of its employees (Snell and Morris, 2018).

According to Solow, 2017, the significance of the employee experience is growing as they will engage more in achieving the firm/s objective more effectively, research showed that companies with highly engaged and experienced personnel made a revenue growth rate 2.3 more than average.

## VIII. Data Collection

As described earlier, there are two types of collected data (the employees' data-the bank data).

### *A. The Employees' Data*

The purpose of collecting this data is to obtain a clear idea about the personality of the employees and the specifications and competencies they hold in the Syrian banking sector, as we need to search for information regarding the educational level of the bankers in the Syrian market which is the main variable to be studied; in the research, it is necessary to distinguish between the levels of education and the researchers have been divided those level into (secondary certificate, university degree, master's degree, and doctorate), where it is not possible for the banker to hold any certificate that is less than high school.

It is also necessary to distinguish between the types of certificate, whether it is specialized in the economic or banking field, and it is also important information to be taken into account for the research. It must also take into account whether the employee is in the stage of academic achievement and what kind of certificate he is seeking.

As for the training, the duration of the training obtained by the employee in the early stages of the work is one of the important factors that affect the efficiency of the employee and raise the effectiveness of his performance, taking into account, the type of training if it is predominantly theoretical or scientific is also an important factor, and the subject of continuity of training during the period of work, duration, and periods of repetition of training courses within the bank or outside the information to be observed.

The foreign language is one of the skills that must be met by the bank's employee, which has become an urgent necessity in the light of electronic banking and for the purpose of dealing with correspondent banks. Therefore, the foreign language possessed by the employee and the extent of his proficiency is important information to obtain a clear idea of efficiency and ability of the bank employee.

The experience of a bank employee from his previous job at a bank is one of the strengths of the employee, which helps him to adapt quickly to the new work environment and the lack of the need for intensive training courses, especially in the practical aspect.

Moreover, there are some other natural characteristics that may affect negatively or positively on the performance of employees in banks and we will choose from them in our research the average age of employees and the gender of employees and its impact on the performance of banks.

### *B. The Banks' Data*

According to Casu et al., 2015, as being an intermediary between depositors and borrowers, the essence of the banks' operational nature is accepting the deposits and providing credit, thus comparing the amount of deposits of a bank to total amount of loans is considered to be one of the ratios to evaluate the performance of a bank. The amount of deposits and loans of a bank is dependent on many external factors that might affect the banks' activity as an intermediary between depositors and borrowers, such as the state laws and regulations, the expectations for the economy, the clients preferences regarding savings versus investments decision, and many other factors that will affect the demand for liquidity and relatively, the level of deposits, and loan amounts.

As a result, another measure has been adopted for this research, this measure depends on evaluating the operational efficiency of the bank by calculation the efficiency ratio by comparing the expenses to the revenues of the bank, considering that a bankers' efficiency is the most effective element to reduce the operating costs and in increasing revenues (Choudhry, 2018). As a well-trained staff, both academically and professionally with fair banking experience would be more able to avoid mistakes and faults, and performing better for the purpose of reducing operating expenses and increasing the bank's revenues (Massoudi, 2016).

## IX. Data Analysis

For the purpose of this research, an analysis approach has been adopted to assess the employees working in banks selected in a the sample, this approach depends on the capabilities of the employee, which has been questioned in the questionnaire, each item of the questionnaire has a certain weight which depends on the significance of the answer, which reflects the efficiency of the employee, as an example, the weight of significance of an employee holding an academic degree is 15%.

Moreover, every potential answer for the items of the questionnaire has a grade that ranges between 0 and 100, according to the significance of the answer and its relevance to the nature of the banking operations, as an example, if the respondent chose having a bachelor degree, this will result into having a 50/100, while PHD holders will get 100/100 as explained in the following Table I:

Following the primary data collection, each item answer will be assigned with its relative grade, then multiplied with the weight of the item, the total of the all the items will result in giving the level of efficiency for that employee using the following the following equations:

Equation 1:

$$efx(ed) = (\alpha 1 * \beta 1) + (\alpha 2 * \beta 2)$$

Where:

efx(ed): Employee's educational efficiency

$\alpha1$: First question grade

$\beta1$: First question weight

$\alpha2$: Second question grade

$\beta2$: First question weight

Equation 2:

$$efx(tr) = (\alpha 4 * \beta 4) + (\alpha 5 * \beta 5)$$

TABLE I

Survey Questions Grade Distribution

| Questions | Weight (%) | Answers 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Level of academic degree | 15 | 0 | 10 | 50 | 75 | 100 |
| Degree in banking or relevant study (yes/no) | 25 | 0 | 100 | | | |
| Foreign languages (good level minimum) | 10 | 0 | 50 | 75 | 100 | |
| Duration of training when you started working in the banking sector<br>None=1<br>1 month=2<br>2 months=3<br>3 months=4<br>4 months or more=5 | 15 | 0 | 25 | 50 | 75 | 100 |
| Are you still getting continuous training in your bank? | 10 | 0 | 100 | | | |
| Do you have previous experience in the banking industry | 10 | 0 | 100 | | | |
| Years of experience in banking sector | 10 | 0 (<1) | 25 (1) | 50 (2) | 75 (3) | 100 (>3) |
| Position in previous job<br>No position=1<br>First entry level=2<br>Position in a middle management level or higher=3 | 5 | 0 | 25 | 100 | | |

Where:
efx(tr): Employee's educational efficiency
α4: Fourth question grade
β4: Fourth question weight
α5: Fifth question grade
β5: fifth question weight
Equation 3:

$$efx(ex) = (\alpha 6 * \beta 6) + (\alpha 7 * \beta 7) + (\alpha 8 * \beta 8)$$

Where:
efx(ex): Employee's educational efficiency
α6: Sixth question grade
β6: Sixth question weight
α7: Seventh question grade
β7: Seventh question weight
α8: Eighth question grade
β8: Eighth question weight
Equation 4:

$$efX = \sum_{8}^{1} \alpha * \beta$$

The following example explains how to use Equations 1, 2, 3, and 4; considering a respondent has the following data:

- Level of academic degree: Bachelor
- Degree in Banking or relevant study: Accounting
- Foreign languages: English
- Duration of training when you started working in the banking sector: 1 month
- Are you still getting continuous training in your bank: NO?
- Do you have previous experience in the banking industry: YES?
- Years of experience in banking sector: 1 year
- Position in previous job: First level entry

According to the above answers, the employee's efficiency is calculated using the previous Table II as follows:

Relevantly, using Equations 1, 2, and 3, we can calculate the educational, professional training, and experience efficiency of the employee as follows:

$$efx(ed) = (\alpha 1 * \beta 1) + (\alpha 2 * \beta 2) = 7.5 + 25 = 32.5$$

$$efx(tr) = (\alpha 4 * \beta 4) + (\pm 5 * \beta 5) = 0 + 3.75 = 3.75$$

$$efx(ex) = (\alpha 6 * \beta 6) + (\alpha 7 * \beta 7) + (\alpha 8 * \beta 8)$$
$$= 10 + 2.5 + 1.25 = 13.75$$

Equation 5:
To find out the educational efficiency of a bank, we need to calculate the average of the employee's educational efficiency grades using the following equation:

$$efB(ed) = \frac{\sum_{n}^{1} efx(ed)}{n}$$

Where:
efB(ed): The Bank's educational efficiency
n: Total number of the bank's employees

The following Table III shows the value of the educational efficiency of each bank of the study sample:

Equation 6:
To find out the educational efficiency of a bank, we need to calculate the average of the employees professional training efficiency grades using the following equation:

$$efB(tr) = \frac{\sum_{n}^{1} efx(tr)}{n}$$

Where:
efB(tr): The Bank's professional training efficiency
n: Total number of the bank's employees

The following Table IV shows the value of the professional training efficiency of each bank of the study sample:

Equation 7:
To find out the educational efficiency of a bank, we need to calculate the average of the employee's experience efficiency grades using the following equation:

$$efB(ex) = \frac{\sum_{n}^{1} efx(ex)}{n}$$

Where:
efB(ex): The Bank's experience efficiency
n: Total number of the bank's employees

The following Table V shows the value of the experience training efficiency of each bank of the study sample:

TABLE II
EMPLOYEE 'S EFFICIENCY

| Questions | α Grade | β Weight (%) | α×β |
|---|---|---|---|
| Level of academic degree | 50 | 15 | 7.5 |
| Degree in Banking or relevant study (yes/no) | 100 | 25 | 25 |
| Foreign languages (good level minimum) | 50 | 10 | 5 |
| Duration of training when you started working in the banking sector | 25 | 15 | 3.75 |
| Are you still getting continuous training in your bank | 0 | 10 | 0 |
| Do you have previous experience in the banking industry | 100 | 10 | 10 |
| Years of experience in banking sector | 25 | 10 | 2.5 |
| Position in previous job | 25 | 5 | 1.25 |
| Employee's efficiency efX | | | 55 |

