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International Journal of Human Capital in Urban Management (IJHCUM) aims to offer an outlook on the utilization of human capital in urban management based on existing urban and metropolitan problems. The journal expects to eventually turn into a convergence point as a reference available to professionals, managers and researchers in the field of urban management. Topics of interest include but are not limited to the following disciplines: Human Capital in Urban Management; Urban architecture, design, development and planning; Urban communications and services; Urban civil engineering and related management issues; Urban economics, administrative and financial management; Urban transportation systems and traffic management; Urban social and cultural welfare; Urban ecology and related; environmental concerns; Urban Health, Safety and Environment; Sustainable urban infrastructure.

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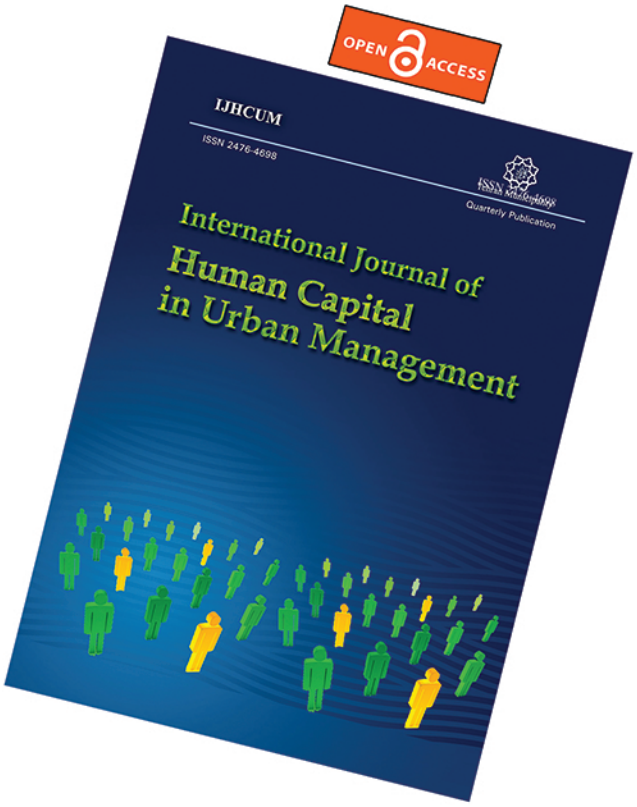

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ORIGINAL RESEARCH PAPER

Designing career management model for public organizations using the Grounded Theory

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ABSTRACT

BACKGROUND AND OBJECTIVES: Career management determines the direction of staff's movement in the organizational hierarchy and directs them to perfection. The Objective of this study was to design a model for career management of Tehran Municipality employees.

METHODS: The research method was Qualitative-Quantitative and the statistical population of the study was 11 experts in the qualitative section and 660 employees of the organization in the quantitative section. The data collection tool was semi-structured interviews in qualitative section and in quantitative part of the questionnaire was researcher-made. Using the Grounded Theory and Theoretical Coding, the initial model was presented and the final model of the research was presented using Delphi technique and obtaining the opinions of experts. Exploratory Factor Analysis and Structural Equation Modeling were used to validate the model.

FINDINGS: The final research model was based on 6 categories, 13 factors and 36 concepts: Causal Conditions included individual and organizational factors, Context including hardware and software capabilities, Intervening Conditions including environmental, behavioral and structural barriers, and Strategies including development and current strategies. Consequences of model implementation were classified into three categories: employees, organization and citizens. Among the 36 concepts identified, the highest factor load was related to the concept of job enrichment with a value of 0.882 and the lowest factor load was related to the concept of productivity with a value of 0.712. This model was investigated among the employees and the results of validation confirmed the model.

CONCLUSION: By implementing career management, the field of growth and prosperity of employees in the organization is provided and improves the productivity of the organization and customer satisfaction.

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INTRODUCTION

The wave of business change has caused organizations to face unpredictable changes that in these complex conditions, effective and continuous leadership capabilities have been increasingly considered. Hence, many managers have moved to implement specific management systems to identify, develop and upgrade high-capacity employees (Rajabipour *et al*., 2018). Human resources are the most valuable asset of any organization and no organization can survive and grow without proper ability and capability of human resources (Jyoti and Rani, 2019). One of the basic tasks of human resource management is the effort in the field of maintenance, development and promotion of employees in the organization, so that each person working in the organization after training, gaining the necessary job experience and skills, has the opportunity to achieve career advancement and organizational development (Mahapatro, 2010). Through career development, organizations can maintain or increase the current productivity of their employees and prepare them for a changing world. Effective career development programs can reduce employee turnover and increase their productivity. An effective career path program helps to identify people's interests, desires, and abilities. These programs also provide the individual with sufficient knowledge and information about the organization and also adapt individual activities to job opportunities, which is achieved through the continuation of training and development programs (Abbaspour, 2019). Career management is a strategy in order to develop a career path that, by finding the path of progress of each person in his work life, will lead him to the desired perfection. (Mahapatro, 2010). In this regard, each organization designs different careers with different degrees of complexity for its employees based on the necessity and in order to achieve organizational goals. Considering that the optimal job characteristics and characteristics of people in some job positions change rapidly over time, providing programs such as career management programs for employees of the mentioned job positions will be effective in increasing the efficiency of the organization. On the other hand, providing job management programs for employees in any organization may be interpreted from the employees' point of view in the sense of the value of the organization's participation and well-being, which in turn leads to job satisfaction, increases employees' work performance and reduces psychological pressure and organizational behaviors (Allen, 2007). Career management includes the actions that the organization performs to manage the career management of its employees, which includes a wide range of programs and activities that focus on comparing the needs of the organization's and individuals' careers, and in the form of formal or semi-formal measures including training courses, evaluation centers for career guidance and counseling (De Vos *et al*., 2009). The main variables of career management include organizational, job and individual characteristics, and the most appropriate conditions for achieving maximum motivation, challenge and efficiency of the organization are achieved at the intersection of organizational, job and individual characteristics (Chambers, 2005).

Problem Statement

One of the main challenges of organizations is the lack of attention of managers to the needs of employees; If meeting the emotional, material and communication needs of employees is considered by the human resources management of the organization, their basic needs such as: the need for training, development and promotion of employees, more attention will be paid to other challenges of organizations, employee dissatisfaction with methods Inefficient and excessive regulation in the administrative bureaucracy. Financial crises, public criticism, advances in technology and rapid changes in the workforce have added to the problems of traditional procedures and have made reforms in this area more necessary (Seyed Naghavi *et al.,* 2018). The Problem that attracted the attention of researchers to this research was the lack of a clear, legal and stable career path for the appointment of individuals to various organizational positions in the Municipality of Tehran. The purpose of this study was to design a model for career management of Tehran Municipality employees to promote their careers and increase motivation to develop individual skills and abilities. The research was conducted as a case study in Municipality of Tehran during 2019 and 2020. Municipality of Tehran as a public non-governmental organization is a service and human-centered organization and human resources are of great importance. The authors of this study, who have experience in the field of human resource management of this organization, believe that

the lack of a legal and sustainable career path has led to a lack of disciplined and competent selection of individuals and employees have no clear horizon for career advancement and wait for possible communications and appointments to determine the career path. This issue reduces the purpose and motivation of employees to improve their knowledge, abilities, skills and competencies. With the aim of filling the existing gap in the career management of this organization and with the present research plan, it will be tried to determine and weigh the indicators effective in explaining the career plan to provide a model for career management in Municipality of Tehran. It is expected that by presenting the optimal model of career management in this organization, while ensuring the existence of efficient alternatives for appointment in different job categories, increasing human resources productivity, increasing job satisfaction, improving job security, increasing work efficiency and ultimately improving the productivity of the organization will be realized. Lack of career has always been a concern for employees and managers of Municipality of Tehran and the proposed model of this research is considered as an innovation in the organization. The main question of the present study is "What is the practical model of career management in Municipality of Tehran?" The research sub-questions also seek to identify the Causal Conditions, Core Category, Strategies, Context, Intervening Conditions and Consequences of career management in Municipality of Tehran.

Research background

Maher (2020) considers the understanding of job needs and job values of managers to be effective in career management of organizational managers and advises organizations to develop strategies to maintain quality managers. In explaining the factors of success of the career management, Venegas (2019); Defilippi and Arthur (1994) expresses the individual characteristics affecting the career including knowledge, skills, abilities, values, interests and identity. In a study on women's career success in Lebanon, researchers have achieved lifestyle factors, fairness of opportunity for progress and lack of career counseling. In this study, lifestyle, support for fairness of progress opportunity and guidance on counseling have been considered in the field of occupational interests (Farahi *et al*., 2019). Shoesmith (2018); King (2000) reviewed the theories of different theorists of the 1980s and 1990s and expressed the individual needs of career management including extended work involvement, Self-nomination, exposure and visibility, improving skills and qualifications, building reputation, interpersonal relations, impression management, strategic choice of job moves, building informal relationships, political manoeuvring, moving between organisations. Clark (2018) believes that in order for the organization's employees to become valuable resources for the organization, it is necessary that the employee performance management system communicate effectively with the needs and expectations of the organization's stakeholders so that they know what to expect from them and adjust their efforts and improvement plans accordingly. He introduces organizational, individual, educational and occupational needs as factors affecting career management. Dimensions and components of career management in research of Farahi *et al.* (2018) include: job analysis (job information and announcement, competencies), education (transverse, longitudinal), support (participation, communication, opportunity for progress), guidance (counseling, guidance), evaluation (career planning, organizational programs) career changes (job rotation, promotion, re-alignment), job interests or job anchors (managerial competence, Sacrifice, creativity, job stability and security, technical competence, job independence, challenging, lifestyle). Rajabi and Shirazian (2018) concluded in a study that job characteristics have a significant effect on career path growth and adaptability. Also, the capabilities of adapting to the career path have a significant direct drug effect on the growth of the career path. Foroughi Nematollahi and Divandari (2018) believe that success in career path can be defined in two completely different ways; Career success as an achievement and career success as a gift. In achieving this success, the role of the five human, social, motivational, psychological and spiritual assets are of special importance. Analyzing the global labor market, Ongiti (2018) considers it necessary to change the paradigm in career management. Having a strategic mindset for career management can improve employee preparedness for emerging global socio-economic trends. By designing a model for a Sustainable Career, De Vos *et al*. (2018); Anseel (2017) expressed the dimensions of context, time and person as input and prerequisite for the realization of a suitable individual career, which will eventually result in satisfaction, health and

optimal performance. De Vos and Cambré (2017) introduced individual favorites and competencies as effective in career management. Callahan (2017) has effective Individual characteristics in career management including ability to work in a team, ability to make decisions and solve problems, ability to plan, organize and prioritize work, ability to communicate verbally with people inside and outside an organization, ability to obtain and process information, ability to analyze quantitative data, technical knowledge related to the job, proficiency with computer software programs, ability to create and/or edit written reports and ability to sell and influence others. Yavarpour *et al.* (2017) in a study aimed at designing the career management model of Bank Melli Iran employees, individual, organizational and extra-organizational factors as causal conditions, staff training system, performance appraisal system, bank in the country and the organization's perspective as context and business conditions identified specific individual and organizational components as intervening conditions. Neo *et al*. (2015); Hall (2004), by proposing the concept of Protean Career, this career is frequently affected by changes in the work environment and changes in the ability, interest and values of individuals. Daryanto (2014) studied teachers' satisfaction in a study stating job characteristics, personal characteristics and career development. He found that there was a significant relationship between job characteristics and career growth and development. Patton and McMahon (2014) introduce factors such as ability, attitude, interests, talents, sexual orientations, gender, age, skill, race, beliefs, lifestyle, values, job knowledge, personality, self-perceptual, physical character, family status, work environment, social and economic status as effective in career management. By examining the effect of job characteristics on job satisfaction and job adjustment, Na-Nan and Pukkeere (2013) found that individual characteristics and job satisfaction factors have a direct relationship with job adjustment and on the other hand, individual characteristics have a direct effect on job adjustment. Ahi (2012) divides the effective factors in career management into three categories. Organizational needs include effectiveness, efficiency and creativity, individual needs including job satisfaction, development of individual skills, quality of work life, attention to the talents and abilities of individuals and attention to the interests and desires of individuals and job needs including knowledge, ability, skills, attitude. George and Jones (2012) has pointed to factors such as efficiency, job satisfaction and independence in studies on the career path. Kong *et al*. (2011) considers organizational career management as three activities: career evaluation, career development and career training. Based on this research, career management activities such as job rotation, support (financial assistance), and education and career development programs are positively related to career satisfaction. Organizations try to increase employees' career satisfaction with effective support such as training, performance evaluation and challenging jobs.

MATERIALS AND METHODS

The present research is inductive and inferential in terms of research method and descriptive research in terms of data collection method and quantitative-qualitative in terms of data processing. In the qualitative section, to identify the dimensions, components and codes related to career management and model design, the Grounded Theory method and MAXQDA quality software were used. The reasons for choosing grounded theory were: 1. The questions of this research are of what type and seek to conceptualize; 2. Considering that the present research obtains qualitative and primary data from the interviewees, therefore, it represents the facts in the career management process of the employees of the organization; 3. Career management research is poor in terms of content, process and especially the native view of the career. These reasons are the characteristics of the Grounded Theory strategy. In order to collect data, the semi-structured interview method was used and based on theoretical sampling among experts proficient in career management knowledge in the organization. The interviews were exploratory in nature and were addressed with research issues. The interview begins with the question "What do you think about the goals ..." (open interview) and the rest of the questions are based on the answers of the interviewee.The selection of samples in this section continued until the stage of Theoretical Saturation. The number of samples in the quality department was 11 organizational experts. By conducting this number of interviews, the researchers recognized that the information collected had reached a theoretical saturation point and that no further interviews were required. In selecting this number of samples,

issues such as time, availability of interviewees and their level of cooperation have been considered. Danaeifard *et al.* (2019) believe that in a guided study in which sample selection is evolutionary and follow-up, a saturation point can be reached with about 12 participants. Using Grounded Theory method, Open, Axial and Selective coding steps were performed. In the open coding stage, the material is read and the words, sentences and even the line or paragraph of the interview text can be identified as code. Depending on their importance, the desired codes can be categorized into main or sub-categories and form a category. After categorization and open coding, we enter the axial coding. In the pivotal coding step, the theorist selects a category of open coding, places it at the center of the process under consideration, and then relates it to other concepts. In this connection, we encounter categories that have certain characteristics; Including the Causal Conditions, Core Category, Strategies, Context, Intervening Conditions and Consequences. In the final stage, selective coding takes place in which the researcher methodically relates the categories and writes the theory (Danaeifard and Emami, 2007). In the continuation of the research, Delphi technique was used to assess the validity. Delphi assessment was performed using a questionnaire for each variable on the Likert scale and 9 degree range in a group of 11 experts in two stages. At this stage, the scores for each indicator were determined. After calculating the score of the indicators, its utility should be determined. Determining the degree of desirability allows the researcher to select indicators with higher measurement power. To increase the measurement power of the questionnaire, only the indicators whose desirability was in the range of 6-9 (i.e. in the desired range) were selected and passed to the second stage Delphi questionnaire. A new questionnaire was prepared and provided to the experts for completion. After collecting and calculating the weighted average, indicators, components and dimensions whose score was less than 6 were removed and the final research model was determined. After the qualitative stage of the research and presentation of the model, a questionnaire based on the theory was obtained and a consensus of experts was developed. Finally, a validated questionnaire was distributed among employees and quantitative data were collected.

In the quantitative section, to discover and identify the dimensions of career management in the sample, using Exploratory Factor Analysis and SPSS software, to measure the validity of the model and confirm the indicators by Structural Equation Modeling and SmartPLS software and to determine the central indicators and the percentage of consensus on the model was SPSS. At this stage, according to the size of the statistical population and using the Cochran's formula, 660 people were selected by cluster sampling and the questionnaires were distributed in person and online.