TABLE III
EDUCATIONAL EFFICIENCY

| Bank name | ARBS | IBTF | BSO | CHB | SIIB |
|---|---|---|---|---|---|
| efB(ed) | 24.2885 | 26.6833 | 18.4091 | 17.0192 | 18.2813 |
| Bank name | BAS | FRBS | QNBS | SHRQ | BOJS |
| efB(ed) | 30.4623 | 21.5748 | 16.2584 | 16.3548 | 13.5834 |

TABLE IV
PROFESSIONAL TRAINING EFFICIENCY

| Bank name | ARBS | IBTF | BSO | CHB | SIIB |
|---|---|---|---|---|---|
| efB(tr) | 18.6538 | 19.3333 | 18.1818 | 6.7788 | 6.3021 |
| Bank name | BAS | FRBS | QNBS | SHRQ | BOJS |
| efB(tr) | 26.56 | 15.6586 | 18.2148 | 12.3645 | 10.4167 |

Equation 8:

As for the bank's employee's efficiency of the sample, an average for all employees efficiency grades of the sample of this research, this calculation is as follows:

$$efB = \frac{\sum_{n}^{1} efX}{n}$$

Where:

efB(ex): The Bank's experience efficiency

n: Total number of the bank's employees

The following Table VI shows the value of the employees' efficiency of each bank of the study sample:

Equation 9:

The efficiency of the bank is measured using the efficiency ratio of the bank, which is calculated by dividing the total expenses to the total revenues (Moles and Terry, 2005), the efficiency ratio can be expressed as follows:

$$Effeciency\, ratio = \frac{\sum expenses}{\sum revenues}$$

The following Table VII shows the value of the efficiency ratio of each bank of the study sample for the year 2019, which is the same year of collecting data of the banks' personnel:

TABLE V
Experience Training Efficiency

| Bank name | ARBS | IBTF | BSO | CHB | SIIB |
|---|---|---|---|---|---|
| efB(ex) | 7.6923 | 9.5833 | 5.2273 | 7.6923 | 6.5625 |
| Bank name | BAS | FRBS | QNBS | SHRQ | BOJS |
| efB(ex) | 28.173 | 19.1452 | 19.3256 | 14.2549 | 11.6183 |

TABLE VI
Employees Efficiency

| Bank name | ARBS | IBTF | BSO | CHB | SIIB |
|---|---|---|---|---|---|
| efB | 1687.8205 | 1853.3321 | 1393.9394 | 1049.6796 | 1038.1944 |
| Bank name | BAS | FRBS | QNBS | SHRQ | BOJS |
| efB | 2839.8433 | 1879.2867 | 1793.2933 | 1432.4733 | 1187.28 |

TABLE VII
The Efficiency Ratios

| Bank name | ARBS | IBTF | BSO | CHB | SIIB |
|---|---|---|---|---|---|
| Efficiency ratio | 240.81% | 47.15% | 23.84% | 74.51% | 59.92% |
| Bank name | BAS | FRBS | QNBS | SHRQ | BOJS |
| Efficiency ratio | 41.94% | 86.29% | 65.89% | 65.50% | 124.90% |

With the data collected above, this study is about finding the impact of the independent variables on the dependent variables using correlation and regression tests for the hypothesis explained earlier as follows:

*A. Hypotheses 1: (Impact of Education on Banking Performance)*

By applying Pearson correlation test and regression, it is founded the correlation coefficient (R = 0.011), which reflects a very low relation between the two variables, and in result a low regression coefficient, which also means that the education efficiency factor has no effect on the banking performance in the study sample. Table VIII illustrates the Pearson correlation coefficient for hypothesis 1.

TABLE VIII
Correlation Analysis for Education and Efficiency Ratio Variables

| | Education | Efficiency |
|---|---|---|
| Education | | |
| Pearson correlation | 1 | 0.011 |
| Sig. (two tailed) | | 0.977 |
| n | 10 | 10 |
| Efficiency | | |
| Pearson correlation | 0.011 | 1 |
| Sig. (two tailed) | 0.977 | |
| n | 10 | 10 |

*B. Hypotheses 2: (Impact of Training on Banking Performance)*

By applying Pearson correlation test and regression, it is founded the correlation coefficient (R = −0.049), which reflects a very low relation between the two variables, and in result a low regression coefficient, which also means that the training efficiency factor has no effect on the banking performance in the study sample. Table IX illustrates the Pearson correlation coefficient for hypothesis 2.

*C. Hypotheses 3: (Impact of Experience on Banking Performance)*

By applying Pearson correlation test and regression, it is founded the correlation coefficient (R = −0.210), which reflects a very low relation between the two variables, and in result a low regression coefficient, which

TABLE IX
Correlation Analysis for Training and Efficiency Ratio Variables

| | Training efficiency | Efficiency |
|---|---|---|
| Training | | |
| Pearson correlation | 1 | −0.049 |
| Sig. (two tailed) | | 0.894 |
| N | 10 | 10 |
| Efficiency | | |
| Pearson correlation | −0.049 | 1 |
| Sig. (two tailed) | 0.894 | |
| N | 10 | 10 |

TABLE X
Correlation Analysis for Experience and Efficiency Ratio Variables

| | Experience | Efficiency |
|---|---|---|
| Experience | | |
| Pearson correlation | 1 | −0.210 |
| Sig. (two tailed) | | 0.560 |
| n | 10 | 10 |
| Efficiency | | |
| Pearson correlation | −0.210 | 1 |
| Sig. (two tailed) | 0.560 | |
| n | 10 | 10 |

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also means that the experience efficiency factor has no effect on the banking performance in the study sample. Table X illustrates the Pearson correlation coefficient for hypothesis 3.

## X. Conclusion

The aim of this study is to find out the effect of the basic elements of efficiency on financial performance in the Syrian banking sector and after conducting correlation and regression tests for the data that were collected using a methodology of collecting both primary and secondary data.

The conclusion of the tests was that those elements (education, training, and experience) have no effect on the financial efficiency in the Syrian banking sector. Reasons may be interpreted which are many including:

- Financial efficiency is usually a result of policies and strategies that are usually benchmarked from best practices of big enterprises and successful cases, especially in what is considered a new market like the Syrian banking sector.
- In a relative new market as the Syrian banking sector, most of the financial efficiency is a result of the effort of the management of the banks, which are most likely highly experienced personnel who are managing the financial performance of the banks.
- Using the operating efficiency as a sole indicator of financial performance could have affected the tendency of the analysis
- Using data of only year 2019 could be one major limitation of the study that has resulted in a no relation or impact conclusion.

### A. Recommendations

Considering the above results, the researchers have few recommendations for the purpose of achieving the purpose of the study:

- Conducting more research using the same study model for several years and using the values' differences of the used variables for several continuous years.
- Expanding the study using several elements for the financial performance variable rather than only analyzing the operational efficiency
- Using the model on a different market to compare results.
- Conducting more research to find out the ration of financial performance in new markets, not only banking sectors, in developing countries.

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# F. Scott Fitzgerald's Tender is the Night: Cons and Pros of the Narrative Method and Technique

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***Abstract*—Most critics tackle Fitzgerald's works thematically, whereas what distinguishes his fictional narratives is his magnificent style, suggestive language, and innovative narrative methods and techniques. This is quite evident in The Great Gatsby and other pieces such as The Last Tycoon, "The Mountain as Big as the Ritz," and the autobiographical piece The Crack Up. Tender is the Night is among these masterpieces which is our major concern in this paper. Yet still, this novel witnessed some controversial issues in its narrative technique and method. The study of the narrative method and technique in Tender is the Night has no less significance in the literary world than it has in The Great Gatsby. In fact, Fitzgerald mounted his artistic maturity and craftsmanship in this novel despite all the controversial issues that surrounded the novel's first publication. The present study sheds light on the cons and pros of the narrative technique and method in both versions of Tender is the Night with necessary reference to the development of the events in the novel.**

***Keywords*—Fitzgerald, Narrative method and technique, Tender is the Night, Dick diver, Nicole.**

## I. Introduction

One of the controversial issues in F, Scott Fitzgerald's Tender is the Night (1934) is that it came to existence 9 years after the publication of The Great Gatsby (1925) (Luong Merry B. 2010, p. 22). The themes, ideas, title, and material have been subject to recurrent changes during those years. This is partly because things in the US and world economy and henceforth social and cultural trends had changed rapidly. The Jazz Age, which Fitzgerald was pioneer and representative of, was over by 1929; it was, as described by Fitzgerald himself, "reluctant to die outmoded in its bed, leaped to spectacular death in October 1929" (Fitzgerald, The Crack Up. 1965, p. 13), and followed by the 1930s Great Depression during which Tender is the Night was made and published. The economic depression influenced people's manners and mores significantly worldwide; they were more concerned with the rising cultural, philosophical, and intellectual ideas and thoughts than the romantic and Jazz-Age issues (Mizener, 1959, pp. 220-221).