RESULTS AND DISCUSSION

Qualitative findings

In the qualitative section, the process of coding and extracting the model from the data resulting from the interview is described. Depending on the type of research, data analysis was performed using grounded theory. Tables 1 and 2 show how to achieve research categories through open coding, secondary coding, subcategory, and axial class. The following are examples of interviews and how they are coded (done by MAXQDA quality software). Due to the fact that the researcher moves from the text of the interview to higher levels in the grounded theory method, first the key points of the first interview are shown in the form of Tables 1 and 2 and then its analysis will be shown in the form of Table 3.

After preparing the documents obtained from the interview, using the software, the work of categorization and open coding began. The interviews were organized in the form of 158 initial codes. After reviewing and analyzing 158 key points resulting from the interviews, in the next step, the software was coded centrally, which based on recognizing the degree of similarity and semantic similarity and in consultation with professors, 13 sub-categories and 36 concepts were received. In the last step, after analyzing the concepts of all interviews, through selective coding, these concepts were categorized into categories (more abstract concepts): Causal Conditions (individual-organizational), Core Category (current and developmental strategies), Intervening Conditions (structural, environmental and behavioral barriers), Context (hardware and software capabilities) and Consequences (employees-organization-citizens). After the sub-categories were identified, theoretical coding was performed due to the use of the apparent approach, and the last six cases appeared. A summa-

Table 1: Key points from open coding by MAXQDA quality software

Indicator	Source
Knowledge	A7- A8- B11- J3
Skills	A20- C1- B12 –d4
Competence	A13- B2- J14– j3
Internship	A9- B1- C7
Flexible Organizational Structure	F1- G4- H9
Organizational Culture	A1- B3- C2- D4
Socialization of Employees	E18- J15
Justice in Appointments	B7- D16- A11
Creating Conformity between Individual, Organizational and Occupational Needs	B1 -D1 –C10
Perception of Organizational Justice	K6- G1
Merit-based evaluation system	A4- B14- A16-
Changing Organizational Culture	A31-A39- E10
Reviewing the Compensation System	G6- G7- E14
Budget investment	A30- C7-D2
Job Enrichment	A29 -D5- C6
Job Rotation	G7- H1- H2- H3
Job Classification	D10- E4- E6- -F2
In-Service Training	E9- E12- E13- K2
Dry and Non Flexible Regulations	G3- I3- j4- j5
Lack of Budgetary Resources	K2- G4- -I1- I2
Lack of Proper Needs Assessment in Accordance with Expertise	j2- j3 -A25- D9- F3
Failure to Implement the Promotion Hierarchy	A27- B3- C3
Lack of Coordination between the Organizational Sector and the Central Government Sector	j6- j10- K3- K4
Pressure of External Political Factors	A21- A22- D8
Lack of Meritocracy	A26- B4- B5
Taste of Managers	A23- A24- E14
Alignment between Job Tenures and Occupation	A34- B17-
Job Discipline	C4- D4
Creating the Sense of Responsibility in Employees	E9- H17
Enrichment of Socialization Process	D4- B17
Job Satisfaction	A41 -B20- B22
Job Engagement	B24- C15 -A44
Productivity	B23 -C16- F7- B20
Administrative Health	J15- G13- B19- C18
Customer Satisfaction	J18- D19- E23- F14
Positive Organizational View	J20- D20- J19- E22- F18- A45

ry of the axial and selective coding steps is given in Table 3.

Examination of the findings revealed that the subcategories have changed slightly since the seventh interview; However, after the tenth interview, the sub-categories did not change and according to the researchers, with the continuation of the interviews, the main categories reached the necessary richness. Considering the enrichment of the sub-categories and the saturation of the main categories, it can be concluded that the conceptual framework of the research has reached theoretical sufficiency. In selecting the dimensions and classification of the categories proposed in the model, a three-pronged model was used. Finally, the conceptual model of career management based on data and Grounded Theory method was presented. Fig. 1 is the final research model.

Quantitative Findings

Summary of quantitative research findings are presented in two sections: Descriptive statistics and Inferential statistics:

Descriptive Statistics Result

Descriptive statistics of research variables for 660 questionnaires answered are given in Table 4. Based on the results of descriptive statistics, it was found that the lowest mean is related to the variable of perception of organizational justice (3.00) and the highest average is related to the variable of failure to implement the promotion hierarchy (3.987).

Inferential statistics Result

Exploratory Factor Analysis Result

In order to identify the dimensions of career path management in the sample, exploratory factor anal-

Table 2: Classification of key points resulting from open coding by MAXQDA quality software

Indicator	Source
Knowledge, Skill, Physical characteristics, Environmental conditions, Background, Ability to take up jobs, Expertise, Knowledge and Related expertise, Employee empowerment, Internship, Ability to take over jobs, Flat organizational structure, Organizational culture, Organic and Flexible culture, Employee empowerment, Employee socialization, Justice in appointing individuals, Reduce administrative corruption	A7-A8-A9-A13-A20-B11- B12-E18-E19-J14-J15-B1-B2-
Creating a conformity between individual, organizational and occupational needs, Perception of organizational justice, Equal opportunities for promotion, Competency-oriented, Competency-based evaluation system, Balance in individual and occupational needs, Balance between individual, organizational and occupational needs, Organizational health	D16- A11-B1-D1-K6-G1
Job classification, Financial rewards, Creating equal opportunities for people's growth, Changing organizational culture, Job enrichment, Job rotation, Budgetary investment, Recruitment system aligned with needs, Reforming job classification plan, Job educational needs assessment, Business classification review, Reforming the meritocracy system, Competency-based performance evaluation, Job classification Reform, Service compensation system, In-service education, Merit-based system reform, Job classification revision, Organizational culture change, Job correct classification system, Correct needs assessment in accordance with expertise, Reduce administrative corruption	A4-A14-A16-A29-A30-A31-A32-C7-D2-E9-E10-E12-E13-E14-G6-G7-K2
Lack of meritocracy, Familiarity and family relationships, Dry and non flexible regulations, Budgetary constraints, Taste of managers, External forces pressure, Non-compliance with the National Service Law, Appointment of persons with lack of field and academic expertise, Lack of job qualifications, Perception of uninvitedness in the organization, Lack of need assessment, Lack of specialized view on human resources, Lack of human resources status, Influence of political organizations in the organization, Lack of executive guarantee of the program, Lack of coordination between the organizational sector and the central government, Political work in the organization, Shortage of experts and saturation of unskilled persons, Lack of budgetary resources, Taste of managers, Political issues working in the organization, Non-specialized view of human resources, Lack of proper needs assessment in accordance with expertise, Non-specialized look at the field of human resource management, Lack of meritocracy, The taste of managers, Appointment and selection based on relationships, Disproportionate between degree and job order, Failure to implement the promotion hierarchy, Political work and pressure of politically insecessant factors	A21-A22-A23-A24-A25-A26-A27-B3-B4-B5-B6-C3-C4-C9-D6-D7-D8-D9-D10- E4-E6-E14-F2-F3-G3-G4-G7-H1-H2-H3-I1-I2-I3-j2-j3-j4-j5-j6-j10- K2-K3-K4
Organization culture, Alignment between job tenures and Occupation, Job discipline, Creating the sense of responsibility in employees, Socialization of employees, Enrichment of socialization process	A34-B17-C4-D4-E9-H17
Effectiveness and Efficiency, Job satisfaction, Job engagement, Customer satisfaction, Positive organizational view, Job satisfaction, Productivity, Effectiveness, Reducing financial and administrative costs, Administrative health, Organizational commitment, Job satisfaction	A41-A42-A43-A44-B20-B22-B23-B24-C15-C16-F7-F8

Table 3: Formation of research classes based on axial coding and categorization based on selective codingby MAXQDA qualitative software

Main Categories	Sub-Categories	Concepts
Causal Conditions	Individual Factors	Knowledge - Skills - Competence
	Organizational Factors	Internship- Flexible Organizational Structure - Organizational Culture - Socialization of Employees - Justice in Appointments
Core Category	Career Management	Creating Conformity between Individual, Organizational and Occupational Needs - Perception of Organizational Justice - Merit-based evaluation system
Strategies	Development Strategies	Changing Organizational Culture- Reviewing the Compensation System - Budget Investment
	Current Strategies	Job Enrichment - Job Rotation - Job Classification - In-Service Training
Intervening Conditions	Structural Barriers	Dry and Non Flexible Regulations - Lack of Budgetary Resources - Lack of Proper Needs Assessment in Accordance with Expertise - Failure to Implement the Promotion Hierarchy
	Environmental Barriers	Lack of Coordination between the Organizational Sector and the Central Government Sector - Pressure of External Political Factors
	Behavioral Barriers	Lack of Meritocracy - Taste of Managers
Context	Organizational Hardware Capabilities	Alignment between Job Tenures and Occupation - Job Discipline
	Organizational Software Capabilities	Creating the Sense of Responsibility in Employees - Enrichment of Socialization Process
Consequences	Consequences for Employees	Job Satisfaction - Job Engagement
	Consequences for Organization	Productivity - Administrative Health
	Consequences for Citizens	Customer Satisfaction - Positive Organizational View

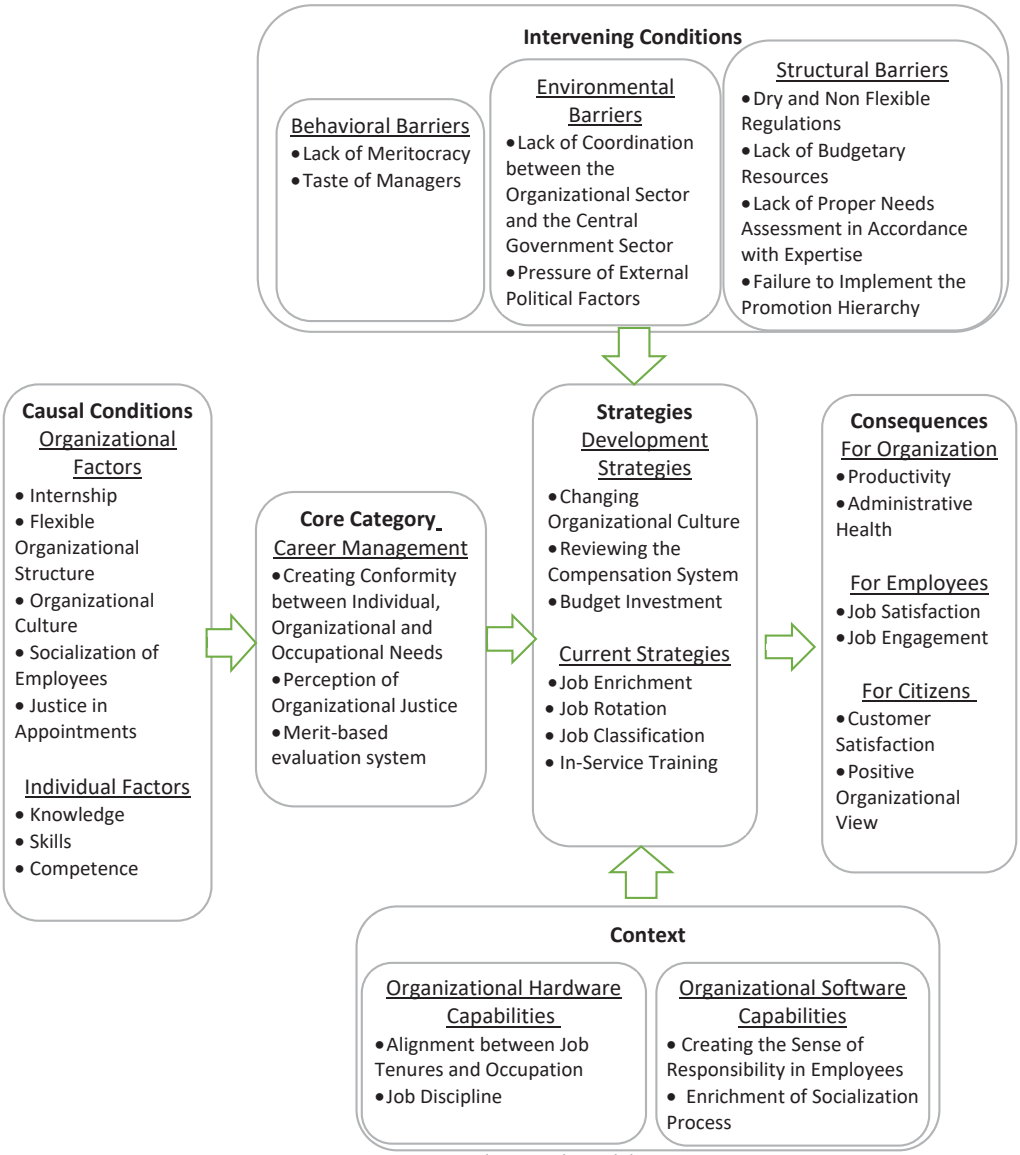

Fig. 1: Final Research Model

ysis method was used in SPSS software. Exploratory Factor Analysis was performed on the indicators, which determined the results of this analysis in five conditions (structure) and by obtaining special values above one, a total of about 7% of the total Variance was explained. In general, the hardest step in Exploratory Factor Analysis is naming the factors, because there is no specific criterion for that. Finally, 6 factors were identified through the name and concept of questions and research literature. These factors were called Causal Conditions, Core Category, Context, Strategies, Intervening Conditions and Consequences, respectively. It should be noted that the coefficient of KMO indicator was 0.819, which is higher than the required level of 0.60. Also, the significance level of Bartlett's Test (Sig) was less than 0.05, indicating the suitability of the data for Factor Analysis and the adequacy of the data is confirmed (Significance Level=0.000). Table 5 states the results of Exploratory Factor Analysis and Bartlett's Test.

Table 4: Description of research variables

Indicator	Number	Min	Max	Average	Standard Deviation	Variance
Knowledge	660	1	5	3.336	0.752	0.565
Skills	660	1	5	3.717	0.719	0.517
Competence	660	1	5	3.361	0.836	0.699
Internship	660	1	5	3.413	0.852	0.726
Flexible Organizational Structure	660	1	5	3.633	0.723	0.522
Organizational Culture	660	1	5	3.464	0.667	0.932
Socialization of Employees	660	1	5	3.882	0.522	0.842
Justice in Appointments	660	1	5	3.826	0.583	0.848
Creating Conformity between Individual, Organizational and Occupational Needs	660	1	5	3.962	0.705	0.871
Perception of Organizational Justice	660	1	5	3	0.721	0.889
Merit-based evaluation system	660	1	5	3.814	0.610	0.899
Changing Organizational Culture	660	1	5	3.384	0.566	0.855
Reviewing the Compensation System	660	1	5	3.914	0.608	0.855
Budget Investment	660	1	5	3.532	0.744	0.841
Job Enrichment	660	1	5	3.123	0.571	0.93
Job Rotation	660	1	5	3.763	0.931	0.868
Job Classification	660	1	5	3.842	0.951	0.906
In-Service Training	660	1	5	3.723	0.904	0.818
Dry and Non Flexible Regulations	660	1	5	3.441	0.934	0.873
Lack of Budgetary Resources	660	1	5	3.152	0.929	0.864
Lack of Proper Needs Assessment in Accordance with Expertise	660	1	5	3.229	0.973	0.948
Failure to Implement the Promotion Hierarchy	660	1	5	3.987	0.947	0.897
Lack of Coordination between the Organizational Sector and the Central Government Sector	660	1	5	3.225	0.953	0.91
Pressure of External Political Factors	660	1	5	3.347	0.973	0.947
Lack of Meritocracy	660	1	5	3.011	0.957	0.916
Taste of Managers	660	1	5	3.99	0.986	0.974
Alignment between Job Tenures and Occupation	660	1	5	3.35	0.974	0.95
Job Discipline	660	1	5	3.821	0.882	0.778
Creating the Sense of Responsibility in Employees	660	1	5	3.910	0.976	0.953
Enrichment of Socialization Process	660	1	5	3.114	0.927	0.861
Job Satisfaction	660	1	5	3.126	0.911	0.83
Job Engagement	660	1	5	3.392	0.909	0.827
Productivity	660	1	5	3.179	0.476	0.690
Administrative Health	660	1	5	3.144	0.504	0.710
Customer Satisfaction	660	1	5	3.230	0.480	0.693
Positive Organizational View	660	1	5	3.277	0.528	0.728

Confirmatory Factor Analysis Results

Confirmatory Factor Analysis and Structural Equation modeling method were used to assess the validity of the model and confirm the indicators and the Factor Loading of the model was calculated in standard estimation mode and the effect of each indicator. The condition of optimal trading load is values greater than 0.5 and a significant value greater than +1.96. Based on the results obtained, the Factor Loading of all variables was higher than 0.5 and the significance level of the identified variables was higher than +1.96 and all indicators were approved. Among the 36 identified items, the highest factor load is related to the item of job enrichment with a factor load of 0.882 and the lowest factor load is related to the productivity item with a factor load of 0.712. (Table 6)

Table 5: Exploratory Factor Analysis of career management

Exploratory Factor Analysis	KMO Test and Bartlett's Test Number	The names of th obtained factors are explained in terms of Variance, respectively	Percentage of Variance explained
Career Management	0.819	Causal Conditions	24.200
		Core Category	21.725
		Context	16.124
		Strategies	13.985
		Intervening Conditions	12.211
		Consequences	11.910

Table 6: Factor Loading and Significant Coefficients of Causal Factors

Indicator	Factor Loading	Significance Coefficients	Confirm/Reject Relationships
Knowledge	0.718	6.666	Confirm
Skills	0.746	6.812	Confirm
Competence	0.805	6.879	Confirm
Internship	0.769	5.448	Confirm
Flexible Organizational Structure	0.809	5.419	Confirm
Organizational Culture	0.733	7.773	Confirm
Socialization of Employees	0.751	6.472	Confirm
Justice in Appointments	0.782	7.823	Confirm
Creating Conformity between Individual, Organizational and Occupational Needs	0.836	5.519	Confirm
Perception of Organizational Justice	0.782	5.668	Confirm
Merit-based evaluation system	0.734	6.508	Confirm
Changing Organizational Culture	0.763	5.449	Confirm
Reviewing the Compensation System	0.812	5.517	Confirm
Budget Investment	0.760	7.122	Confirm
Job Enrichment	0.882	7.311	Confirm
Job Rotation	0.843	7.445	Confirm
Job Classification	0.818	7.633	Confirm
In-Service Training	0.757	6.809	Confirm
Dry and Non Flexible Regulations	0.749	5.664	Confirm
Lack of Budgetary Resources	0.738	5.437	Confirm
Lack of Proper Needs Assessment in Accordance with Expertise	0.812	7.219	Confirm
Failure to Implement the Promotion Hierarchy	0.879	7.337	Confirm
Lack of Coordination between the Organizational Sector and the Central Government Sector	0.864	7.604	Confirm
Pressure of External Political Factors	0.766	7.455	Confirm
Lack of Meritocracy	0.809	7.618	Confirm
Taste of Managers	0.856	5.675	Confirm
Alignment between Job Tenures and Occupation	0.840	5.822	Confirm
Job Discipline	0.843	6.707	Confirm
Creating the Sense of Responsibility in Employees	0.762	5.631	Confirm
Enrichment of Socialization Process	0.757	5.712	Confirm
Job Satisfaction	0.732	5.830	Confirm
Job Engagement	0.746	5.342	Confirm
Productivity	0.712	5.388	Confirm
Administrative Health	0.713	5.611	Confirm
Customer Satisfaction	0.749	5.701	Confirm
Positive Organizational View	0.803	6.789	Confirm

Reliability

To evaluate the reliability of internal consistency of reflective models, Cronbach's alpha and composite reliability methods are used and the optimal condition for accepting the reliability of variables is values greater than 0.7. Considering that the composite reliability coefficient and Cronbach's alpha coefficient of all variables are higher than 0.7, the appropriate reliability of the model was confirmed. (Table 7)

The results of descriptive statistics of the quantitative part of the research showed that among the 36 concepts identified, the highest average was related to the non-implementation of the promotion hierarchy variable (3.987) and the lowest average was related

Table 7: Cronbach's Alpha and Composite Reliability of Variables

Indicator	Cronbach's Alpha	Composite Reliability
Knowledge	0.774	0.809
Skills	0.737	0.766
Competence	0.854	0.882
Internship	0.757	0.791
Flexible Organizational Structure	0.719	0.777
Organizational Culture	0.737	0.790
Socialization of Employees	0.717	0.781
Justice in Appointments	0.741	0.803
Creating Conformity between Individual, Organizational and Occupational Needs	0.748	0.794
Perception of Organizational Justice	0.763	0.802
Merit-based evaluation system	0.751	0.822
Changing Organizational Culture	0.782	0.819
Reviewing the Compensation System	0.744	0.825
Budget investment	0.769	0.831
Job Enrichment	0.737	0.794
Job Rotation	0.795	0.853
Job Classification	0.766	0.817
In-Service Training	0.783	0.825
Dry and Non Flexible Regulations	0.712	0.785
Lack of Budgetary Resources	0.721	0.794
Lack of Proper Needs Assessment in Accordance with Expertise	0.733	0.772
Failure to Implement the Promotion Hierarchy	0.718	0.793
Lack of Coordination between the Organizational Sector and the Central Government Sector	0.734	0.788
Pressure of External Political Factors	0.741	0.790
Lack of Meritocracy	0.788	0.833
Taste of Managers	0.753	0.799
Alignment between Job Tenures and Occupation	0.794	0.854
Job Discipline	0.736	0.790
Creating the Sense of Responsibility in Employees	0.785	0.848
Enrichment of Socialization Process	0.791	0.866
Job Satisfaction	0.766	0.813
Job Engagement	0.763	0.852
Productivity	0.832	0.898
Administrative Health	0.808	0.855
Customer Satisfaction	0.797	0.864
Positive Organizational View	0.845	0.888

to the perception of organizational justice (3.00). The results of Exploratory Factor Analysis showed that the concepts identified in the research are appropriate and have the necessary adequacy and are in line with the research background. The coefficient of KMO indicator was 0.819 (and above the required limit of 0.60) and the significance level of Bartlett's Test (Sig) was less than the required limit of 0.05, which indicates the suitability of the data for factor analysis. Data adequacy was also confirmed (significance level = 0.000). The results of Confirmatory Factor Analysis and Structural Equation modeling method showed the validity of the research model and the factor load of all indicators was confirmed. The factor load of all variables was higher than the desired level of 0.5 and the significance level of the identified variables was higher than the desired level of +1.96. The highest factor load was related to job enrichment with a factor load of 0.882 and the lowest factor load was related to productivity with a factor load of 0.712. The study of Cronbach's alpha results and combined reliability also indicated the reliability of the final research model.

Comparison of research results with research background showed that all the concepts and dimensions identified in the research are in order to confirm the researches mentioned in the research background: Education, job rotation and attention to competencies have been noted in research by Farahi *et al*. (2018); Yavarpour *et al.* (2017) and interests in research by De Vos and Cambré (2017). Understanding job needs, job values and individual competencies in research conducted by Maher (2020), knowledge, skills and competence in researches conducted by Venegas (2019); Callahan (2017); Shoesmith (2018);

Patton and McMahon (2014); Ahi (2012), pay attention to individual, organizational and occupational and educational needs in research conducted by Clark (2018), support and encouragement, motivation, organizational structure, recruitment policy, organization support, economic incentives, support for fairness of progress opportunity, job satisfaction and job adjustment, and employee's career satisfaction in researches conducted by Daryanto (2014); Farahi *et al*. (2019); Kong *et al*. (2011); George and Jones (2012); Na-Nan and Pukkeere (2013); De Vos *et al*. (2018); Anseel (2017); Ahi (2012) have been noted.

CONCLUSION

In this study, which was conducted with the aim of providing a suitable and practical model for career management of public organizations, using the data foundation approach, a model was presented in the form of a paradigm model based on 6 categories, 13 factors and 36 concepts. Causal Conditions dimension were developed in the form of individual factors including knowledge, skills and competence and organizational factors including internship, flexible organizational structure, organizational culture, socialization of employees and justice in appointing individuals. The Core category (career management) included creating conformity between individual, organizational and occupational needs, perception of organizational justice and Merit-based evaluation system.The Intervening Conditions in the implementation of job management in three dimensions were environmental barriers including lack of coordination between the organizational sector and the central government sector and pressure of external political factors, structural barriers including dry and non-flexible regulations, lack of budgetary resources, lack of proper needs assessment in accordance with expertise and failure to implement the promotion hierarchy and behavioral barriers including lack of meritocracy and taste of managers' performance. The Context factors included software capabilities including creating the sense of responsibility in employees and enrichment of socialization process and hardware capabilities including alignment between job tenures and occupation and job discipline. Effective strategies that were important in the implementation of career management in Municipality of Tehran from the perspective of experts were identified in two parts: developmental and current strategies, including changes in organizational culture, revision of compensation system, accurate educational needs assessment of jobs, job enrichment, job rotation, job classification and in-service training.The consequences of career management in Municipality of Tehran were also in three dimensions of consequences for employees including job engagement and job satisfaction, consequences for the organization including productivity and administrative health and consequences for citizens including positive organizational view and customer satisfaction. In summarizing and analyzing the research results, it can be stated that in order to implement career promotion plans, individuals must have the necessary knowledge, skills and competence, and the structure of the organization must be designed in a way that can provide the ground for growth and development of individuals. Flexible organizational structure is one of the most important organizational factors in the implementation of career management. The existence of a competency-based evaluation system, in addition to creating desire in the organization's staff, leads to the development and career advancement of individuals. In general, employees who have a positive perception of the distribution of justice in the organization, feel a sense of identity with the organization and strive to maintain and promote the success of their organization and have an emotional commitment to the performance of the organization; Accordingly, all the strategies that are considered by senior managers to improve the performance of the organization are important to them and the career strategy that is designed to better and more match the individual, job and organizational needs in the first step. They accept the title of a logical and standard strategy that provides the ground for their growth and prosperity. Also, with the establishment of the career process, the direction of evaluation in the organization is proportional to the level of performance of individuals. Lack of a comprehensive and coordinated structure in the body of the country's government system is always one of the most destructive factors in the implementation of development plans in organizations, of which the Municipality of Tehran is no exception. Also, the influence of political forces inside and outside the organization is always one of the most important organizational problems that occurs in the shadow of the imbalance between bureaucracy and democracy in organizations; If this phenomenon is not managed properly, it will have negative effects on the organizational pyramid and the body of the organization. Political forces are always

unplanned and rely solely on communication in the governing body of the organization, and this leads to a contradiction between the perceptions of employees and their capabilities, as well as pessimism towards the organization due to lack of attention to meritocracy and managers' tastes. The responsibility of individuals and their synchronization with environmental conditions, provides the ground for their growth and excellence in the organization. Also, job discipline, as one of the principles of scientific management, is always one of the prerequisites for the development of the organization. Changing organizational culture, reviewing the service compensation system, strengthening the organization's budget, in-service training, job enrichment, job rotation and job classification can also be effective factors in the development of career path management. Definitely, development and progress in any organization requires two infrastructures of technology and capital necessary to implement programs. Also, the culture of the organization must be internalized towards development and progress in order to implement development-based strategies. Finally, the consequences of implementing career management, the income of the organization's employees, customers and the organization itself are implemented. Employees of the organization, as internal customers of the organization, need attention in order to grow and provide satisfaction and belonging. On the other hand, in government and public organizations, especially Municipality of Tehran, which are in contact with citizens, meeting the needs of employees will definitely lead to meeting the needs of customers and meeting the needs of these two groups, will lead to positive organizational performance. Always paying attention to the employees of the organization as internal customers of the organization is an approach that can play a role in the culture of the organization under the title of internal marketing. The innovation of the present resaerch is that by developing the previous concepts, it has been able to explain other dimensions in the local model of career management in Municipality of Tehran and by identifying two dimensions of evaluation based on competence and perception of organizational justice in addition to creating a relationship between Individual, organizational and job needs provide a new innovation in the field of career studies.

AUTHOR CONTRIBUTIONS

A. Shahrabi has conducted library studies and reviewing management articles and texts related to the field of career management. Also, field research and interviews with experts and distribution and collection of questionnaires among employees have been done. Dr. K. Teymournejad was the supervisor of this research.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

ABBREVIATIONS

CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
KMO	Kaiser-Meyer-Olkin Measure of sampling adequancy
PCA	Principal Component Analysis
PLS	Partial Least Squares

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ORIGINAL RESEARCH PAPER

Statistical evaluation of surface water quality parameters: the extent of industrial effluent pollution in urban settlement

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ABSTRACT

BACKGROUND AND OBJECTIVES: Industrial effluent contamination of water resources has emerged as a major challenge in developing and densely populated countries like Nigeria where river systems are the primary means for disposal of waste, especially the effluents from surrounding industries.
This study seeks to determine the extent of surface water pollution from industrial effluent discharge.
METHODS: Principal Component Analysis (PCA) and analysis of variance (ANOVA) were applied on the surface water quality data to identify the pollution sources and their contribution toward water quality variation. Water samples were collected from 4 sampling locations along the Onne-Okirika river.
FINDINGS: The characteristics of the river showed a mean concentration of biochemical Oxygen Demand (BOD = 19.73 mg/l), Chemical Oxygen Demand (COD = 54.53 mg/l), Ammonia (NH3 = 21.00 mg/l), Dissolved Oxygen (DO = 5.78 mg/l) and temperature (28.40°C) which varied significantly among sampling locations. Site 1, 2, and 3 showed a high level of NH3 and Chemical Oxygen Demand while site 4 (the control) has slightly high salinity when compared. The extent of pollution could be classified as; site 1 (High Pollution), site 2 (Moderate Pollution), and site 3 (Low Pollution).
CONCLUSION: Sources of pollution include effluents from industrial plants such as fertilizer plants and oil refineries due to the high level of NH3. While the higher Chemical Oxygen Demand level is an indication of a greater amount of biodegradable organic material, which reduced the amount of Dissolved Oxygen. Additionally, a reduction in Dissolved Oxygen level can lead to an anaerobic condition, which is insidious to aquatic life forms. Therefore, the state environmental regulatory agency should ensure compliance monitoring of the industry's activities.