The second point (Luong, 2010, p. 21) is that Fitzgerald was very much preoccupied with his domestic problems, particularly the ones with his wife, Zelda's sickness of schizophrenia, which he employed in Tender is the Night. In effect, the novel did not get its due attention by the time of its first publication in 1934. Besides, Fitzgerald thought the problem lied in his narrative technique because the narrative did not take a chronological sequence, it rather used what is called flashback method in cinema. Moreover, this is the third point in the narrative technique of the story. For this particular reason, Fitzgerald made several changes to the novel later on including the title itself until the novel gained its due reputation after Fitzgerald's premature death in 1940 (Eble, 1963, pp. 135-138). The narrative method and technique Tender is the Night is composed of five books. Each one contains several chapters. Unlike The Great Gatsby, there is only the author's voice to narrate the story; in other words, the story has no first or second narrators, but the novelist's hidden voice to convey it. Here, still Fitzgerald follows a certain technique which is to distribute his moral judgments among the characters as in the case of Tommy Barban and others. What distinguishes each book from the others is a certain angle of consideration through which Fitzgerald delivers his story. His voice is conveyed through the eyes of his characters. Each one looks at the events from a certain angle; and the author's voice shifts from one to another stage by stage and book by book. Dick Diver, Rosemary Hoyt, and Dick again play the primary angles, whereas characters such as Franz Barban and, at the end of the story, Nicole's deliver minor angles (Eble, 1963, pp. 135-138).

Dick's angle comes first in "Case Study" which is the Book One in 1934 edition, but Book Two in 1936 edition. "Case Study" exposes the setting and the whole situation through Doctor Dick Diver's eyes both as a romantic genteel hero and

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as a psychiatrist who is allowed to know and consider Nicole Warren's mental and psychological condition. In "Rosemary's Angle," the scene on the Riviera, the Diver's marital life as well as their group of friends are all seen through the innocently fascinated eyes of Rosemary Hoyt. Then, Dick Diver's angle turns to capture the incidents inside and outside the family till his dissipation. Only then, the angle shifts from his eyes. As a balance, Nicole is not allowed to see things through her own eyes until her final recovery, and thus, the novel ends with the way she and her class (represented by her sister Baby) look at things while Dick Diver vanishes into the obscure towns of New York (Luong, 2010, p. 42). By October 1933, the manuscript of what Fitzgerald then called Doctor Diver's Holiday (an early title of Tender is the Night) was finished. Before the first draft was published in Scribner's Magazine for January 1934, Fitzgerald decided to change the novel's name to Tender is the Night. The book came out under this title on April 12, 1934, when Fitzgerald replanned the novel early in 1932 (Mizener, 1959, pp. 345-347).

When the original version of the novel was first published, the general mood of its failure made Fitzgerald demand a republication of it to rearrange its form. In the only edition published during his lifetime, the novel begins from the middle of the story, with the Diver family at the peak of their popularity, the charmed center of a circle of careless hedonists spending their vacation on the Riviera. A vague but early hint that there is something wrong soon discloses when Nicole suddenly breaks down in a hysterical fit at the end of Book One (Luong, 2010, p. 22).

Book Two opens with a flashback to 1917, when Dr. Diver arrives in Zurich to complete his studies. His relationship with Nicole, first as a doctor-patient, then as a lover is explained, and the story is carried beyond the point the novel began to show the beginning of his decline in 1928. In 1936, when a new edition was suggested, Fitzgerald was thinking to revise the method of narration in Tender is the Night, but it was not published then. Unfortunately, it was only after his death there was found among his effects a revised copy on which he had written: "This is the final version of the book as I would like it" (Mizener, 1959, pp. 220-221). Malcolm Cowley's edition of this 1951 edition follows the outline that Fitzgerald jotted in his notebook:

I. Case History (1911–1919)
II. Rosemary's Angle (1919–1925)
III. Casualties (1925)
IV. Escape (1925–1929)
V. The Way Home (1929–1930)

And according to Cowley, both of the editions have their virtues as well as flaws. In the last version, the story gives a tragic emphasis to Dick Diver's downfall by an initial account of his early promise and his fatal meeting with Nicole, but it sacrifices one of the artistic elements which is the sense of awesome mystery and fascination which is preserved in "Rosemary's Angle" as Book One in the original version (Cowley, 1963, p. 9). To provide authenticity, Fitzgerald deploys this novel technique of using several angles to narrate the story.

## II. Dick Diver's Angle

With the aim of tackling the method and technique of narrating Tender is the Night, it is inevitable to take significant slices of the story into consideration in a chronological sequence of events. Fitzgerald begins his second version of the novel with "Case History," the story opens on the protagonist Dr. Dick Diver, a 26-year American scholar of medicine in Zurich. The history of Dick's scholarship goes back to 1914 when he was an Oxford Rhodes Scholar from Connecticut to have one final year at John Hopkins (home) and took his degree. Then, in 1916, he could manage to get to Vienna to study psychology. However, after being discharged from the army, "instructions from his local board were that he was to complete his studies in Zurich and take a degree as he had planned." During this severe period of Europe's history, Dick set himself to his task seriously and wrote many pamphlets which he arranged to be "the backbone of the book he published in 1920" (Fitzgerald, 1963, pp. 19-20).

For the purpose of setting the core problem of the story, Fitzgerald creates two antagonistic parties made to share a love story and subsequently a marital life. The conflict is made by attributing the first party in his protagonist Dr. Dick Diver to the genteel tradition of health, culture, and social ethics, whereas the second party represented by his beloved wife Nicole Warren belongs to psychological and moral sicknesses, material power and crooked manners and morality of the very rich American stratum. Dr. Diver's career as a psychiatrist paves the way to a fragile ground of such a relationship. Fitzgerald's definition of his cultivated hero is clearly applied to Dick. He is made open to the promises of life before him as one of the gifted young Americans. That was a "heroic period" in Dick's life, he was charming, and he used to inspire the people around him with his affection and good health for which his friends at Yale University used to nickname him as "Lucky Dick" (Fitzgerald, 1963, p. 20). Dick is described as serious and brilliant by his friend and coworker Franz (Fitzgerald, 1963, p. 259).

By this cultural and moral exposition of his hero's background, Fitzgerald prepares the reader to anticipate Dick Diver's disillusionment by any practical experience of his ideal manners. Besides, Dick is just "like Grant, lolling in his general store in Galena, is ready to be called to an intricate destiny" (Fitzgerald, 1963, p. 22). Here, the writer makes a comparison between Dick Diver and Ulysses Grant (1822-1885), the 19$^{th}$ president of the U.S.A. (1869-1877), a republican. He was the commander-in-chief of the Union army during the American Civil War (1861-1865). His administration was marked by partisan politics and corruption (Watson, ed. "Grant" P. 460. Longman Modern Dictionary. 1976). According to the American history, Grant was an idealist who believed in the foundations of the pioneer Puritan Fathers. Ironically enough, when this idealist American hero wanted to emancipate the colored Americans, he committed mass butchery in the Civil War. And when he was elected to succeed Abraham Lincoln to the presidency of the USA, he was betrayed by his entourage who were later called the corrupt "Robber Barons." With this significant comparison between the two idealists Dick Diver and Grant, the story of Tender is the Night begins.

It is in Dohmler's asylum, Zurich where Dick gets introduced the 1st time to his friend Franz who delivers Nicole Warren's case history to him. The place is itself described by Franz as "…we are a rich person's clinic," a hint to affiliate psychological and moral sicknesses to the very rich people (Fitzgerald, 1963, p. 23ff). Franz starts narrating Nicole Warren's case history to Dick. After reading Nicole's card "Diagnosis: Divided personality…. The fear of men is the symptom of the illness" (Fitzgerald, 1963, p. 14). As Franz goes on in detailing the case, the reader comes to disclose more about a father-daughter incestuous affair that eventually made the girl collapse into schizophrenia. "After her mother died when she was little," says Mr. Warren to Franz, "she used to come into my bed every morning, sometimes she'd sleep in my bed…. We were just like lovers – and then all at once we were lovers – and after it happened I could have shot myself…." (Fitzgerald, 1963, p. 35). These are the people with whom Dick is to confront in a mutual love affair and marriage; they are the very symptoms of the "God damned degenerate" world of the American rich where the simplest heavenly relationship of a father and daughter turns into incest and assassination of a "little thing" beauty.

After this brief presentation to the corrupt antagonist the Warrens' sick realm, Franz asks Dick about his future plans. "I've only got one, Franz," says Dick enthusiastically, "and that's to be a good psychologist – maybe to the greatest one that ever lived," then Franz replies: "That's very good – and very American" (Fitzgerald, 1963, p. 37). Hence, Dick's future wholesome ambitions are put against the Warrens' past sins. With this romantic readiness for the possibilities of life together with the sense of nostalgia toward the old illusions of morality, Dick Diver is prepared to be seduced by the physical features and sensuous voice of Nicole Warren. Tracing the impact of Nicole's sensuous inviting voice while singing to Dick compared to her father's claim "she used to sing to me," Nicole herself becomes the germ of corruption in her atmosphere (Fitzgerald, 1963. p.39). And here lies the significance of the lines Fitzgerald borrowed from Keats's "Ode to a Nightingale" as a title and epigraph for this novel:

Already with thee Tender is the Night,
………………………………………….
………… But here there is no light.
Save what from heaven is with the breezes blown
Through verdurous glooms and winding mossy ways

The comparison is made clear between the nightingale's singing voice with the tender night and the verdurous gloomy atmosphere and "mossy ways." Dick is quite aware of Nicole's demonic figure coming out of the enchanted wood by the moonlight; "as if this was the exact moment when she was coming from a wood into clear moonlight" (Fitzgerald, 1963, p. 41). Using this suggestive language, Fitzgerald sets the atmosphere and the plot, introduces the problem through ambivalent backgrounds and ambitions of his characters.

## III. Rosemary's Angle

One of the privileges of the original version of Tender is the Night is beginning the novel with "Rosemary's Angle." The presentation of the Divers and their circle through the eyes of a new comer, Rosemary Hoyt, the star of Daddy's Girl. Fitzgerald describes Rosemary as being "so young and innocent… embodying all the immaturity of the race, cutting a new cardboard paper doll to pass before its empty harlot's mind" (Fitzgerald, 1963, p. 137). The rich people summoned on the Divers' "bright tan prayer rug of a beach" (Fitzgerald, 1963, p. 69) are unlike any Americans she has ever encountered, yet she observes that their joy is caused by the existence of a single person. Being captivated by Nicole's beauty and Dick's charm, Rosemary has a sense of "a conviction of home coming, of a return from the derisive and salacious improvisations of the frontier" (Fitzgerald, 1963, p. 101).

Still in her 18 with an immature views and virginal world where her romantic dreams are transformed into vivid shades, Rosemary is made to see Dick as if he has recreated Eden (Sklar, 1967, p. 270). The whole place is envisaged by her as a temple and Dick as a high priest. Confessing that she loves him, Rosemary almost kneels "feeling the smooth cloth of his dark coat like a chasuble" (Fitzgerald, 1963, p. 105), and while she is reacting to their "expensive simplicity," she is unaware that their sacred charm, "the nursery-like peace and good will, the emphasis on the simpler virtues, was part of desperate bargain with the gods and had been attained through struggles she could not have guessed at" (Fitzgerald, 1963, p. 88).

Being applied with these immature romantic naiveté, Fitzgerald employs Rosemary's character and vision to make a keen contrast between a simple eye's attitude of beauty and charm against the ugly reality lurking underneath that surface. Eventually, Rosemary herself becomes one of such god-like "high priest's" victim. The conflict is made clearer in "Case History." It indicates the strain imposed on Dick by his effort to draw others into his vision of an earthly paradise. Dick's attempt, as put by Edwin Fussel, is "to prevent, for a handful of the very rich, the American dream from revealing its nightmarish realities" (Fussel, 1963, p. 50).

## IV. Nicole's Eyes

Disintegration is at the core of Tender is the Night. And at the abyss of this disintegration lies Nicole's image (Shapiro, 2016, p. 157): Rich, corrupt, racist, and empty of illusions, as Rosemary sees her: "She sat in the car, her lovely face set, controlled, her eyes brave and watchful, looking straight ahead toward nothing" (Fitzgerald, 1963, p. 81). According to Fussel, her image is a personification of the vacuumed concept of Progress in "Fitzgerald's Brave New World." Being her psychiatrist and husband, instead of recovering her from her sickness, Dick gets himself infected by her moral disease and becomes corrupt and thus gets through what he later calls an "emotional bankruptcy" (Fitzgerald, "The Crackup," 1965). As a balance, this leads Dick to downfall to a virtual incestuous love affair with the innocent Daddy's Girl, Rosemary. Dick's fall is balanced by Nicole's climb to completeness: "You ruined me, did you?" says he to his recovering wife. And when Tommy Barban, Nicole's new lover, advises her to prevent Dick from drinking, she is amazed as if realizing her recovery at last: "I tell Dick what he should do or shouldn't do!" (Fitzgerald. 1963. pp. 292-3).

This disintegration leads to Dick's loss of confidence in himself and in all his beliefs of a good will. Therefore, he gives in to excess and dissipation. The last confrontation between him and Nicole is significant. Here, Dick seems to suffer the symptoms of his wife's sickness, whereas she speaks in a confident and sarcastic tone. "Don't touch me.... Why did you come, Nicole? I can't do anything for you anymore. I'm trying to save myself," says Dick. However, her rhetorical question afterward is a revelation and an end to the preset conflict: "From my contamination?" (Fitzgerald, 1963, p. 320).

From that point onward, Fitzgerald begins to project the rest of Dick's decline through Nicole's eyes. With his loss of confidence and disintegration, Dick's angle retreats to give way to his antagonist to conclude the story in which case Dick retreats and vanishes to be a mere reference at the end of the story. The book closes with fragmentary reference to Dick's mediocre career as a small town medical practitioner in New York; Dick Diver's figure recedes into a vague distance (Fitzgerald, 1963, p. 334).

## V. Conclusion

F. Scott Fitzgerald was obsessed with innovation. After the narrative success of The Great Gatsby, he spent long years writing, renaming, and reshaping Tender is the Night even after its first publication in 1934. The most problematic issue in the novel is that it has two methods in the narrative technique: The 1934 edition which begins from the middle of the story with a naïve new-start actress Rosemary's angle. The second edition that went to publication after Fitzgerald's premature death in 1940, the novel starts in a chronological sequence of events according to his will and final revision. This method is on the one hand. On the other, we have a new narrative technique used by Fitzgerald in Tender is the Night. Yet regardless of these problems, Fitzgerald comes out with a novel style in applying objectivity to the story.

Unlike The Great Gatsby, where Fitzgerald employs Nick Caraway as both a major character and narrator, in Tender is the Night, Fitzgerald uses his own voice as a narrator in the first person, but this voice is materialized through certain characters' eyes and angles such as Dick Diver, Rosemary Hoyt, Franz, and Nicole in the end of the story. All these subjective views, whether professional, sympathetic, or naïve add a collective objectivity to the authenticity of the story; the authenticity that is necessary to story to be accepted and appreciated. These new methods and techniques are quite peculiar to Fitzgerald's craftsmanship in the art of narration.

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# The International Protection of Women in Armed Conflicts: Analytical Study

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***Abstract*—The protection of women during armed conflicts has from time to time been a matter of concern to the international community in various forms and degrees. The laws of war have regulated the protection of women long before the Geneva Conventions and additional protocols system. The aim of this paper is to highlight the protection that women should be given in armed conflict, also taking into account their special needs.**

***Keywords*—Armed conflict, International humanitarian law, International instruments, Protection, Women.**

## I. Introduction

Women are repeatedly the victim of armed conflict. Whose are exposed to armed conflict, including gender-based violence such as rape, sexual violence, killing, harming, enslavement, and forced prostitution, are directly or indirectly affected by the conflict. Furthermore, armed conflict also effects of women gender relations, for example, as a result of the family's loss due to the conflict. This article aimed to discuss how international law protects women in armed conflict according to international conventions, protocols, and how the implementation of that protection. This study is divided into several sections; with conclude closing remarks and recommendations.

## II. Research Backgrounds

The behavior of war has changed dramatically over the past century. In its traditional context, the war was fought against states. In the aftermath of World War II, and especially after the end of the Cold War, (Schütte, 2015, p. 28), we witnessed a sharp rise in civil wars – wars between the states, armed groups, or wars between armed groups and the state were fought. A common feature of past conflicts is that armed conflict has turned into massacres of the resident population whenever regular forces face an irregular or "weak" conflict.

Women in armed conflict suffer from massive gender-based violence, among other types of gender-based violence, sexual violence such as rape, sexual assault, forced abortion, forced marriage, slavery, and women in warfare, also being met with other types of violence sexual. For example, in Somalia, opposition groups use rape and sexual assault against women as a form of reprisal. In armed conflicts that include the Islamic State in Iraq and Syria (ISIS), women are forced to work as sexual slaves to serve ISIS fighters, some of whom are sold as sex slaves for $ 500–2000 per woman, and if they refuse to be sex slaves, ISIS fighters will kill the women, (Bunga, 2017, p. 15).

### *A. Problem Statement*

With regard to the protection of women in armed conflict, it is important to consider the relevant legal instruments that provide the basis for the protection of women when conflicts occur and how to institutionalize them. The aim of this paper is to explore how international humanitarian law provides the legal framework for the protection of women in armed conflict, and how to exercise such protection. Both will be followed by looking at how women are affected by armed conflict.

## III. Research Questions

### *A. The Question of this Thesis Tries to Address*

1. Do the women enjoy the same protection and responsibilities as ordinary citizens in armed conflicts?

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2. To what extent the international humanitarian law has been effective to protect women in armed conflict?

*B. Research Objective of the Study*

The main objectives of this research are as follows:

1. Attempts to evaluate the international provision or suitable legal instrument to protect women in armed conflict.
2. It is the aim of this research to provide an overview on the status and treatment of women in national and international sphere.

*C. Scope of the Study*

This study will concentrate only on the international protection of women in armed conflicts since 2014 specifically in Iraq and Syria. Moreover, this study will also discuss the impact of conflicts whether international or non-international on women; furthermore, the study will examine the conventions and international instruments concerning their protection.