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INTRODUCTION

Rivers play a significant role as they serve not only the purpose of water supply for domestic, industrial, agricultural and power generation but also utilized for the disposal of industrial waste and therefore put under tremendous pressure (Subin *et al.,* 2013). The pressure of increasing population, growth of industries, inadequate environmental awareness, lack of enforcement of environmental regulations, untreated effluent discharge from industries and municipalities, use of chemical fertilizers, etc. are the major causes of water pollution (Monte-Egito *et al.,* 2007). The pollution of water resources is a global issue (Vargas *et al.,* 2001; Ohe *et al.,* 2003; Monte-Egito *et al.,* 2007; Sandra *et al.,* 2010). In addition to the direct health effects, pollutants may be mutagenic or toxic and could lead to human afflictions such as cancer, atherosclerosis, cardiovascular diseases, and premature aging. It is required that surface water parameters must meet acceptable limits and minimum ecological criteria (McKnight *et al.,* 2010). The pollutants from industrial discharge besides finding their way to surface waters and rivers may also percolate into sub-surface to contaminate groundwater sources. The quality of surface water provides significant information about the available resources for supporting life in the ecosystem (Leme and Marin-Morales, 2009; Manikannan *et al.,* 2011). The physical, chemical, and biological composition of surface water is controlled by many factors such as natural (climate, topography, and precipitation) and anthropogenic (domestic, industrial activities, and agricultural run-off). Increasing surface water pollution causes not only the deterioration of the water quality but also poses a great threat to human health, aquatic life, economic development, and social prosperity (Ohe *et al.,* 2003; Milovanovic, 2007). It is, therefore, imperative to prevent and control surface water contamination and to make a proper investigation of its quality for effective management (Singh *et al.,* 2005). Several researchers have used Principal Component Analysis (PCA) and Analysis of Variance (ANOVA) to identify water quality sources and compare their characteristics. Shrestha and kazama (Stambuk-Giljanovic , 1999; Shrestha and Kazama, 2007), Huang *et al.* (2010) and Juahir *et al*. (2011) studied spatial variability of surface water quality and sources apportionment and classified the studied water bodies into high pollution site (HP), Moderate pollution site (MP) and Low pollution site (LP). Onojake *et al.,* (2011) reported that rivers in the Delta State of Nigeria were heavily polluted as a result of industrial discharge which is an anthropogenic source of pollution. They used Principal Components Analysis (PCA) to identify the latent factors that explain the chemistry of the surface water in which PCA yielded three Principal Components with more than 82% variance. However, this study seeks to determine the extent of surface water pollution from industrial effluent discharge into the Onne-Okirika river within urban settlement. The current study has been carried out in Port Harcourt in 2020.

MATERIALS AND METHODS

Description of the study area

The Onne-Okrika River flows from the Okrika creek into the main sea at the Onne seaport. The main source of the river is the Bonny River. There is mangrove vegetation around the banks of the river. People who live in communities around the river are mostly fishermen and farmers. Local fishing ports can be sighted along the bank of the river. Water from the river is also used for irrigation by farmers who farm along the bank of this river. So, economically the river serves as a means of livelihood for people who fish and those who depend on the river for growing their crops, especially in the dry seasons. The Onne-Okrika River is confined in the saltwater swamp zone and is influenced by tidal fluxes. The flow of the Onne-Okrika creek is only slightly swift and the bidirectional two major industries that discharge their effluent into this River are the Port Harcourt Refinery and the surrounding fertilizer industry. This study seeks to investigate the impact of industrial effluent discharge at the Onne-Okrika River.

The surrounding Industry is located in Onne (8° 350’ N and 7°925’ N, 5° 162’ E and 5° 215’ E) in urban area, present Eleme Local Government Area of Rivers State. They produce Urea fertilizer, ammonia, demineralized water, and generate power. The sampling points are numbered 1, 2, 3, and 4 on the map in Fig. 1.

Sample Collection and Analysis

Four sites were established along the Onne-Okrika river for water sampling. Site 4 is about 280m away from the industry’s effluent discharge point upstream, used as the control. Site 1 is at the

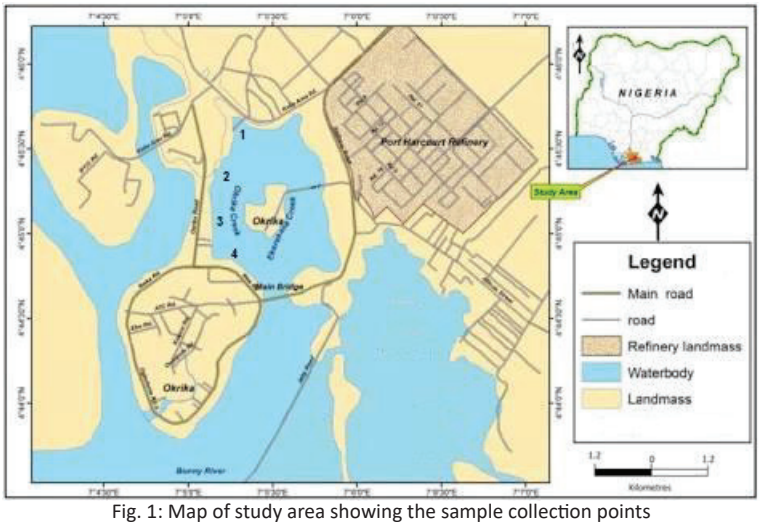

Fig. 1: Map of study area showing the sample collection points

Table 1: Sample location

Location	Distance between Sample collection points
Site 1	Industry's effluent Discharge Point
Site 2	120 meters away from site 1 downstream
Site 3	150 meters away from site 2 downstream
Site 4	280 meters away from industry's discharge point upstream

industry's discharge point. Site 2 is located at 120m from Site 1 and site 3 is 150m from site 2 (Table 1). The control site was selected as the least polluted site owing to the absence of effluent discharge in the direct vicinity. The sampling was carried out over three months. Samples were collected from each site once in a month. The control Sample at site 4 is the water in its natural state (i.e. before the effluent discharge on the water surface) (Table 1). The sample was sent to the laboratory immediately after collection. The temperature of the sample was measured with a mercury-in-glass thermometer; the bulb of the thermometer was completely immersed in water to a depth of 15 cm and remained for about 3-5 minutes. The temperature of the water was taken when the mercury level became steady. Winkler titrimetric method was used to analyze water samples for Dissolved Oxygen (DO). Biochemical Oxygen Demand (BOD) was determined by the dilution winkler method. Chemical Oxygen Demand (COD) was determined (alpha, 1998) method. Ammonia was measured by nessler's colorimetric method. Salinity as chloride content of the samples was determined according to APHA-4500B while Total Dissolved Solids (TDS) was determined according to APHA 20gc using TDs meter after due calibration. Measurement of Total Hardness was done by EDTA titrimetry. The pH of the sample was measured by the electrometric method. Details of the method used to determine the concentration of BOD, Ammonia, Total hardness, and pH are contained in Etim and Onianwa (2013) report.

Principal Component Analysis (PCA)

Principal Component Analysis (PCA) is one of the best multivariate statistical techniques for extracting linear relationships among a set of variables (Simeonov *et al.,* 2003; Monte-Egito *et al.,* 2007; Yap *et al.,* 2011; Botelho, 2012). It provides data on the significant parameters with minimum loss of original data (Singh *et al.,* 2005). PCA is a recognition tool that attempts to describe the variance of a large data set of inter-correlated variables with a smaller

Table 2: Descriptive statistics of the physicochemical parameters

Parameter	Site 1	Site 2	Site 3	Mean ± SD	Site 4
Temperature (°C)	28.95	28.85	27.5	28.43 ± 0.81	28.10
pH	8.67	8.28	7.75	8.23 ± 0.46	7.45
DO (mg/l)	9.52	4.26	3.55	5.78 ± 3.26	5.40
BOD (mg/l)	24.50	18.10	16.60	19.73 ± 4.20	12.40
COD (mg/l)	60.00	57.10	46.50	54.53 ± 7.11	37.50
NH_3 (mg/l)	25.10	19.50	18.40	21.00 ± 3.59	0.00
Salinity (mg/l)	18.90	18.30	18.20	18.47 ± 0.38	24.70

Table 3: Henry's Law Coefficients, KH (mol/L. atm) (Masters, 2006)

Temperature (°C)	Oxygen (O_2)
0	0.0021812
5	0.0019126
10	0.0016963
15	0.0015236
20	0.0013840
25	0.0012630

set of variables. In this study, PCA was applied to the surface water quality data from the Onne-Okirika river to identify the source and extent of pollution. The measure of sampling adequacy was obtained by the Kaiser-Meyer-Olkin (KMO) method which is 0.714, indicating that the degree of intercorrelation among the variables and the essence of PCA application was valid. Similarly, the Bartlett test of sphericity was significant ($p < 0.0001$), confirming that the variables are correlated. The surface water samples were collected from four different sampling points along the Onne-Okirika River. Selected parameters such as Temperature, pH, BOD, DO, COD, NH_3, and Salinity were analyzed to determine the extent of industrial effluent pollution in the river at the different sites, and these parameters were selected based on the composition of the industry's product.

RESULTS AND DISCUSSION

Statistical Analysis

It was observed that DO, BOD, COD, NH_3 concentration and conductivity varied significantly among sampling locations. The descriptive statistics showing the mean and standard deviation of results obtained is presented in Table 2.

All parameters analyzed varied significantly among sampling locations. Excel and SPSS software were used to perform ANOVA between the samples mean and control; it showed a sig. of 0.819, df (1) between groups, and 16 within groups at a 95% confidence level. The method of analysis used in this work is in agreement with Paul and James (2011) who used Excel and Gen stat to perform ANOVA to investigate the impact of industrial effluents on water quality of streams. In their method, differences in concentration levels obtained for a given parameter along sampling locations were considered significant if calculated P-values were < 0.05. Ewa *et al.* (2011), Sum and Gui (2015), Olatunji and Horsfall (2017) also used ANOVA to analyze their water quality parameters. However, most studies did not show the solubility of gases in polluted rivers. Therefore, the linear regression model developed to predict the solubility of gases in rivers and the oxygen deficit calculated herein is the novelty in this study.

Solubility of Gases in the River

The solubility of gases in the river was measured using Henry's Law Coefficient (see Table 3 below).

The solubility of the gas in water is given by Eq. 1

Table 4: Oxygen deficit at different points in the river

Location	Temp (℃)	K_H (mol/L)	DO_s (mg/L)	DO deficit
Site 1	28.95	0.000942	6.33	-3.19
Site 2	28.85	0.000946	6.36	2.10
Site 3	27.50	0.001000	6.72	3.17
Site 4	28.10	0.000976	6.56	1.16

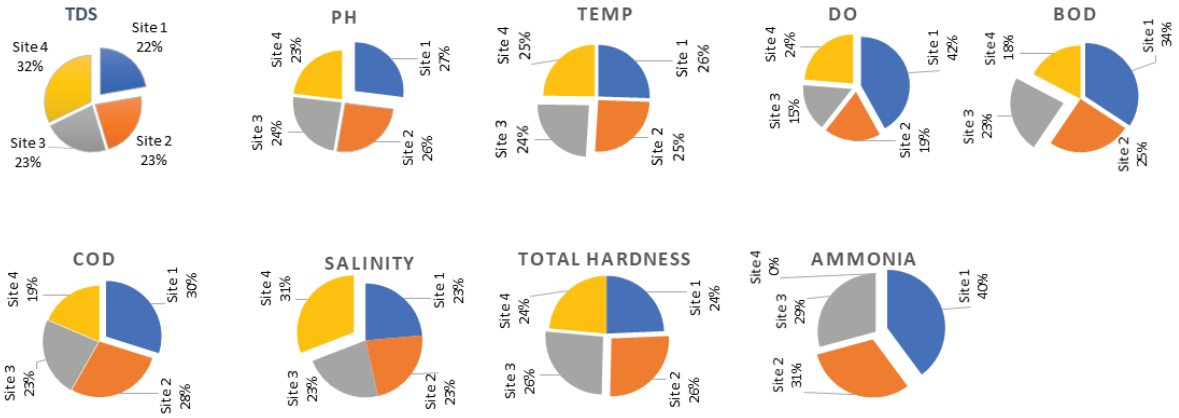

Fig. 2: Variations in physicochemical characteristics of parameters

(Masters, 2006):

$$[\text{gas}] = K_H P_g \quad (1)$$

The linear equation from the Fig. 4C can be used to predict the concentration of oxygen at any given temperature. The graph in Fig. 4C was plotted from Table 3: Henry's law coefficient (Masters, 2006). From Table 3 and Fig. 4C we obtain the regression equation given below (Eq. 2);

$$\therefore K_H = -4\times10^{-5}T + 0.0021 \quad (2)$$

The concentration of oxygen in the air is 21% by volume. Therefore, the equilibrium concentration of oxygen in the river in (mg/L) at site 1 with a temperature of 28.95 ℃ and 1 atm of pressure.

$$K_H = -4\times10^{-5}(28.95) + 0.0021 \quad (3)$$

$$K_H = 0.000942 \text{ mol/L} \quad (4)$$

Since air is 21% Oxygen, so its partial pressure at 1 atmosphere is given as:

$$P_g = 0.21\times1 \text{ atm} = 0.21 \text{ atm} \quad (5)$$

$$[O_2] = K_H P_g = 0.000942 \frac{\text{mol}}{\text{L}}.\text{atm}\times0.21 \quad (6)$$

$$DO_S = 1.9782\times10^{-4}\frac{\text{mol}}{\text{L}}\times\frac{32\text{g}}{\text{mol}}\times\frac{10^3\text{mg}}{\text{g}} = 6.33\text{mg/L} \quad (7)$$

The ultimate BOD by Masters (2006) is given as:

$$L = \frac{BOD_5}{\left(1-e^{-k(t)}\right)} \quad (8)$$

Principal Component Analysis

Principal Component Analysis showing the extent of industrial effluent pollution on the surface water quality: axes F1 and F2 were selected as the observational axes because it carries 99.57% of the initial information (Fig. 3). Therefore, the interpretation will be focused on axes F1 and F2. There is a strong and positive correlation between the water quality at sites 2 and 3 (Fig. 3). However, site 4 shows a significant difference as the control. This indicates

Table 5: Pearson Correlation matrix

Variables	Site 1	Site 2	Site 3	Site 4
Site 1	1.000	0.988	0.975	0.738
Site 2	0.988	1.000	0.994	0.810
Site 3	0.975	0.994	1.000	0.825
Site 4	0.738	0.810	0.825	1.000

Table 6: Eigenvalues

Factors	F1	F2	F3	F4
Eigenvalue	3.6740	0.3090	0.0140	0.0030
Variability (%)	91.845	7.7250	0.3610	0.0690
Cumulative (%)	91.845	99.570	99.931	100.00

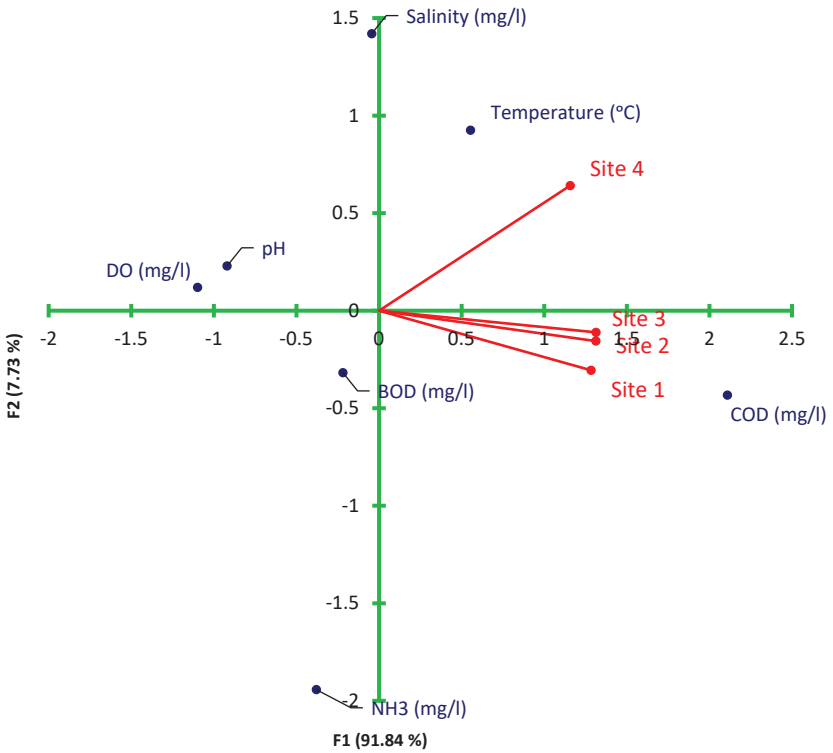

Fig. 3: A biplot of water quality parameters versus sites for axes F1 and F2 at 99.57%

that site 1 has the highest level of contamination, followed by site 2, and then site 3 is slightly polluted because the correlation matrix shows that site 3 has a stronger relationship with site 4 compared to sites 1 and 2 (Table 5). Site 1, 2 and 3, has a high level of NH_3 and COD while at site 4, the salinity is slightly high (Fig. 2). The study revealed a high level of NH_3 and COD. Point sources of NH_3 include effluents from industrial plants such as fertilizer plants and oil refineries (CCME 1989). While High level of COD is an indication of a greater amount of biodegradable organic material in the sample, which can reduce the