*D. Women in Armed Conflicts*

*The women's situation in armed conflict*

Women face the same receding tide and movement in times of armed conflict, which are violations of international humanitarian law as groups at risk as a whole: Torture, summary execution and arbitrary arrests, forced transfer, hostage taking, threat, and intimidation. In addition to these women, sexual violations such as rape, forced prostitution, sexual slavery, and forced vaccinations must be faced, (Bennoune, 2007, p. 363).

Women account for the largest proportion of refugees or vulnerable persons who are transported with their children. Keeping their husbands away from the family, and participating in armed conflict several times, the social status of women also changes. Women bear all responsibilities for the care of children and the elderly, becoming the only and final guardian of family peace, harmony, and identity. She becomes vulnerable in such matters, and the mortality rate inside pale women increases alarmingly in the event of armed conflict. It is estimated that since 1990, 90% of all deaths related to armed conflict have been civilians and that 80% of this number are women and children, (Otunnu, 2002).

Women have suffered from serious violations of human rights and international humanitarian law in all armed conflicts. They have been victims of all forms of sexual violence due to the negligence of the leaders or leaders of armed groups, in an intermittent and uncontrollable manner. These barbaric acts, however, also occur in a continuous and systematic way. In some cases, by perpetrating these atrocities, women become real targets of those who seek to humiliate and destroy entire societies. Women are victims of sexual aggression because their mental and physical integrity is destroyed by the attackers. Usually, in an inhuman attempt to demonstrate the inability of the male part of a group to protect them, women are attacked in public. Women are victims, because they represent the future of the group to which they belong. For this reason, acts such as female genital mutilation or forced fertilization are common, where attackers attack a nation or an ethnic or religious group, in whole or in part. These acts are a crime of genocide committed during armed conflict or in peacetime, (Ivanciu, 2016, p. 2).

Women still suffer in the post-conflict period because of their sexual assaults, but in some cultures the assaults come from the members of their group. In times of armed conflict or soon after it ends, with husbands engaging in warfare or killing at work, the status of women is greatly changed and they are either the only protection for their families or, on the contrary, they are excluded due to the sexual aggression that they need to overcome. That the victim of sexual assault is equivalent to the disastrous consequences of the victim, such as the consequences of exclusion from public life in society, persecution, or loss of marital status, and the judgment in certain cultures that the victims have mutilated the family and the group in which they live, (Than, 2003, p. 347).

The President of Security Council made a statement on the role of women in peace building on October 26, 2006, by the Security Council, (S/PRST/2006/42). President declared: The Security Council remains deeply concerned about the existence of forms of violence against women in armed conflict, including murder, mutilation, severe sexual violence, kidnapping, and human trafficking. The council reiterates its utmost condemnation of such activities and calls on all parties to the armed conflict to ensure full and effective coverage of women and stresses the need to end impunity for those responsible for gender-based violence (Mccormack and Kleffner, 2006, p. 278).

In an armed conflict, women must be treated in a manner that takes into account their specific needs. Women are protected under the Fourth Geneva Convention in wartime during an international armed conflict. Under these circumstances, women are subject to all laws that uphold the basic principle of humane treatment, including respect for life and physical and mental dignity, in particular, the prohibition of coercion, punishment, torture, collective punishment, and the taking of hostages, (Papyan, 2016, p. 6).

In addition to the general protection that "Women shall be specially secured against any attack on their honor, in particular against enforced prostitution, rape or any form of indecent assault," (Geneva Convention IV, 1949, Article 27).

The origin of Article 76 of Additional Protocol I, entitled "Women's protection," is the United Nations Economic and Social Council resolution "Protection of women and in the time of emergency, war, the struggle for peace, national liberation, and independence." In a non-international armed conflict, women are protected by the basic guaranteed protection of persons not participating in the hostilities set forth in Article 3, and common to all four conventions, (Protocol Additional II, 1977).

However, there is no special protection for women under Article 3 of the Geneva Conventions. This provision was supplemented and developed under Protocol II. Article 4 of Protocol II explicitly prohibits "outrages on personal dignity, in particular, humiliating and degrading treatment, rape, enforced prostitution, and any form of indecent assault."

Like all vulnerable groups, women are legally protected from any abusive treatment by the conflicting parties as well as from the effects of hostilities: "A vulnerable groups are any person who does not belong to armed forces." These special protection measures provide a more comprehensive mechanism to prohibit any degrading treatment of women, but there are some difficulties in practicing getting parties to a conflict to properly implement their obligations, (Papyan, 2016, p. 7).

*Understanding the global impact of armed conflict on women*

Armed conflict has had a major impact on the lives of women. Females are more vulnerable at the personal and structural levels to become victims of gender-related abuse. For example, women are victims of rape, forced marriage, or detained women in their places, and access to fresh air that is caused by arrests mixed with men. However, the impact of armed conflict has brought about changes in gender relations, especially with regard to women, specifically in the four areas of attitude, identity, constitution, and ideology. For example, due to the armed conflict of women who have lost their husbands who previously worked as families, women have been forced to take office, or armed conflict has made it possible for women to obtain smaller marriage expectations, which in some places have a high social status associated with marriage to reduce women's chances of standing higher social, (Bunga, 2017, p. 18).

Women also tend to be classified as "vulnerable," although they are not necessarily weak, they even display remarkable strength, as evidenced by their role as fighters or agents for peace, or through their wartime roles to protect and support their families. Conversely, women and girls are more vulnerable to sexual violence, regardless of the perpetrator's motives, although men are also victims of this violence," (Lindsey, 2001, p. 11).

In some opposing villages, young girls have admitted that armed men come at night – these girls are used as sex workers – they are not allowed to protest – they are not allowed to close their doors, and this is acceptable to the entire community because these armed men protected the society – so it is a trade-off. The essence of women's vulnerability lies more in the fact that armed conflicts have grown to such an extent that the vulnerable groups are completely trapped in war, and it is often women who try to perpetuate them and provide them and their protection daily survival for families, (Krill, 1985, p. 337-363).

The notion of vulnerability also includes the problem of danger (exposure), ability to deal with a situation, pain and trauma, and war trauma. "Weaknesses" do not thus fall into an easily identifiable category or description – especially when it comes to women. Therefore, it is possible to identify groups of women as particularly vulnerable and need special assistance according to the specific nature of each case and the various relevant factors, for example, pregnant women, breastfeeding mothers, mothers of children, and housewives. At the same time, women all over the world not only show that they can be very brave and resilient but also those they can take full advantage of their ingenuity and skills in their daily roles as heads of households, caregivers, and caregivers within their families, as well as active participants in the life of their societies, as employees of international organizations and NGOs, (Lindsey, 2001, p. 12).

The degree of exposure of women and, accordingly, the type of work required to respond to needs clearly depends on the circumstances. A comprehensive needs assessment is required in each situation to identify the most vulnerable groups – however, the potential for women's situations and needs must always be taken into account. Sexual violence as a method of warfare, for example, or the demand for women to have more children to replace lost children (an increase in the birth rate that increases the demand for reproductive health services) makes women more vulnerable and need to address their own situation.

*International humanitarian law and women*

Most rules of international humanitarian law apply to international armed conflicts. There is no definition of cases to be applied in the Hague Regulations, (Laws and Customs of War on Land) (Aldrich, 2000, p.42-63). It is clear from their title and material that they refer to interstate wars. Since the concept of war was common and firmly established in international law at the time of its introduction, the application of these laws was not an immediate problem. In recognition of the impact of Article 2 (4) of the Charter of the United Nations and the reluctance of states to recognize the existence of war, the four Geneva Conventions of 1949 extend the coverage of the agreements under common Article 2: "To include all declared states of war or any other armed conflict … even if they do not One of them recognizes the state of war and all cases of partial or total occupation," (Schindler, 1979, p. 4 and Greenwood, 1987, p. 283-295).

At the end of the hostilities, IHL generally ceases to apply, (Geneva Convention III, 1949, Article 5). In the case of the occupied territories, 1 year after the end of the hostilities, the Fourth Geneva Convention is no longer in force. The first protocol abolishes this rule and replaces termination of employment as the date on which the agreements and protocol ceased (Roberts, 1990, p. 44-103).

The protection of international humanitarian law of women covered under the Fourth Geneva Convention. The convention provides some general immunity to all residents of disputed countries, (Additional Protocol I, 1977, arts 68-72). However, most of its provisions apply only to "protected persons" during war or invasion, that is, to persons who are in possession of a party to the conflict or occupying power who are not citizens. Neither the nationals of a neutral state, nor the nationals of a belligerent state, "whereas the state they are nationals has a normal diplomatic representation in the state in their hands," (Geneva Convention IV, 1949, Art 4).

*Adequate protections for women*

International humanitarian law is the law that governs armed conflict and is therefore the first place to consider whether women enjoy adequate protection in international law against violence, (Qurashi, 2013, p. 43). The basic requirements for the protection of women are contained in the Geneva Conventions, which state that "women shall be especially protected against any attack on their honor, in particular against rape, enforced prostitution, or any form of indecent assault," (Geneva Convention IV, 1949, Article 27). This explains how international humanitarian law is an existing law on gender; he sees rape as an "honor" challenge and not a violent attack on women because of their gender, (Niarchos, 1995, p. 672). When linking rape with dignity, the violent attack on a woman's body and mind is not mentioned. It also fits with expectations in society that women are subjected to humiliation and deserve to be overlooked after bearing this assault.