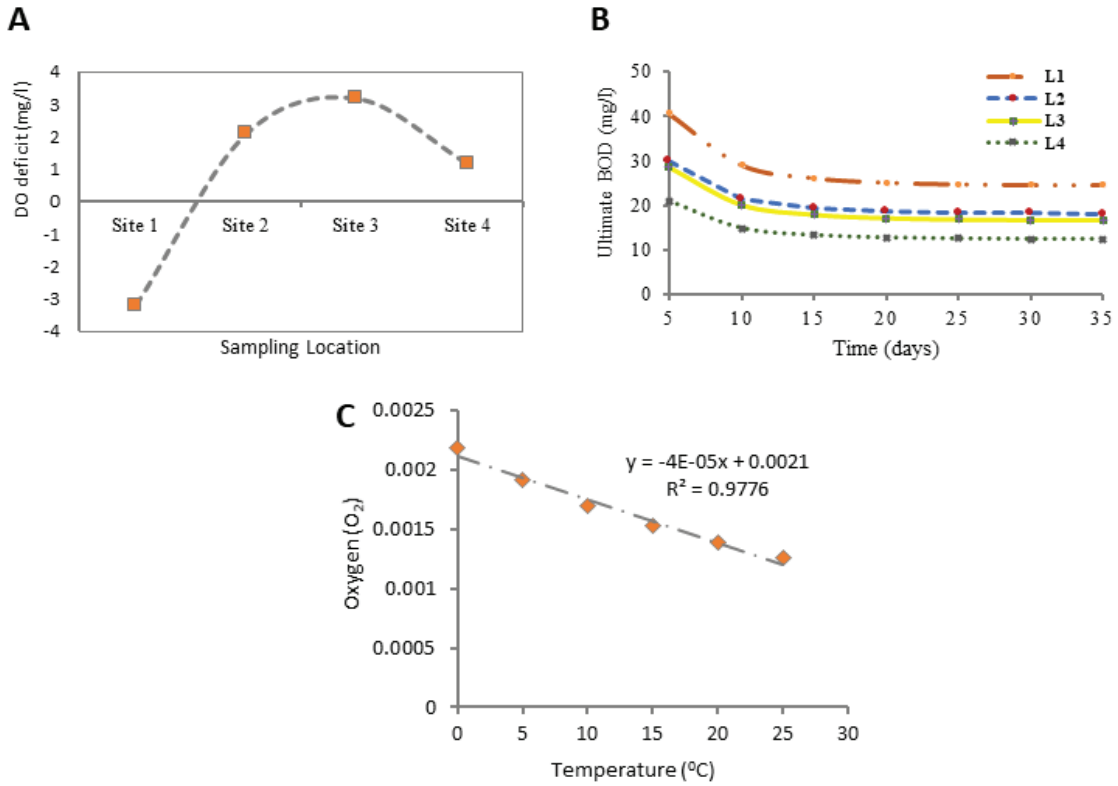

Fig. 4: (A) Variations in dissolved oxygen deficit (B) Variations in ultimate BOD (C) Oxygen coefficient of the river

(DO) levels. A reduction in DO can lead to anaerobic condition, which is detrimental to aquatic life forms (Real Tech 2017).

Industrial effluents are the main sources of direct and often continuous input of pollutants into aquatic ecosystems with long term implications on ecosystem functioning (Masters, 2006). This study revealed a high level of NH_3, BOD, COD, and slightly high pH. The high level of BOD is an indication of the presence of oxygen-demanding waste. However, there is no significant variation in TDS among the sampling locations (Fig. 2a). Again, the pH varied significantly among the sampling locations and the pH of sites 1, 2, and 3 are higher than the control (site 4), this is an indication of pollution (Fig. 2b). Additionally, the concentration of pH declined progressively from 8.7 to 7.8 with distance from the point of impact but were still significantly higher than the control. The variation in pH this affected other chemical reactions such as solubility and metal toxicity (Sayyed and Bhosel, 2010; Sirohi *et al.,* 2014). Metcalf and Eddy (2003) wrote that the concentration range suitable for the existence of most biological life is quite critical (between 6 and 9). The temperature at sampling locations 1 and 2 are higher site 3 and the control sample which is site 4 (Fig. 2c). The temperature of the water is a very important parameter because of its effect on chemical reactions and reaction rates, aquatic life, and the suitability of the water for beneficial use. Also, oxygen is less soluble in warm water than in cold water. From Fig. 2d, there is a significant variation in DO (dissolved oxygen) among sampling locations. However, the actual quantity of oxygen that can be present is solution is controlled by (1) the partial pressure of the gas in the atmosphere (2) the temperature (3) solubility of the gases, and (4) other impurities in the water such as salinity, suspended solids, etc. The biochemical oxygen demand (BOD) varied significantly among the sampling locations (Fig. 2e). From Fig. 2f, the chemical oxygen demand (COD) varied significantly among the sampling locations. There is no significant

variation in the salinity level of the river among the various sampling locations, the salinity of all three sampling sites (1, 2, and 3) is less than the control (site 4) in Fig. 2g. From Fig. 2h, the total hardness varied significantly among sampling locations. There is a significant variation in ammonia concentration among the sampling locations in Fig. 2i. The average level of a contaminant in the effluent receiving water body within 100 meters around the point of effluent discharge, henceforth referred to as the point of impact (POI), is shown in Fig 2. Higher concentrations of BOD (19.73 mg/l), NH_3 (21.00 mg/l), COD (54.53 mg/l), Total Hardness (4801.13 mg/l), TDS (17042.30 mg/l), Salinity (18.47 mg/l) and high temperature (28.40 °C), DO (5.78 mg/l) and pH (8.20) were observed in the water sample at various locations of the river. The order of abundance is COD > BOD_5 > DO, showing less anthropogenic pressure on the surface water. However, as DO drops, fish and other aquatic life are threatened, it also reduces the attractiveness of the river for recreational purposes.

Oxygen deficit at different points in the river

The oxygen deficit at site 2 and the control site is low compared to site 1 and site 3 (Fig. 4A and Table 4). From Fig. 4B; L1, L2, L3, and L4 represents the Ultimate BOD concentration for site 1, 2, 3, and site 4 respectively. It shows that the ultimate BOD at the industry's discharge point is higher. However, site 2 and site 3 did not show any significant difference. The ultimate BOD values were calculated in Excel, following iterations with time in (days) for all the locations (Fig. 4B).

CONCLUSION

This study has sufficiently analyzed and evaluated the current status of the Onne-Okirika River. The non-variability and low level of TDS among sampled locations is an indication of excessive harmful metallic mineral contaminants from wastewater discharges. It was observed that the average temperature of the river is high. Many varieties of fish and aquatic life are extremely sensitive to changes in water temperature and composition. The observed higher temperatures at sites 1 and 2, maybe attributed to high biological or chemical activities which indicate greater pollutant load at these sections of the river. A BOD value above 8.0mg/l at site 4, shows that the river was severely polluted at the point of impact (POI). Additionally, higher concentrations of NH_3 (21.00 mg/l), COD (54.53 mg/l), Total Hardness (4801.13 mg/l), Salinity (18.47 mg/l), DO (5.78 mg/l) and pH (8.20) were observed at various sampling points of the river. The order of abundance is COD > BOD_5 > DO, showing less anthropogenic pressure on the surface water. However, as DO decreases, fish and other marine life are threatened, it also reduces the attractiveness of the river for recreational purposes. This suggests that communities within the surrounding location should not depend on the river's self-cleansing mechanism for consumption. Therefore, there is need for industries to introduce as well as implement alternative systems to safely discharge their effluents following the environmental regulations. Also, in the case of adopting water bodies like a sink for waste disposal, such industrial effluent should be treated.

AUTHOR CONTRIBUTIONS

I.T. Horsfall performed the literature review, experimental design, analyzed and interpreted the data, prepared the manuscript text, and manuscript edition. I. Okosa performed the experiments and literature review, compiled the data and manuscript preparation. T. Adumbu helped in the literature review and manuscript preparation and T.H. Ekiyor did the final review and corrections.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

ABBREVIATIONS

Symbols

DO_s	saturation value of dissolved oxygen

[gas]	concentration of dissolved gas (mol/L)
BOD	biochemical oxygen demand (mg/L)
DO	dissolved oxygen (mg/L)
K_H	henry's law constant (mol/L.atm)
P_g	partial pressure of the gas in air (atm)
POI	Point of impact
O_2	oxygen
N	nitrogen
L	ultimate BOD (mg/L)
COD	chemical oxygen demand (mg/L)
T	Temperature (℃)
PCA	principal components analysis
HP	high pollution
MP	moderate pollution
LP	low pollution

Superscripts

k	rate constant (days^{-1})
t	time (days)

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ORIGINAL RESEARCH PAPER

Analysis of factors affecting organizational innovation and improving members' performance in urban civil development cooperatives

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ABSTRACT

BACKGROUND AND OBJECTIVES: While innovation in some circumstances is detrimental to a number of urban civil development cooperatives many have benefited from the use of innovation strategies around the world. Therefore, this study sought to analyze the effective factors of organizational innovation on the performance of members in urban development cooperatives.

METHODS: The statistical population of this study is all urban civil development cooperatives and the sample size consisted of 384 members of these civil cooperatives who were selected using stratified-random sampling method. The data gathering tool was a questionnaire which validity using content validity and construct validity and reliability using Cronbach's alpha coefficient has been reviewed and approved. In order to analyze the data, inferential statistical tests including Kolmogorov-Smirnov test, Student t-test, correlation test and structural equation modeling technique were used.

FINDINGS: The results of data analysis showed that the research variables including organizational innovation and members performance in urban development cooperatives are in good condition (β= 0.76 and ϕ=0.68). Also, according to the research findings, organizational innovation and its four dimensions, including production (ρ=0.72), administrative (ρ=0.75), process (ρ=0.68) and technological innovation (ρ=0.76), has a positive and significant effect on the performance of members in urban civil development cooperatives.

CONCLUSION: The results indicated that the development of innovations requires specific organizational resources and capabilities so that the organization can benefit from innovation and its benefits.

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INTRODUCTION

Today, with increasing labor mobility, increasing division of labor due to globalization activities, increasing intellectual property protection laws, and technical advances in telecommuting, the use of innovation has become a common strategy for businesses (Dahlander and Gann, 2010). Creativity and innovation are an essential pre-requisite for organizational development and excellence. Awareness of its techniques is an unavoidable necessity for managers, staff and researchers. The increase in creativity and innovation in organizations can lead to the improvement of the quantity and quality of services, reduce costs, and prevent loss of resources, thereby enhancing performance and productivity, and motivating and satisfying employees in the workforce (Salimi, 2013). By benefiting from creative texts and innovations in organizations, in particular SMEs will be able to achieve our goals efficiently, be developed and lead an organization and society (Samkhanian *et al.,* 2012). On the other hand, according to most of the scholars, one of the most important reasons for failing to meet the goals of the companies and reducing their competitive ability is the poor performance of the manpower, which is influenced by many factors .In addition, the sales department and its staff are highly regarded by their direct relationship with customers (Karimpour and Chattari, 2014). Therefore, it is important to study the factors affecting the performance of sales force and can affect the performance and success of the organization. One of the factors affecting sales force performance is organizational innovation. Innovation is the application of innovative ideas from creativity. Actually Innovation is referred to as the idea of creativity presented as a new product or service. Organizational innovation can have a positive impact on individual and organizational performance. A review of the innovation literature in relation to Iranian cooperatives shows that today innovation in Iranian manufacturing cooperatives does not have a suitable place (Hashemi Dehaghi, 2015). This sector in Iran is facing problems such as lack of resources, lack of strong liquidity, lack of research and development, lack of innovation, problems in providing resources and raw materials needed, which causes their poor performance. By paying more attention to the reasons for participating in the innovation process, can be reduced the weaknesses of cooperatives and take a stronger step towards development (Mashdai and Taghavi, 2010). Recent experiences of many countries in the world show that the innovation model is effective in improving the performance of cooperatives (Rahmanian and Nasr, 2010). Also, the knowledge that companies gain from working with other organizations is very valuable for their success and creates an advantage in competitive markets (Ahmadi *et al.,* 2018). What is obvious is the identification and analysis of factors affecting the decision of cooperatives in order to evaluate the innovation environment from the perspective of urban development cooperatives is one of the first requirements and a constructive step towards increasing the participation of this sector in innovation activities and enjoying its benefits. A review of the research background showed that little research has examined the impact of organizational innovation on improving the performance of members in urban civil development cooperatives. The results of these researches indicated that organizational innovation has a positive and significant effect on improving the performance of employees in organizations. Therefore, this issue has been studied and analyzed in this research. The main question of the present research is how does organizational innovation affect the improvement of performance of members in urban civil development cooperatives?

Theatrical background

Innovation

Innovation refers to major changes in technological advances or the presentation of the latest concepts of management or production methods. Innovation is a truly dramatic and controversial phenomenon. Innovation is generally an incarnation phenomenon that can only be addressed in certain individuals (Haghighatmanesh 2014). Innovation is the application of innovative ideas from creativity. In fact, innovations are called for the idea of creativity presented as a new service (Ramezanpoor, 2014; Moradzade and BadichiJavan, 2014). In general, companies are creating financial and non-financial benefits for themselves by utilizing the benefits of innovation strategies (Hung and Chou, 2013). Based on Torrens (2000) perspective, innovation in per-

formance improvement has come from a range of strategies and practices used in an evolving organization to identify, create, distribute and enable organizations to gain insight and engagement. Hossain and Kauranen, (2016) has suggested that the use of innovation in order to improve performance in gaining competitive advantage beyond markets and improving the decision-making process is essential for effective decision-making on strategic issues and the creation of a business-driven economy (Najafipour, 2014). Knowledge management groups divide innovation management in a variety of ways. In one of these divisions innovation is divided into four categories:

Production Innovation: This kind of innovation refers to cases in which it can create a change in the company in the production of products and services by bringing about technological changes. This kind of innovation occurs as a result of using a tool, fan, style or system and making changes to products or services. In other words, at the product innovation from two sides; internal side where it depends on knowledge, capacities, resources and the technologies used in the company, however; from the external side product innovation focuses on the consumers' needs and the owners' expectations (Antonelli, 2012).

Administrative Innovation: This type of innovation consists of changes in organizational structure and administrative processes, such as presenting a new idea for a new recruitment policy, allocation of resources, structure of duties and powers (Hamidi *et al*., 2013).

Process innovation: This type of innovation focuses on improving the flexibility of production, lower production costs (by reducing wage share costs, reducing material intake, reducing waste and production rates, and reducing product design costs), improving working conditions and reducing The environmental damage implies (Osman *et al.,* 2016).

Technological innovation: This type of innovation refers to innovation in the hardware and software technologies used by the company (Khodadadhassani, 2009).