Moreover, Article 147 of the Fourth Geneva Convention does not define rape as a "serious violation" that refutes the severe and harmful consequences of rape and denies that it deserves universal jurisdiction, (Niarchos, 1995, p. 674). However, some progress has been made with the 1977 Additional Protocols to the Geneva Conventions, which prohibit "attacks on personal dignity," including rape, forced prostitution, and any other degrading treatment, (Additional Protocol I, 1977, Articles 76 (1).

However, by granting woman a secondary status in international humanitarian law, the reference to "personal dignity" still fails to recognize the seriousness of rape. Another concern is that, due to the improvements made in the protocols for women, the scope of their protection is limited because it is universally unacceptable and does not belong to customary international law. Charlesworth and Gardam also clarify how important 43 provisions of the Geneva Conventions and their Protocols are in dealing with women and the consequences of armed conflict, but they remain ineffective because they only deal with women in relation to others and not as individuals alone, (Gardam and Charlesworth, 2000, p. 159). Gardam also believes that international humanitarian law takes into account the protection of women from a male perspective, thus ensuring that laws remain inherently discriminatory and unfair, (Gardam and Charlesworth, 2000, p. 67).

The interests of women are less important than men because the terms "defense" are used instead of "prohibitions." Gardam suggests that it is important and fact that there is a new protocol to protect women in times of armed conflict, (Gardam, 1997, p. 77). However, another more credible option is to focus on reimagining existing rules by incorporating gender issues into them. Whatever method is used, it is clear that international humanitarian law needs to be revised to recognize rape as a distinct form of warfare used to persecute women because of their gender, (Niarchos, 1995, p. 679).

*E. The Instrument for Protection of Women in International Humanitarian Law*

Specialists differ on the types of provisions of international humanitarian law that provides women with protection in armed conflict. The cornerstone of modern international humanitarian law is the four Geneva Conventions adopted in 1949 (with reliable comments issued between 1952 and 1960 by the International Committee of the Red Cross) and their two complementary protocols that were adopted in 1977. As protectors of international humanitarian law, the conventions are remembered Geneva. Although there are sufficient rules in international humanitarian law to prevent violence against women in armed conflict, the problem lies in the lack of implementation of the law, (Bennoune, 2007, p. 363).

Females are covered under treaties and regulations, such as those who are part of the vulnerable groups that do not participate in war, as well as female fighters who have fallen into the enemy's hands. Article 3 (1) of the 1929 Convention has already established that "women must be treated with due regard for their gender," (Geneva Convention, 1929, article 3). It then stated in the third Geneva Convention for the Treatment of Prisoners of War that "Women shall be treated with all the regard due to their sex and shall in all cases benefit by treatment as favorable as that granted to men" (Geneva Convention III, 1949, Article 14). Therefore, we see in this statement that women should be treated no worse than men in all cases, which means that women enjoy all the rights and freedoms granted by the Convention. Therefore, any discriminatory measures not arising from the convention are prohibited. The principle of equal treatment is supplemented by the other principle, which states that in Article 12 of the First Convention and the Second Convention, Article 14 of the Third Convention, "women should be treated with all consideration to their sex respected," (Geneva Convention III, 1949, Article 14).

In the event of armed conflict, international humanitarian law provides women equal rights to men, regardless of whether they are vulnerable groups or fighters. In the documents of the Geneva Conventions (1949) and the Additional Protocols to the Geneva Conventions (1977), the definition of discrimination is legislative. To this end, Article 27 of the Fourth Geneva Convention states that "protected persons are entitled, in all circumstances, to respect for their persons, their honor, their family rights, their religious convictions and practices, and their manners and customs", (Ivanciu, 2016, p. 3).

Sexual violence during armed conflict was a matter of concern before the adoption of the Geneva Conventions system. The Lieber Act provides for punishment for those responsible for the rape of a hostile country. Convention No. 4 of The Hague Convention of 1907 stipulates that family honor, rights, property of persons, religious beliefs, and religious practices must be respected, (Dixit, 2002, p. 147).

They must be treated humanely at all times and protected, in particular, from all acts of violence or threats to which they are subjected and from insults and public curiosity. Any discrimination based on gender, color, language, race, ethnicity, political opinion, national or social context, level of wealth, or any other similar standard is strictly prohibited on the same side, (Geneva Convention IV, 1949).

At the same time, the framers of the Geneva Conventions and their Additional Protocols, taking into account the physical and psychological characteristics of women, are entitled to women with a special requirement for protection. In the four Geneva Conventions and their two Additional Protocols, rules that define and impose respect for the special needs of women can be found:

The First Geneva Convention concerning the Improvement of the Status of the Wounded and Sick in the Armed Forces

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in the Field and the Second Geneva Convention Concerning the Improvement of the Status of the Wounded, Sick and Shipwrecked in the Armed Forces at Sea, these conventions (similar in both conventions) state that "women shall be treated with all consideration due to their sex;" (Geneva Convention II, 1949, article 12, para 4).

Article 27, paragraph 4 Geneva Convention. 2. Women are granted special protection "in relation to any attack on their honor, especially rape, forced prostitution or any other form of inappropriate assault;" (Geneva Convention IV, 1949, article 27, para 2).

Additional Protocol I to the Geneva Conventions on the protection of victims of international armed conflicts contains special provisions for the protection of women in Article 76, paragraph 1: "Women are of special concern and are protected in particular from rape, forced prostitution and any other form of inappropriate assault;" (Protocol Additional I, 1977).

The Second Additional Protocol to the Geneva Conventions does not include a specific rule requiring respect for the special needs of women, but it requires refraining from violent behavior against life and physical and mental well-being as a general rule for all, (Ivanciu, 2016, p. 3).

Accordingly, Article 70 of Additional Protocol I address the situation in which vulnerable groups are under-supplied, and when there is a need for humanitarian and impartial activities. Pregnant women and breastfeeding mothers will be given priority when allocating this humanitarian aid. Parties to an armed conflict must also access any transport of basic food and fortified clothing for children under 15, pregnant women and maternity issues, (Geneva Convention IV, 1949, art. 23, para 1).

As a result of this whole set of provisions, without looking again at the specific rules that protect women in general, among them some of the vulnerable groups, we may conclude that the Geneva Conventions and their Additional Protocols harbor pregnancy and family unity.

In all four Geneva Conventions of 1949, and in both protocols, there are provisions that specifically address women. The starting point for a special protection plan for women is laws that address "respect" or "consideration due to women because of their gender" and that require special respect and security for them, (Gardam and Jarvis, 2011, p. 79) the purpose of these provisions is to preserve the woman's "modesty," "honor," or "weakness." For example, in Article 3 of the 1929 Geneva Convention relative to the Treatment of Prisoners of War, the first recent traditional reference to women requires "the treatment of women with regard to their gender," (Geneva Convention I, 1949, art 12, and Geneva Conventions II, 1949, art 12, and additional Protocol I, 1977, Art 76).

There are a number of provisions that have the same effect in conventions and protocols. Comments on these provisions give an indication of the meaning of these phrases. For example, in the meaning of Article 14 of the Third Geneva Convention, the phrase "women must be treated with all due respect because of their gender …" is defined as follows: "It is difficult to give some general definition of" women's interest. "Some considerations, however, they should be taken into consideration;… these points are as follows: (Geneva Convention of Commentary III, 1949, at 147-148).

A. Weakness – This will affect working conditions;
B. Honor and modesty – The main goal is to defend women prisoners from rape, forced prostitution and all forms of inappropriate assault...
C. Pregnancy and child-birth – If there are mothers with children among the inmates, early repatriation must be granted … Women who have given birth to their children must be repatriated, while pregnant women must either enjoy special treatment or must be returned if their health permits. In the context of Articles 12 of the First and Second Geneva Conventions, a similar approach has been adopted:

*The special consideration with which women must be treated is of course in addition to the safeguards embodied in the preceding paragraphs, to the benefits of which women are entitled equally with men. What special consideration? No doubt that accorded in every civilized country to beings who are weaker than oneself and whose honor and modesty call for respect, (Pictet* et al., *1960, p. 92).*

*Geneva conventions 1949*

The creation of the Geneva Conventions was seen as a major step forward for the security of women in armed conflict. Art. 12 of the First Geneva Convention on Improving the Treatment of the Wounded and Sick in the Field Armed Forces (1949) establish the Equal Treatment of Men and Women Act. However, it also indicates the need for women to be treated "with due regard to their sex" (Article 12), (Gekker, 2014, p. 105-133).

Likewise, the Third Geneva Convention provides that women and men prisoners of war are treated fairly and that women are treated "with due respect for their gender," (Geneva conventions, 1949, art. 14, 88, 97). On the other hand, the Fourth Geneva Convention for the Protection of vulnerable groups in Time of War (1949) states that "women shall be especially protected against any attack on their honor, in particular against rape, enforced prostitution, or any form of indecent assault," (Additional Protocols, 1977, art.2). It also determines the protection of specific maternity (Additional protocol, 1977).

A broader analysis of the Geneva Conventions will go beyond the scope of this paper, but some comments should be made. The Geneva Conventions marked a major shift in the legal status of women in war, but the protection of their rights enshrined in them remains largely based on concepts such as "respect for women," "honor," and "family rights," and women are seen primarily as mothers and capabilities Care in those treaties. Researchers point out that acts of coercion against women, especially rape, are considered by these treaties to be harmful to a woman's "honor" in its social sense, and not to the dignity of women in the sense that a person is necessary in character, (Even Khen and frey, 2013, p. 43-66). It is also important that the application of the Fourth Geneva Convention be somewhat restricted to the notion of "protected persons" who are "in the hands of an opposing party or an occupying power who are not citizens," (Geneva Convention IV, 1949, article 4). This means that the nationals of a state are not a party to the agreement and citizens of a state; neither do they have the nationals of a neutral state nor the nationals of a belligerent state, (Gardam, and Jarvis, 2011, p. 60).

Moreover, the Geneva Conventions do not explicitly provide for the prosecution of crimes against women, but they do state that the conventions are governed by the States parties, (Geneva Convention I, Article 49; Geneva Convention II, art. 50; Geneva Convention III, art. 129; Geneva Convention IV, Article 146, 1949). Effective penalties should be imposed on persons who commit or order the commission of any serious breach of the convention. However, all forms of sexual violence were considered to meet the criteria for serious breach of the convention, (Security Council Resolution 780, 1992). It was stated that the issue of the prosecution of violence against women should be expressly included in the treaty and should not be interpreted, (Gardam and Jarvis, 2011, p. 67).

*Additional protocols*

With regard to sexual violence, Article 76 (1) of Additional Protocol I states that "Women shall be the object of special respect and shall be protected in particular against rape, forced prostitution, and any other form of indecent assault." Consequently, the protocol explicitly refers to specific forms of sexual violence and provides for the protection of women from these acts. Article 75 also prohibits "enforced prostitution and any form of indecent assault, not limiting the prohibition to a particular sex." Article 76 also provides for broader protection for women by making women a subject of "special respect."

Additional Protocol I also offer implicit protection against sexual violence as an additional protocol. Article 75 (1) provides for a general obligation to humane treatment, which therefore includes a ban on sexual violence. Article 75 (2) specifically prohibits "violence in people's lives, health, or physical, or mental integrity," in particular, torture and mutilation. We know that rape and other forms of sexual violence can be torture, (Prosecutor v Kunarac, 2002, para. 150).

Likewise, some forms of sexual violence can be considered mutilation. Article 75 (2) continues to prohibit "outrages on personal dignity, in particular, humiliating and degrading treatment' and includes, as mentioned, enforced prostitution, and indecent assault," and it includes, as mentioned, forced prostitution, and inappropriate assault. The International Criminal Tribunal for the Former Yugoslavia concluded that some forms of sexual violence, such as public forced nudity, and constitute attacks on personal dignity.

For its part, Article 4 of Additional Protocol II sets the rule for general humane treatment and prohibits many of the same procedures. Therefore, we need to look beyond explicit references to rape or inappropriate assault on our own to understand protection from sexual violence. There are, in fact, other provisions of the protocol that contributes to protection from sexual violence. In particular, Article 75 (5) of Additional Protocol I states that "women whose liberty has been restricted for reasons related to the armed conflict must be held in places separate from those of men" and "they must be subject to the immediate supervision of women … among other things, to protect women from sexual violence" (Sivakumaran, 2018, p. 113).

It is known that sexual assault of women in wartime is considered a weapon of war. During the 1994 genocide in Rwanda, more than 50,000 women were raped; in the early 1990s, about 20,000 and 50,000 women in Bosnia and Herzegovina were sexually assaulted. It was also found that more than 50,000 women were internally displaced in the Sierra Leone conflict and that about 64,000 women had been subjected to violence by armed fighters. This conclusion prompted the United Nations to conclude that "Violation of the human rights of women in a situation of armed conflict constitutes violation of the fundamental principal of human rights and humanitarian law," (Nkuanga, 2019).

According to the testimony of witnesses and victims verified by reports from the United Nations (UN), including the Secretary's report on sexual harassment in 2015, this sex trade was a planned process that ISIS itself had initiated, coordinated, and supervised. It began in August 2014, when ISIS launched an attack on the Yazidis, invading their main town of Sinjar, killing thousands, and capturing 6000 of their wives and children as young boys (women captured as slaves in battle) and "battle spoils," (Callimachi, 2015).

Then, girls and women are divided into smaller groups. The "best" girls will go to "Raqqa," the capital of the caliphate, while the rest will be sent to open slave markets, or "bazaars." ISIS also published documents ranging from 300,000 Iraqi dinars for children (1–9 years) to 50,000 for women ages 40–50, allowing only foreign fighters from Turkey, Syria, and the Gulf states to purchase more than three prisoners, (UNIRAQ, 2016).

In addition to sporadic physical violence, including rape during armed conflict, it has been observed that women are plotting sexual violence in many conflicts. What happened in World War II in Berlin, Nanking under the occupation of Japan, in Vietnam, Mozambique, Afghanistan, Somalia, Bosnia and Herzegovina, Kosovo, Sierra Leone, and elsewhere around the world are not only open-minded but also a humiliating and horrific experience for the global community. The conflict in Bosnia and Herzegovina is a striking example of the rape of women as a method of war, (Meron, 1993, p. 424-428).

In Iraq, ISIS has committed atrocities against Yezidi women and girls, including systematic rape, human trafficking, and the killing of children. However, ISIS used the bodies of these women and girls as spoils of war to draw and train the Takfiri groups, often known as suicide bombers. Therefore, the justification of these women and the killing of their children is morally justified because the Islamic State claims that they really serve God by torturing the enemy. Certain fighters have kidnapped, abducted, and systematically raped Yezidi women and children. Moreover, because of violence and abuse in ISIS detention centers, many Yezidi women have suffered a miscarriage, and many children have lost their lives due to malnutrition and disease. Crimes committed by the Islamic State against Yazidi women are a crime against humanity, and they should be considered genocide, (Hassen, 2016, p. 26).

The world was surprised and terrified to hear the accounts of women forcibly detained for rape and impregnation, (Meron, 1993, p. 424-428). Sexual crimes during armed conflict take multiple forms such as: Kidnapping, forced sexual intercourse, or other acts of sexual contact with family members, forced impregnation, sexual mutilation, sexual humiliation, medical experiences on the sexual and reproductive organs of women, forced abortion, forced sterilization, and prostitution forced, and sexual intercourse with essential subjects, (Schneider, 2007, p. 915). Sexual assault of vulnerable women in conflict is an unabated and ongoing legal issue and there is still insufficient legal redress for women victimized by gender violence in war, (Schneider, 2007, p. 920).

The international community has made great strides over the past few years to target and prosecute sexual violence against women in conflict, (Corcoran, 2008, p. 203). Starting with the international criminal tribunals in Rwanda and the former Yugoslavia, the Rome Statute was developed, (U.N. Doc. No. A/CONF. 183/9, 1998). The creation of the International Criminal Tribunal for the Former Yugoslavia and the International Criminal Tribunal for Rwanda has been successful in prosecuting sexual violence as war crimes, crimes against humanity, methods of torture, and forms of servitude and persecution, (O'Sullivan, 2011, p. 271).

### *F. The Scope of Protection of Women in Armed Conflict under IHL*

*Protection from sexual violence*

Global armed conflict in situations of global armed conflict, rape and other forms of sexual assault are implicitly and explicitly discussed in the four Geneva Conventions of 1949 and their Additional Protocols of 1977. In particular, Article 12 of the First Geneva Convention and Article 12 of the Second Geneva Convention provide general immunity from, among other things, mistreatment and torture of the wounded, sick, and shipwrecked in the armed forces. By doing so, they stress, on the one hand, the non-discriminatory, gender-neutral approach of all those under protection. On the other hand, it includes a special reference to women who are "treated with respect for their gender," (Gaggioli, 2014, p. 894).

The protect prisoners of war from violence or intimidation and guarantee their right to "respect and honor people." Women are again identified and demanded not only "to be treated with regard to their gender," but also "to benefit from favorable treatment such as that given to men." More meaningful is the GC IV regarding the protection of vulnerable groups, (Geneva Convention IIV, 1949, Articles 13 and 14).

General protection for all vulnerable groups subject to the convention from violence and inhuman treatment without compromising their "health, age and gender," and specifically protecting women from any attacks on their honor... rape, forced prostitution, or any other form of inappropriate assault, (Geneva Convention IV, 1949, article 27(2). "Attacks on personal dignity, in particular degrading and degrading treatment, forced prostitution, and any other forms of inappropriate assault" on vulnerable groups and military agents are prohibited, (Additional Protocol I, 1977, article 75(2) (b).