Performance

The potential success of a business depends on its organizational performance, which means its ability to effectively implement strategies to achieve institutional objectives (Randeree and Al Youha, 2009). The performance of any organization depends in large part on the level of skill its leaders possess when it comes to implementing strategies. Silva (2014) described the essence of leadership as a conditional relationship that exists between a manager and his or her followers. Several variables constitute organizational performance, such as business model effectiveness, efficiency, and outcomes (Boyatzis and Ratti, 2009; Ryan and Bernhard, 2012). It is usually expected that behavioral behavior and performance of the high sales offer will result in a high performance .Behaviors in the behavioral structure include activities related to the supply and performance of members responsibilities, which include knowledge of the characteristics and functions of the goods, the recognition of the causes of failure and the success of the goods on the market and keep up-to-date on the various information of the company and the market. Behavioral sales behavior is the basis for the actual performance and sales results. If the sales force has sufficient information about the goods and the company, it can better off the sale successfully. Therefore, it can be said that behavioral sales behavior has a positive effect on the objective performance of sales (Azizi *et al*., 2008). Determining and identifying factors affecting the performance of sales force leads to better planning and management of sales force. Performance of members depends on individual, organizational, and environmental factors. One of the key factors that is highlighted in performance of member's studies is occupational perceptions. Member's perceptions represent the perception and perception of the sales force of various components associated with occupation and occupational environments (Holmes and Srivastava, 2012). Important occupational perceptions include job ambiguity, job engagement, job conflict, and job satisfaction. These perceptions are pre-requisites of the sales force's sales behaviors such as effort, hard work, smart work and comparative sales, etc. Occupational behaviors as a work activity are the basis for the sales force's performance in various dimensions. . In other words, the chain of perception, behavior, and the result are implicitly used in many studies (Azizi and Rousta,

2010). Organizational innovation, on the other hand, also has a significant impact on the success of organizations in individual and organizational dimensions, including the improvement of the performance of members in urban civil development cooperatives employees in current market variables (Moradzadeh and BadichiJavan, 2014).

Urban civil development cooperatives

Pursuant to Article 1 of the Law on the Establishment of Urban Development Cooperatives, approved by the Parliament of Iran on 2010, in order to accelerate the growth and development of cities, directing public resources to the productive sectors, preparing for the entry of cooperative and private sectors into economic activities. And carrying out projects that cannot be transferred to the private sector, companies called Urban Civil Development Cooperatives (UCDC) are formed. Among the most important activities of this cooperative are: carrying out development activities in cities and villages, creating and managing economic, production, distribution and service units, buying shares of state-owned enterprises located in the city, acquiring worn-out lands, and carrying out any transaction, the purchase of securities for the management of cooperative resources and investment in development projects (Ministry of Cooperatives, Labour, and Social Welfare, 2018). Currently, there are 103 urban civil development cooperatives in 23 provinces of the country. These cooperatives have more than 77,000 members and have created 4,783 jobs in the country. At present, Yazd UCDC with 10,000 members and Shiraz UCDC with 9290 people are the largest urban civil development cooperatives in the country. These co-operatives have the necessary capacity to improve the quality of life, improve the social and economic situation of the residents of dilapidated structures and can prevent rural-urban migration and the expansion of informal settlement (marginalization) by directing investment in these cooperatives (Ministry of Cooperatives, Labour, and Social Welfare, 2018).

Literature review

In the field of organizational innovation and employee performance and the relationship between them, there have been studies that briefly refer to some of them: Vakil Alroaia *et al.,* (2018) studied the determination of the preference of factors affecting the participation of SMEs in open innovation activities. In this study, first by extracting the models of other researches in the field of factors affecting the participation of SMEs in open innovation activities, they explained the appropriate model. Then, in the second stage, from the point of view of 60 experts and managers of SMEs in industrial park, the data was quantitatively evaluated and validated. The results showed that these factors include the parameters of product specifications, internal factors and environmental factors. In addition, the most important factor of product specifications was identified and finally, executive recommendations to increase the effectiveness of these activities for SMEs were provided. Khan *et al*., (2016) stated that there is a positive relationship between structural capital, relational capital and members' participation with the co-operatives performance while human capital has been found to have a negative relationship. This is further supported by the findings based on the multiple regression analysis whereby all the independent variables were found to be significant expect for structural capital. Based on the findings, this study proposed a model for co-operatives' performance which is based on its intangible assets. Imani *et al.,* (2015) investigated the effect of internal marketing on employee performance considering the effect of intermediate variable of organizational innovation. The results of statistical analyzes indicate that internal marketing has a positive and meaningful effect on employee performance and organizational innovation. Also, organizational innovation has a positive and significant effect on employees' performance. In addition, research findings show that organizational innovation plays a mediating role in the relationship between internal marketing and employee performance. Teymourian (2015) studied organizational innovation and its impact on teachers' performance in Abdanan city. The results of the research showed that there is a significant relationship between organizational innovation and the effectiveness of teachers' performance; and the effect of organizational innovation on teachers' performance is high. Vahdati *et al*., (2014) examined the relationship between knowledge management and organizational innovation and employee performance in the form of a case study in

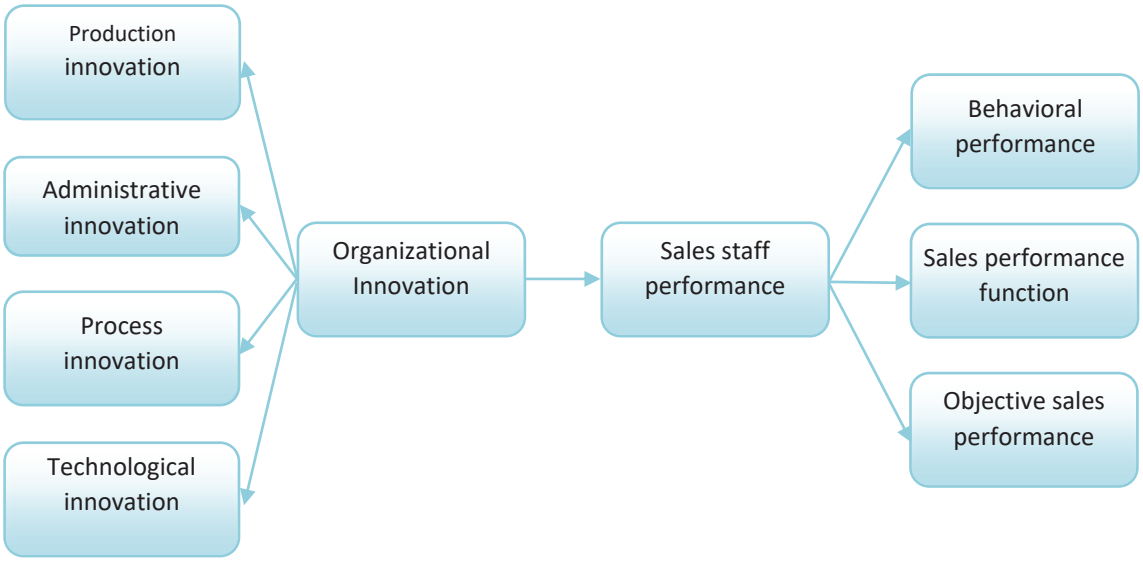

Fig. 1. A framework for determinants of Organizational innovation and performance improvement (Khodadadhassani 2009); Azizi *et al.*, 2008)

Mashhad University of Medical Sciences. The results showed that there is a positive and significant relationship between knowledge management and organizational innovation and staff performance of Mashhad University of Medical Sciences. Osmamn *et al.,* (2016) investigated the effect of organizational innovation on employees' performance. Data were collected through a questionnaire completed by 290 employees of a Malaysian manufacturing company. In this research, the impact of innovation and its four dimensions, including innovation in production, process innovation, technological innovation and organizational innovation, as well as employees' attitudes towards their performance, were studied. The results showed that the attitude of the employees and all four types of innovation on the performance of the employees has a positive and significant effect. Preenen *et al.*, (2015), examined the relationship between labor productivity variables. The results showed that companies with high internal workforce flexibility have better labor productivity and innovative performance. There is also a positive and significant relationship between innovation and labor productivity in manufacturing companies. Kurt *et al*., (2015), in a paper entitled "Innovation and Labor Productivity in Countries", using Panel Method and based on data from 2000 to 2012, examined the relationship between innovation and labor productivity in five countries of Brazil, Russia, India, China and South Africa and concluded that there is a significant relationship between the above concepts and with increasing levels of innovation at the level of companies and the economies of countries, the productivity of labor in it The country rises. According to *Mastrangelo et al. (2014)*, competent leaders influence their followers. Organizational leaders play a vital role in the achievement of organizational goals and objectives by creating a conducive environment that influences employees' behaviors, attitudes, and motivations. In addition, according to the research results, there is a positive and significant relationship between innovation and labor productivity in companies. In this research, by studying the subject literature and the history of research, summarizing theories and findings of empirical research, and interviewing a number of university owners, a conceptual model of research that illustrates the effect of organizational innovation on improving the performance of sales staff in businesses Small and medium sized, which can be seen in the form of (Fig. 1). In this model, Organizational Innovation (OI) based on Khodadadhassani's research (2009) includes four dimensions of Production Innovation (PI), Administrative Innovation (AI), Process Innovation (PrI) and Technological

Table 1: Cronbach's alpha value for the research questionnaire

Variable	Cronbach's alpha	Variable	Cronbach's alpha
Administrative innovation	0.869	Behavioral sales behavior	0.769
Production innovation	0.914	Sales performance function	0.832
Process innovation	0.874	Objective sales performance	0.806
Technological innovation	0.822	Sales staff performance	0.788
Organizational Innovation	0.813		

Innovation (TI). Also, the performance of firms based on the research by Azizi *et al.,* (2008) includes three dimensions of behavioral behavior, sales performance and objective performance of members.

According to the proposed model, the research question is as follows:

How does organizational innovation affect the performance of members in urban civil development cooperatives?

The current study has been carried out in Semnan during the period of 2019- 2020.

MATERIALS AND METHODS

The present research is applied as the target and in terms of collecting data, descriptive research is a correlation type. The statistical population of the research includes 103 city development cooperatives that are currently operating in 23 provinces of the country. Due to the fact that the size of the statistical population was unknown, the population was unlimited and the sample size was equal to 384 people. The sampling method used in this research is stratified random method. A questionnaire was used to collect field information. Questionnaires have been distributed among co-operatives board of members of the 100 best co-operatives in Iran. So, in each co-operatives, 3-4 of the managers have done to complete the questionnaire. Finally, according to the follow-up, 387 questionnaires were completed and used for analysis. The questionnaire consists of three main section. In the first section, demographic information is provided by the statistical sample and general information of the companies. The second section of the questionnaire examines the status of organizational innovation in co-operatives using 20 questions. In the third section, the performance of the members of the cooperatives is analyzed using 16 questions. The answer options have a five-point scale and are categorized from very low (= 1) to very high (= 5). In order to ensure the validity of the questionnaire, content validity and construct validity were used and, according to the literature and the background of the research, interviewing the university experts, the validity and reliability of the questionnaire was verified and confirmed. A questionnaire was used to test the reliability of the questionnaire and the questionnaire was distributed in a sample of 30 participants and its Cronbach's alpha was calculated using SPSS software. The results are shown in Table 1. As it is seen in the table, the reliability of all sub-sets is relatively high and the acceptable level is more than 0.70. Therefore, the research questionnaire has a desirable reliability.

For analyzing the data, inferential statistics tests including the Kolmogorov- Smirnov, T-test, correlation test and Structural Equation Modeling (SEM) were used. SEM is a multivariate and powerful technique from the multivariate regression family and, more precisely, is the extension of a linear model, which allows the researcher to test the set of regression equations simultaneously. One of the main advantages of path analysis or structural equation modeling is that it enables the researcher to measure the direct and indirect effects of a variable on another and compare its value with one another. Therefore, in this research, this technique has been used to investigate the relationship between organizational innovation and performance of sales staff. For this purpose, the statistical software SPSS 19 and LISRELL 8.54 have been used.

RESULTS AND DISSCUSION

In this study, the exploratory and confirmatory factor analysis has been used to ensure the validity of the measurement tool, the exploratory and confirmatory factor analysis has been used. In this regard, first, using SPSS software, exploratory factor analysis was

Table 2: Bartlett test results and sampling adequacy index

The sufficiency test of the Kisser-Mir-Eklin Sample on Sampling Suitability (KMO)		Organizational Innovation	Performance of Members of UCDC
		0.861	0.855
Bartlett Test of Sphericity	Chi square	2699.622	2082.285
	Degrees of freedom	190	120
	Significance level	0.000	0.000

Table 3: Factor weights and meaningful values for the organizational innovation variable

Factors	Sub-norm	Standardized Loud Factors	t- value
Production Innovation	Make changes to the company in the field of product manufacturing	0.65	-
	Replacing new products with previous products	0.80	9.78
	Provide new customer service	0.63	7.80
	Change in technologies used in the manufacturing sector	0.62	7.69
Administrative Innovation	Use of new policies and procedures for recruiting staff	0.70	-
	Use of new policies and procedures in allocating resources	0.82	10.58
	Use of new policies and procedures on the structure of duties and powers	0.78	10.02
	Use of new policies and procedures in allocating rewards and benefits to employees	0.76	9.85
	Use new policies and procedures to motivate	0.74	9.61
	Use of new policies and procedures to improve working conditions	0.84	10.79
Process Innovation	Improved production flexibility	0.62	-
	Reduce the consumption of raw materials	0.58	7.27
	Reduced waste rates and resources	0.64	7.92
	Reduce product design costs	0.63	7.75
	Reduce environmental damage	0.78	9.22
	Changes in administrative processes	0.67	8.16
Technological Innovation	Changes in administrative processes	0.53	-
	Innovation in the software technologies used in the company	0.64	6.47
	Use of modern information and communication technologies in performing administrative processes	0.68	6.71
	Use of information systems in different parts of the organization	0.75	7.12

carried out and the sampling adequacy test (KMO and Bartlet test) was performed for different parts of the questionnaire; after ensuring that the data are appropriate for factor analysis and The adequacy of data based on these tests has been done for different parts of the research model (organizational innovation variables and members' performance), factor analysis of the first and second order (Kaiser and Rice, 1974). Table 2 shows the results of the Bartlett test and the sampling adequacy index. According to the table, the sampling rate sufficiency index (KMO) for organizational innovation variables and the performance of the sales staff was 0.861 and 0.885 respectively, which is higher than the desired level of 0.60. As a result, it can be said that the number of samples used is sufficient and the data used for factor analysis is sufficient. Also, the significance level of the Bartlett test (sig) was less than 0.05, which indicates that the data are suitable for factor analysis and the adequacy of the data is confirmed.