There are two additional articles, Articles 76 (1) and 77 (1), respectively, that specifically protect women from rape, forced prostitution, and any other form of inappropriate assault "and children" against any form of inappropriate assault. As a result, GCs I, II, and III do not refer to sexual violence or act directly. However, each of these treaties creates protections for societies that fall within its subject matter, and therefore prohibits violence against individuals, abuse and care, which may all include rape and other forms of sexual assault, depending on the circumstances, (Aleshkina, 2016, p. 30).

GC IV and AP I clearly define rape, forced prostitution, and inappropriate assault as serious enough crimes to protect vulnerable groups from enemies. Finally, all treaties affirm additional protection against what is implied or explicitly identified as acts of sexual violence against the most vulnerable groups of victims, especially women, and children, (Aleshkina, 2016, p. 31).

*Protection from rape of women*

Rape and sexual violence against women occurs in different circumstances: Sometimes the perpetrators continue after the attacks, but others may follow them; sometimes women and girls are kidnapped in family situations where they are repeatedly raped; (Prosecutor v Kunarac, Kovaĉ and Vuković, 2001).

Legal research has shown that "the laws and customs of war do not definitely prevent rape and other crimes of sexual violence as they are core crimes under humanitarian law, and as such, constitute a clear definition of procedural doctrines and the range of substantive crimes under humanitarian law," (Sellers, 2000, p. 263). In 1474, rape was included in the first recorded trial of war crimes. Hugo Grotius believed that "as Part of the Law of Nations, namely, that whoever ravishes a Woman in time of War deserves to be punished in every Country," (Grotius, 2005, p. 1301).

Sometimes they are raped before killing. Women cannot easily escape the struggle zones when they are pregnant, burdened with children, or social norms that prevent their presence in public places. Even after fleeing the conflict zone, women and girls are not safe, and rape and sexual violence are not the only way for women to experience armed conflict, even though they have been at the center of the international legal system, In addition to the fear of physical violence, vulnerable groups face economic and social difficulties, and the risk of attacks that involve leaving the home to perform routine activities such as finding food, water, and fuel, (Lindsey, 2000, 561).

Occasionally, women and girls are arrested in prison conditions where they are repeatedly raped; sometimes, they are raped before the killing. Women cannot flee the combat zone easily when they are pregnant, burdened with children, or social norms that prevent them from being in public places, (Prosecutor v Kunarac, Kovaĉ and Vuković, 2001).

Among the ten countries most at risk of maternal death in history, most are in war today or in post-conflict situations, such as Afghanistan, Sierra Leone, Cameroon, Angola, Liberia, Somalia, and the Democratic Republic of the Congo; even after fleeing the conflict zone, women and girls are insecure and exposed to more Sexual violence in refugee and internally displaced camps, (Puechguirbal, 2009). For demonstration, in August 2014, Amnesty International reported the accounts of hundreds of Yazidis documenting forced marriage, sexual slavery, abuse, and sexual slavery of women and girls by ISIS, (Amnesty International, 2014). Many Yezidi women and girls were transferred by ISIS from ISIS in Iraq to ISIS in Syria, which made them foreigners under ISIS authority. Fleeing women and girls reported that they were offered as "gifts" or sold to fighters and other ISIS supporters, and they have continuously threatened by marriage and sexual harassment and that lead women of all ages to commit suicide because of fear and abuse, (Guttry, Capone and Paulussen, 2016, p. 115).

The systematic and widespread rape of women is slavery or, at the very least, a crime against humanity and a war crime. Crimes involving the persecution of a religious group, unlawful imprisonment, sexual slavery or any other form of sexual violence are considered to be of equal seriousness when committed in a systematic or widespread manner as part of the group's international crime against humanity policy, (Rome Statute, art. 7).

The first volume of the study includes 161 laws that have been assessed as familiar, and most of them applicable to international and non-international armed conflicts. Rule 93 prohibits rape and sexual violence. It has been found that the embargo applies to international and non-international armed conflicts as well as the protection of women, girls, boys, and men, (ICRC Customary Law Study).

*Protection pregnant women*

There are a number of provisions that address pregnant women, maternity cases, and mothers of children under the age of seven, respectively. These groups of women are equal to the wounded, sick and elderly throughout the traditional rules and enjoy special protection and respect. In the context of matters such as medical care, food, physical safety, and repatriation, they are given special treatment, (Commentary Fourth Geneva Convention, 1949, p 134).

Forced pregnancy and maternity in armed conflict are another practice. Women become pregnant as a result of deliberate rape attempts and are limited to the intention of keeping them pregnant until it is too late for an abortion that aims to humiliate women, (Sudhakar, 2006, p. 279). In the former Yugoslavia, impregnation was imposed as a result of rape during armed conflict as a Serbian strategy and used as a weapon of war. Some rape victims were forced to have unwanted children. It is a humiliating practice against a woman who compels a rape victim to bear the offender's children. The physical, psychological, emotional, and social dimensions will have serious consequences, (Fisher, 1996, p. 91).

The Vienna Conference on Human Rights in 1993 states that human rights violations against women in situations of armed conflict constitute violations of fundamental principles of international human rights and humanitarian law. All of these violations, including murder, systematic rape, sexual slavery, and forced pregnancy in particular, it requires a particularly effective response, (Vienna Declaration, World, 1993, 14-25). The 1995 World Conference on Women in Beijing urged the international community to "fully respect the standards of international humanitarian law in armed conflict and take all necessary measures to protect women," (Beijing Declaration, 1995, para. 144).

The 2005 World Summit of the United Nations in the General Assembly resolved to "eliminate all forms of discrimination and violence against women and girls, including ending impunity and ensuring the safety of vulnerable groups, especially women and girls, during and after armed conflict in line with states' obligations under the law International Humanitarian and International Human Rights," (UN Doc. A/60/L.1,2005, para. 58(f).

*Protection of women from discrimination*

The first principle states that there is no discrimination in the general protection of women. Articles 9 and 57 of Additional Protocol I, and Articles 2 and 4 of Additional Protocol II, as well as the Fourth Geneva Convention, refer to special provisions dealing with discrimination. The core of international humanitarian law is to protect all vulnerable groups without discrimination, and to apply this protection equally between men and women. In fact, this law requires that people be treated humanely, without any bias for sexual reasons, (Fnish, 2013, p. 71).

*Treat vulnerable humanely*

The second principle states that international laws protect vulnerable which requires any party to ensure the humane treatment of all vulnerable in a military conflict. Article 3 of the Fourth Geneva Convention also refers to this provision. All of these doctrines must apply to all persons who are not directly or indirectly involved in any offensive action, including any unarmed military personnel and those who are unable to fight. They should be considered vulnerable groups at all times, without bias. Thus, physical assault and killing of vulnerable groups are prohibited, (Geneva Convention, IV, 1949, art. 3).

## IV. Conclusion

1. Based on the above analysis, we can infer that armed conflict has had a major impact on women's lives. Women are more vulnerable among both individuals and the structure to become victims of gender-related violence. For example, women are victims of rape or forced marriage, or when women are limited in their place of detention.
2. Moreover, the impact of armed conflict has brought about changes in gender relations, especially with regard to women, specifically in the four areas of attitude, identity, constitution, and belief. For example, due to the armed conflict of women who lost their husbands who previously

worked as families, women were forced into office, or armed conflict made it possible for women to obtain lower expectations of marriage, which in some places enjoyed a high social status associated with marriage to reduce women's chances of standing higher social.
3. International humanitarian law provides international legal structure to protect women in armed conflict, to ensure that their human rights are not violated during the conflict. For example, this is contained in the 1949 Geneva Convention and its additional protocols that specify basic rights that cannot be reduced in any circumstance, even in armed conflicts.
4. International humanitarian law has provided a legal framework to protect women in armed conflict, to ensure that their human rights are not violated during the conflict. For example, this is contained in the 1949 Geneva Convention and its additional protocols that specify basic rights that cannot be reduced in any circumstance, even in armed conflicts.
5. Laws relating to women's protection must be disseminated as widely as possible and implemented during situations of armed conflict. Military laws and training manuals must contain a prohibition of sexual assault. Violations of international humanitarian law involving women must be monitored with a system. Attempts should be made to spread the rules relating to the protection of women between parties to armed conflict and the United Nations peacekeeping forces. In light of this violence against women in armed conflict, the Special Rapporteur on violence against women recommended that the existing humanitarian legal requirements be evaluated and that procedures be changed to reflect the development of guidelines on violence against women in armed conflict.
6. In overall, international humanitarian law provides protection and ensures fair care for the injured and the sick, and for prisoners of war and civilians without distinction between sex, race, nationality, religion, political opinions, or other criteria, but international humanitarian law also recognizes that women face different problems in armed conflict as the above-mentioned.

### *G. Recommendations and Suggestions for International Society*

1. Military laws and instruction manuals must contain a prohibition of sexual assault. There have to be a system for monitoring violations international humanitarian law that involving women.
2. Striving to increase awareness of international humanitarian law by conducting courses, holding debates and introducing the international humanitarian law's convention and protocols to armed groups.
3. Penalizing all those groups that violate the Geneva Conventions, their additional protocols and the other international agreements for the protection of individuals.
4. Penalizing all those individuals and groups who order the violation of the provisions of international agreements that aim to protect especially women, from mistreatment.

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