In addition, the total table of variance explained by the components of organizational innovation indicates that the indicators used consist of a total of four factors that can cover about 55% of the variance of the variable of organizational innovation. These factors were named according to the theoretical foundations under the titles of production innovation, administrative innovation, process innovation and technological innovation. In the case of sales variables, salesperson performance also includes three factors of behavioral behavior, sales performance and objective members' performance of over 53 percent of the variable variance of sales staff performance. In the following, using Laser software, the first-or-

Table 4: Indicators fitness model for the organizational innovation

Model fit criteria	Indicator	The amount	Desired limit	Result
χ^2 Relative	χ^2/df	2.34	<3	acceptable
Root mean squares pproximation	RMSEA	0.059	<0.01	acceptable
Stems of residues	RMR	0.015	About zero	acceptable
Normal fit index	NFI	0.92	>0.09	acceptable
Fitness softness index	NNFI	0.93	About one	acceptable
Adaptive fit index	CFI	0.94	>0.09	acceptable
Relative fit index	RFI	0.96	>0.09	acceptable
Additional fit index	IFI	0.95	>0.09	acceptable

Table 5: Factor weights and meaningful values for the salesperson's performance variable

Factors	Sub-norm	Standardized Loud Factors	t- value
Behavioral Performance	Knowledge base Members of Urban Civil Development Cooperatives information	0.47	-
	The availability of sales force information about the market and rivals is up to date	0.78	5.31
	Information on the specifications and functions of the goods	0.75	5.23
	Understanding the causes of failure and the success of goods in the market	0.64	5.03
	Understanding methods and techniques for convincing customers	0.67	5.06
	Understand the behaviors and practices of customers	0.78	5.31
Sales performance function	Proper behavior when selling a product to a customer.	0.71	-
	Precision Hearing To Understand Customer's Main Concerns	0.53	7.36
	The ability to provide sales in a clear and distinct way	0.75	9.89
	Provide solutions to answer customer questions and objections	0.73	9.69
	Proper response to customer behaviors and practices	0.53	7.18
	Correct non-verbal communication skills	0.52	7.04
Objective sales performance	The suitability of sales volumes in sales force	0.77	-
	Suitability of sales value in sales force	0.78	11.67
	The success rate and effectiveness of sales activities in sales force	0.75	11.04
	Sales force sales growth compared to previous periods	0.65	9.52

der confirmation factor analysis is performed for the organizational innovation variable. In the interpretation of factor analysis results, standardized weighting is of great importance. These weights indicate the correlation between each observed variable and its associated factor. Also, significant values indicate the correlation between each observed variable and its associated factor. Table 3 shows the summary of the results of the confirmatory factor analysis. According to the table, all items related to each of the structures have a positive and significant factor load, and the smallest meaningful value is 6.47, which indicates that the convergent validity criterion is satisfactory.

Table 4 shows the indicators of goodness of fitting the variable of organizational innovation. The results presented in the table indicate that the organizational innovation variable has a fitness.

The first and second order confirmatory factor analysis were performed for the salesperson performance variable. Table 5 shows the summary of the results of the confirmatory factor analysis. According to the table, all items related to each of the structures have a positive and significant load factor and the lowest value of 5.03 is obtained, which indicates that the convergent validity criterion is satisfactory.

The first and second order confirmatory factor analysis were performed for the salesperson performance variable. Table 5 shows the summary of the results of the confirmatory factor analysis. According to the table 5, all items related to each of the struc-

tures have a positive and significant load factor and the lowest value of 5.03 is obtained, which indicates that the convergent validity criterion is satisfactory. Table 6 shows the goodness indicators of fitting the variable of performance of the sales staff. The results presented in the table indicate that the sales performance variable is well suited to the sales staff.

In this study, Kolmogorov-Smirnov test was used to test the normal variables of the research. Based on the results of this test (Table 7), the significance level for all variables is greater than the error level (0.05). Therefore, at a confidence level of 95%, it can be said that the data of the research variables are of normal distribution.

Therefore, given the normal distribution of data and the higher number of samples from 30 (based on the central limit theorem), parametric tests can be used to analyze the research hypotheses. Table 8 shows the status of research variables including organizational innovation and performance of members of UCDC, T-student test was used.

As shown in Table 9, for all variables, the test statistic (t) is more than the critical value (1.64) and the significance level of the error level (0.05). Also, given that the lower and upper limits are both positive, it can be concluded that the average of the responses to the components of the research variables is greater than the test value (= 3). In other words, at 95% confidence level, organizational innovation and performance of members of UCDC are in a favorable position. Since the purpose of the study is to investigate the causal relationship between the variables, therefore, before considering the causal relationship, there should be a significant relationship between the variables. Therefore, according to the data type, Pearson correlation analysis has been used to examine the existence of a significant relationship between the variables. The results of this analysis are presented in Table 9.

The results of correlation analysis indicate that there is a significant relationship between the research variables and it can be claimed that there is a positive and significant relationship between organizational innovation and performance of members of urban development cooperatives. After ensuring that there is a meaningful relationship through path analysis, the causal relationship between the research variables is investigated. Here, the relationship between the variables is investigated using structural equation modeling (SEM). And the causality relation between the variables of the model has been investigated. SEM with two objectives is to measure phenomena and study the relationships between phenomena. In this research, both the purpose of studying and testing of (structural) assumptions and the study of the fitting of the proposed model in the research has been studied. Table 10 shows the standardized path coefficients of the direct effects of the variables of the research model.

To test the significance of the relationships between the variables, t is used. If the absolute value of t statistic is larger than the critical value (1.96), there is a significant relationship between the variables. Therefore, considering the t values and the larger test items from the critical value, at 95% confidence level, organizational innovation can have a positive and significant effect on the performance of the members' in UCDC. In other words, with the increase of organizational innovation, the performance of members' in UCDC is also improving. After estimating the parameters of the fitness model, the research model was performed. To this end, various indicators have been considered. Table 11 shows the values obtained for the fitness indicators of the conceptual model of the research.

In summary, the values obtained for the above indicators show that the whole model is compatible with the empirical data used and the conceptual model of the research has a good fit. According to the validation and fitness of the model, through the Lizerl software, the research hypotheses were tested, the results of which were presented in the previous section. It should be noted that the findings of the research with the results of the researches of the Boyatzis and Ratti, 2009; Ryan and Bernhard, 2012; Teymourian, (2015); Hamidi *et al*., (2013); Vakil Alroaia *et al.,* (2018); Vahdati *et al*., (2014) coordinate and approve them. Therefore, it is recommended that corporate executives pay attention to increasing their organizational innovation in order to improve the performance of the members' in the mentioned variables and the relationships between them.

Table 6: Indicators fitness model for the performance of sales staff

Model fit criteria	Indicator	The amount	Desired limit	Result
χ^2 Relative	χ^2/df	2.21	<3	acceptable
Root mean squares approximation	RMSEA	0.064	<0.01	acceptable
Stems of residues	RMR	0.011	About zero	acceptable
Normal fit index	NFI	0.93	>0.09	acceptable
Fitness softness index	NNFI	0.94	About one	acceptable
Adaptive fit index	CFI	0.95	>0.09	acceptable
Relative fit index	RFI	0.92	>0.09	acceptable
Additional fit index	IFI	0.92	>0.09	acceptable

Table 7: Results of Kolmogorov-Smirnov test on the distribution of statistical sample data.

Factor	Average	Standard deviation	The z value in the Kolmogorov-Smirnov test	Significance level
Administrative innovation	3.34	0.617	0.951	0.323
Production innovation	3.38	0.611	0.817	0.427
Process innovation	3.24	0.615	0.828	0.422
Technological innovation	3.36	0.598	0.980	0.281
Organizational Innovation	3.33	0.715	0.995	0.267
Behavioral sales behavior	3.71	0.645	1.109	0.210
Sales performance function	3.78	0.715	1.010	0.241
Objective sales performance	3.73	0.695	1.022	0.236
Members performance	3.74	0.745	1.031	0.221

Table 8: T-test results on the status of research variables

Factor	t-Test statistic	(df)*	Significant level	Difference of averages	Lower Level	upper Level
Administrative innovation	6.67	349	0.000	0.3408	0.2256	0.4560
Production innovation	6.958	349	0.000	0.3818	0.2935	0.4691
Process innovation	6.231	349	0.000	0.2416	0.1705	0.3127
Technological innovation	6.852	349	0.000	0.3624	0.2654	0.4594
Organizational Innovation	6.656	349	0.000	0.3311	0.2198	04424
Behavioral sales behavior	7.624	349	0.000	0.7124	0.6212	0.8036
Sales performance function	8.241	349	0.000	0.8703	0.6621	0.8985
Objective sales performance	7.806	349	0.000	0.7322	0.6515	0.8129
Members performance	7.965	349	0.000	0.7416	0.6725	0.8107

*Degrees of freedom

Table 9: Pearson correlation coefficients between model structures.

Factor	Description	AI	PI	PrI	TI	OI	MP
Administrative innovation	Correlation	1					
	Sig.	0					
Production innovation	Correlation	0.712**	1				
	Sig.	0.000	0.000				
Process innovation	Correlation	0.601	0.702**	1			
	Sig.	0.000	0.000	0.000			
Technological innovation	Correlation	0.627**	0.816**	0.738**	1		
	Sig.	0.000	0.000	0.000	0.000		
Organizational Innovation	Correlation	0.834**	0.912**	0.844**	0.881**	1	
	Sig.	0.000	0.000	0.000	0.000	0.000	
Members performance	Correlation	0.662**	0.758**	0.695**	0.756**	0.975**	1
	Sig.	0.000	0.000	0.000	0.000	0.000	0.000

** Correlation coefficient at 0.01 is significant. * Correlation coefficient at 0.05 is significant

Table 10. The standardized path coefficients of the direct effects

Path	Path coefficient	t-value
Effect of organizational innovation on sales staff performance	0.76	8.83

Table 11: Indicators fitness model

Model fit criteria	Indicator	The amount	Desired limit	Result
χ^2 Relative	χ^2/df	2.65	<3	acceptable
Root mean squares pproximation	RMSEA	0.041	<0.01	acceptable
Stems of residues	RMR	0.022	About zero	acceptable
Normal fit index	NFI	0.95	>0.09	acceptable
Fitness softness index	NNFI	0.93	About one	acceptable
Adaptive fit index	CFI	0.96	>0.09	acceptable
Relative fit index	RFI	0.94	>0.09	acceptable
Additional fit index	IFI	0.92	>0.09	acceptable

CONCLUSION

Increasing competition, variety of products and changing consumer patterns has made the role and importance of force-making as the executive arm of the organization more visible. In fact, vendor performance is one of the key factors that affects the performance and survival of the organization on the market. Members' performance is affected by many internal and external factors, among which these are organizational innovation. In fact, given the importance of organizational innovation and its positive effects on individual and organizational performance, this should be the case for corporate executives. Therefore, in this research, the effect of organizational innovation on improving the performance of members' in UCDC has been studied. The results of analyzing research data about the relationship between these variables showed that organizational innovation has a positive and significant effect on the performance of sales staff in SMEs. Also according to analyzes conducted for the relationship between these variables are direct and positive; as organizational innovation increases, the performance of members' in the UCDC is also improving. In addition, based on the results of the research, organizational innovation, the performance of members' and their dimensions in the UCDC are in a favorable situation. In general, considering the hypothesis test and the obtained results, a significant relationship is found between the variables of the research and the conceptual model of the research is confirmed. Therefore, the variables and components of the research should be considered by the managers of the cooperatives.

Suggestions

According to the results of the research, it is suggested in the first place to directors of the companies to pay special attention to all the variables and components mentioned in this research and their relationship, and to plan and implement necessary measures to increase organizational innovation in order to improve the performance of members' in UCDC. In addition, due to the synergistic effect of the simultaneous effect of organizational innovation dimensions on employees' performance, managers should try to improve the status of these variables in the company in order to improve the performance and competitiveness of cooperatives more often. In order to achieve high innovation performance, the organization must initially create a platform for the behavioral and cultural innovation, and only in such enabling environments, the organization will ultimately be able to innovate, innovate and function properly. The successful development and introduction of innovations requires specific organizational resources and capabilities to enable the organization to generate profit and benefit from innovation. Also, the conditions that innovative companies are working on are very effective on the implications of innovation. Therefore, it is imperative that the moderators that influence the relationship between innovation and individual and organizational performance should be

taken into account. In order to improve performance and increase individual and organizational productivity, it is necessary on the one hand to pay attention to the research and development department of the companies and to create gradual changes in productivity by fostering the creativity and talent of employees through activities A team and team, on the other hand, will pay attention to the qualities of the team and the consultation mechanism with the staff at the top level of the organization, which will boost the creativity of the members' at the cooperatives, which is what, in many organizations and successful countries, It is being used. Studies have shown that our organizations potentially have the potential to gain valuable benefits from creativity and innovation. Therefore, management and organization must work on acquiring this power. Eliminating extreme and unnecessary activities of organizations, challenging and competing with the environment, reviewing and monitoring more about managers, motivating and providing the ground for creativity in employees can be considered as ways to increase creativity and innovation in the organization. It is important to focus on organizational programs to enhance creativity and innovation at individual and organizational levels, in order to further improve the performance of the members' in the UCDC. Due to the fact that in this research the effect of mediator and intermediary variables affecting the relationship between organizational innovation and the performance of sales staff such as organizational climate and culture, organizational structure, experience, specialty and management style, occupational perceptions, etc. It is suggested to researchers interested in the topic to identify these variables in future research and to examine their importance and how they affect each other. It is also suggested that specific studies be conducted on the subject of research in different companies and industries based on the conceptual model of the research. In addition, the pathology of organizational innovation and the performance of corporate staff should also be considered by organizational researchers.

AUTHOR CONTRIBUTIONS

Y. Vakil Alroaia has performed the methodology, literature review, software analysis, result interpretation, data collection, writing original draft preparation, funding acquisition, and prepared the manuscript text and agreed to the published version of the manuscript.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy have been completely observed by the author.

ABBREVIATIONS

AI	Administrative Innovation
Df	Degrees of Freedom
KMO	Kisser-Mir-Eklin
MP	Members Performance
OI	Organizational Innovation
PMUCDC	Performance of Members of Urban Civil Development Cooperatives
PI	Production Innovation
PrI	Process Innovation
SEM	Structural Equation Modeling
UCDC	Urban Civil Development Cooperatives
TI	Technology Innovation

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ORIGINAL RESEARCH PAPER

Irrigation site selection using hybrid GIS-based approach

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ABSTRACT

BACKGROUND AND OBJECTIVES: The use of traditional site selection methods for potential irrigation schemes is so common in Malawi. The overdependence of these methods has had significant consequences on the environment such as pollution, siltation, and land degradation and soil erosion. Traditional selection of irrigation sites is a complex task which is time-consuming, costly and involves collection of a lot of data sets. However, advances in Geographic Information Systems present an opportunity to easily integrate complex systems involving a lot of data sets. The objective of this study was to identify potential areas for irrigation farming in Kasungu district in Malawi using hybrid spatial datasets.

METHODS: Multi criteria decision analysis approach was used in Arc GIS 10.8 to analyze datasets such as slopes, rivers, land use, soil types, soil depths, water quality, water quantity and drainage patterns. A questionnaire was used to solicit expert views on factors to consider when siting feasible irrigation areas.

FINDINGS: This study observed that the use of Geographic Information System in irrigation site selection is flexible and time efficient due to its ability of handling complex and huge volume of datasets. Moreover, the produced maps enhanced an easy understanding of the identified areas hence providing an aid to making right decisions in environmental management. The study found that in Kasungu district, 36.9% of the land is highly suitable, 20.7% is moderately suitable, 33.1% is lowly suitable and 9.3% is not suitable for irrigation.

CONCLUSION: This paper provides good information on promoting the utilization of GIS to solve site selection problems in a bid to reduce soil erosion, pollution and improve land management. The study recommends the promotion of using GIS in government agencies for better decision-making in sustainable irrigation development. The scientific approach used in this study can also be extrapolated in the assessment and evaluation of water resources in Malawi.

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INTRODUCTION

Unlike most developed countries, most African economies still depend on rainfed agriculture as the main source of water for crop production. Due to climate change, there has been a shift from rain-based farming to irrigated farming which enables farmers to grow more than twice in a year. Because of rainfall unpredictability and frequent weather shocks, small scale irrigation farming has long been recognized as a leeway to mitigate these maladies in addition to supplementing food availability (Kadyampakeni *et al*., 2018). Though its recognition is valuable, irrigation has been limited by some constraints such as global climate change, drought, insufficient and unevenly distributed rainfall, and population increase (Boateng *et al*., 2016; Park *et al*., 2019). Kumbuyo *et al*., (2014) argue that the major problem associated with the rainfall-dependent agriculture in Malawi is the high degree of rainfall variability. Due to this variability, crop failures due to dry spells and droughts are frequently leading to food insecurity affecting the livelihoods of the people (Bae *et al*., 2018; Mulwafu *et al*., 2002). In areas with insufficient rains, Mailhol *et al*., (2004) assert that irrigation provides an effective and efficient way of supplying water for agricultural production. However, in Malawi, irrigation has not been fully developed despite the recognition by government of its significance for enhancing economic development (Mulwafu *et al*., 2002). A good example is the GreenBelt Initiative (GBI). The National Irrigation Policy (NIP, 2016) expounds that water shortages, land disputes and por maintenance are among the crucial challenges affecting irrigation development in Malawi. Djagba *et al*., (2014) noted that most organizations and government departments still use the traditional approach in irrigation site selection. This approach involves collecting a lot of datasets which is time consuming and costly. This approach can easily lead one into ignoring other important variables on site selection for irrigation. Processing of such data is equally untimely and in other cases inefficient and ineffective. This has often resulted into frequent problems in irrigation schemes due to improper site selection. Agricane Malawi (2009) agree with Kadyampakeni *et al., (2014*) that constraints to irrigation development in the Malawi have been due to lack of technical expertise in irrigation, use of poor agricultural practices and poor site selection methods. The effect of not considering proper site selection procedures is significant and often leads to problems related to soil erosion, water management, seepage, poor drainage, siltation, flooding, poor marketing systems, insufficient water, and poor yields. These problems are evident in some schemes such as Luweya, Nkopola and Khanda. This substantiates studies of FAO (2002) and Nhira *et al*., (2008) which noted that most problems in irrigation schemes arise from poor site selection methods. Economically, poor site selection can lead to spending much money on rehabilitation, a problem that could easily be solved if necessary tools were used (Schuenemann *et al*., 2018). Contrary to traditional approaches, Varvani (2018) highlighted that GIS-based systematic approaches to siting places for developmental activities are cost effective and enables catchment management. Advancements in technology have led to the introduction of Geographical Information Systems (GIS) which has been used in many sectors to aid decision making in site suitability analysis (Jha *et al*., 2014; Cech, 2002; Malczewski, 2004). For example, using the analytical capabilities of GIS, (Mahmoud *et al*., 2015 delineated suitable sites for rainwater harvesting feasible for water supply and irrigation projects. Most studies (Bhagat, 2016; Delgado *et al*., 2015; Garede *et al*., 2014; Modela *et al*., 2017) have highlighted that GIS is a powerful tool for scientific investigations, resource management, development planning, land evaluation, site selection and as a Decision Support System (DSS). Despite the advances of GIS technology worldwide, the use and application of GIS in irrigation development in Malawi in still limited. To the best of our knowledge, Malawi has no much record and/or has little literature concerning the use of Multi Criteria Decision Analysis (MCDA) approach for site selection in irrigation. In an endeavor to improve irrigation site selection methods for improved water management, this paper sought to site potential irrigation sites in Kasungu district, Malawi, using MCDA in June, 2020.

MATERIALS AND METHODS

Description of the study area and context

Kasungu district is found in Central region of Malawi. Fig. 1 shows the location of the study area. The district is found on latitude 13 ° 1’59.99’’S and longitude 33 ° 28’59.99’’S. The district is on the Lilongwe Kasungu plain and is approximately 127 kilometers from the capital city of Malawi, Lilongwe.

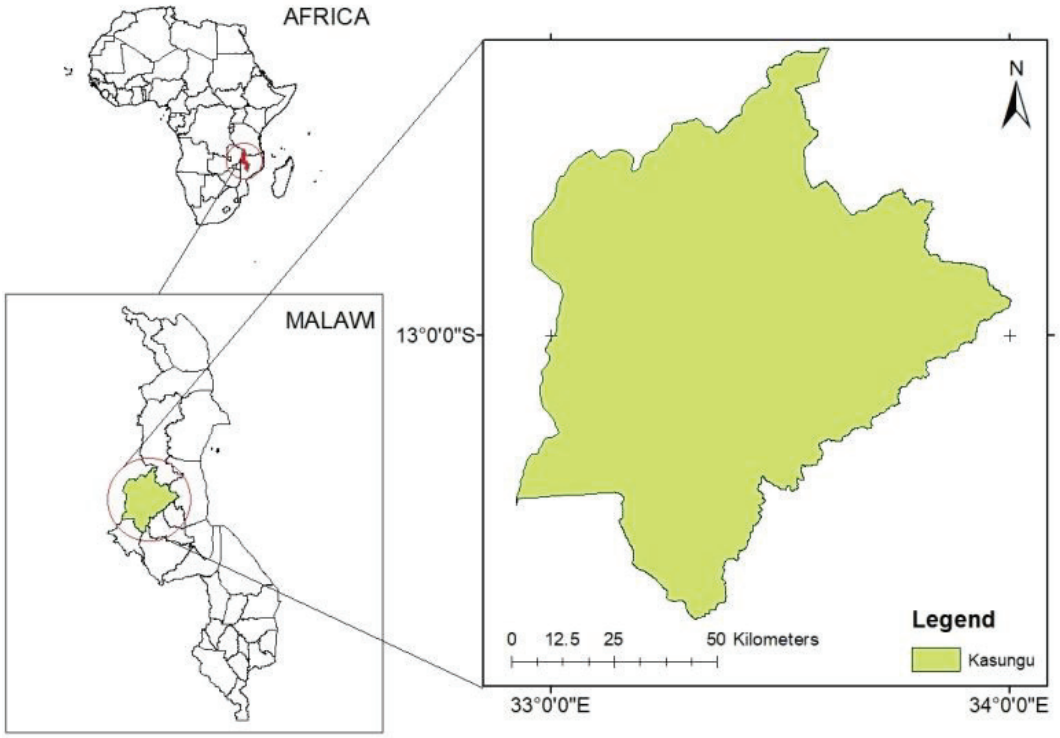

Fig. 1: Geographic location of the study area in Kasungu district

The área of Kasungu district is approximately 7830 km^2 covering 8 percent of the country.

Development of the model

This study used a multi criteria decision analysis (MCDA) approach to identify different levels of suitable sites for sustainable irrigation development. Hussein *et al*., (2019) highlighted that multi-criteria land suitability analysis enables sustainable use of scarce resources such as water and land.

The approach is shown in Fig. 2.

Spatial datasets used in this study were reclassified in order to come up with a common measurement scale for easy identification and suitable area determination. FAO (2002) guidelines in addition to expert advice were referred to in weighting analysis. A questionnaire was used to determine the factors which irrigation experts consider when siting an área for irrigation. The study used a scale of 1 to 4 with 4 being the most suitable and 1 not suitable. Table 1 shows the suitability reclassification levels that were used to determine the suitable areas for irrigation development.

These parameters were weighted in order to determine their level of influence in decisión making. The Analytical Hierarchy Process (AHP) was used to weigh and validate the parameters as proposed by Saaty (2008). Saaty (2008) recommended the usage of weighted parameters when the consistency ratio (CR) was less than 0.1.

RESULTS AND DISCUSSION

Fig. 3(a) shows the elevation of Kasungu district. The district has a peak elevation of 1616 metres above sea level and the lowest point is 774 metres above sea level. The northern part of the district is on a higher land than most of the central part which is flat. Fig. 3(b) presents the distribution of various slope classes of Kasungu. The district is predominantly (54.4%) flat with slopes of 0-2%. These slopes are ideal for irrigation. Sloping land (37.8%) has a percentage of 2-7%, moderately steep land (5.8%) range from 7-16% and steep land (1.6%) ranges from 16-32% whereas very steep lands (0.4%) are greater than

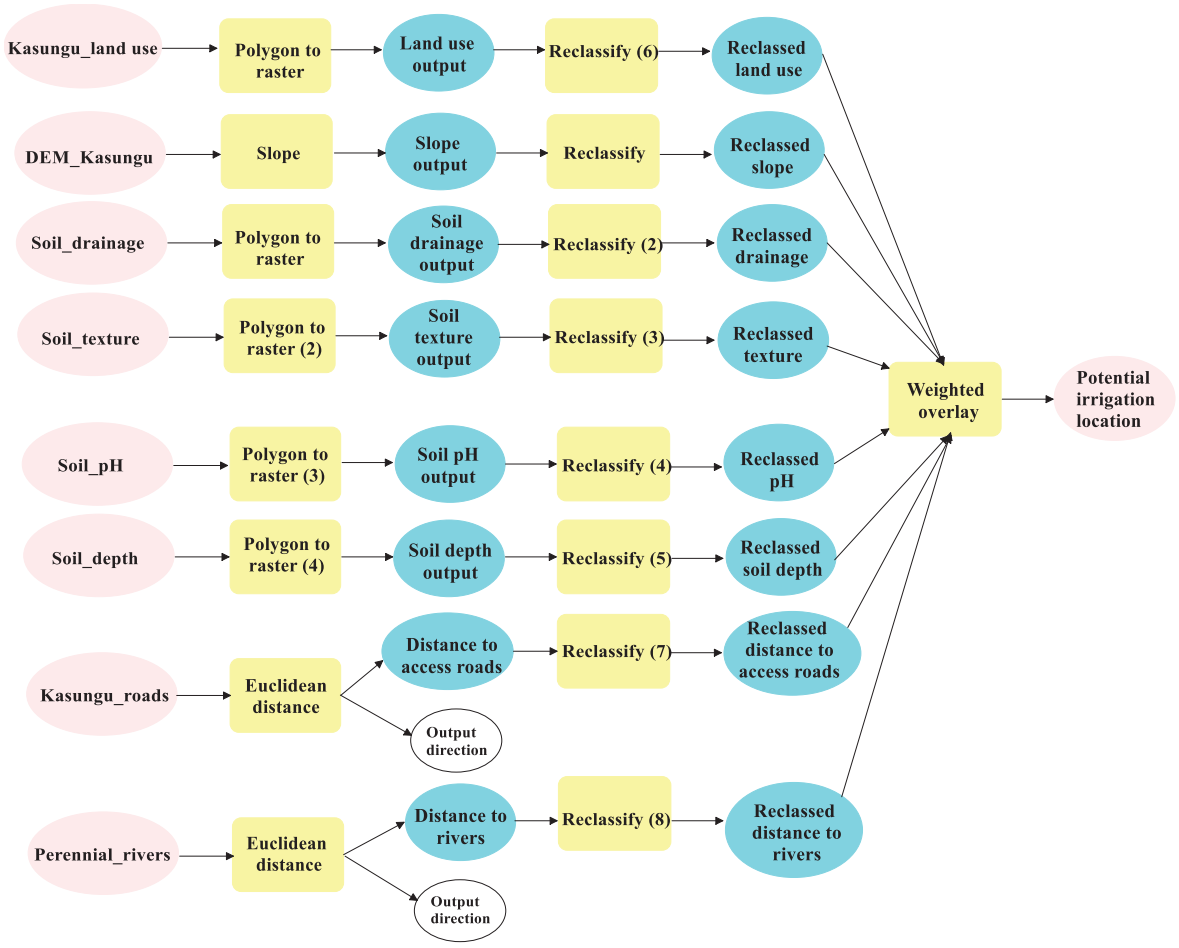

Fig. 2: Irrigation suitability model in Model Builder

32%). FAO (2002) recommends slopes of less than 2% to be feasible for irrigation development especially surface irrigation systems which are common among smallholder farmers. It is an important management tool when deciding when to use gravity fed irrigation methods or pumping. This observation agrees with Maina (2016) that slope has a direct impact on runoff, erosion and drainage in the development of an irrigation scheme. Fig. 3(b) therefore suggested that the district is relatively flat, an attribute which is of prime importance when selecting irrigation sites and methods.

Fig. 3(c) displays the drainage regime in the district. The results indicated that 96.8% of the disrict has good soils with good physical properties that allow the wáter to drain properly. This concurs with Fig. 3(f) indicating that most parts in the district are not susceptible to flooding. This could be attributed to well drained soils and slight levels of erosion in the district. Areas which are prone to flooding have poor drained soils and have high rates of erosion hence not feasible for surface irrigation systems which are common in Malawi. This agrees with Tadesse (2010) who noted that flooding is due to poor drainage, high rates of deforestation and soil degraded areas. The Therefore, the good drainage regime in the district would facilitate the proper siting for a feasible irrigation área and further aid engineers to design sustainable drainage channels in irrigation schemes. Fig. 3 (d) shows that the district has a dendritic riverine system with direction of flow from the west to the east in Kasungu. The district has a network

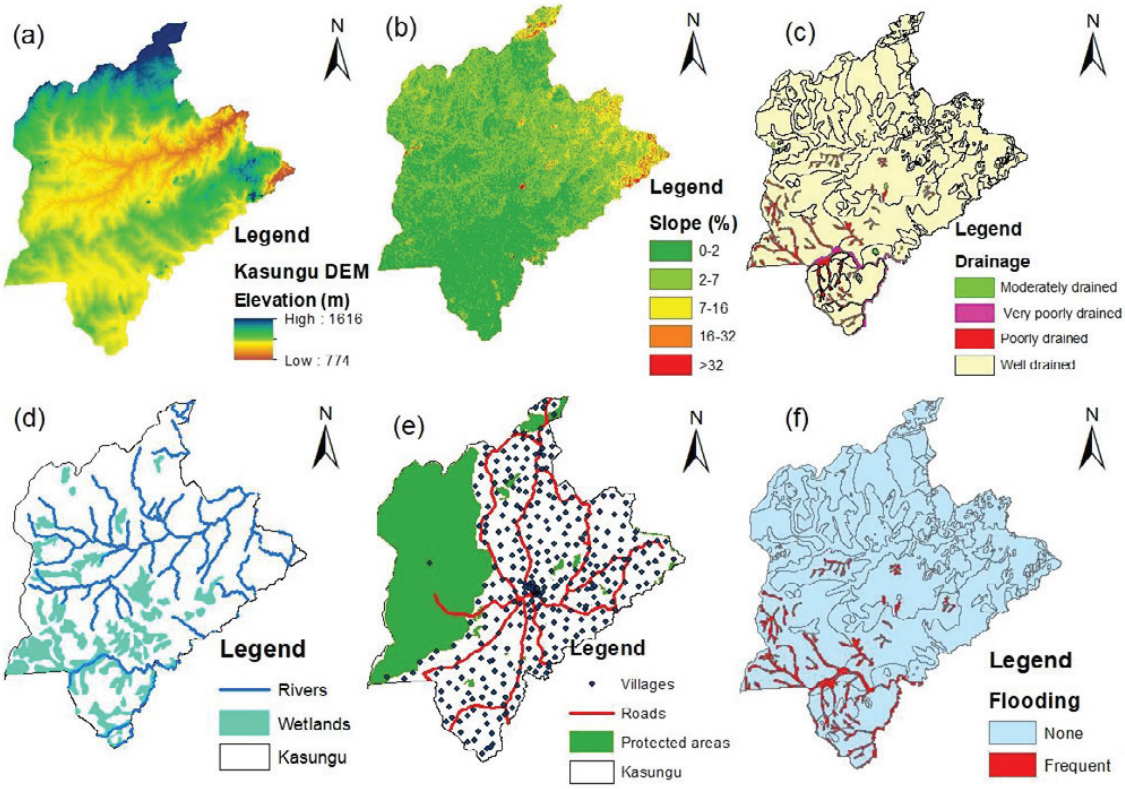

Fig. 3. Digital Elevation Model, slopes, drainage systems and flood frequency in Kasungu district

of perennial rivers such as Dwangwa, Bua, Lingadzi, Rusa, Luwelezi, Lupache and Milenje which have good water quality. The results indicated that the minimum dry season flow (Q80) ranged from 0.01 to 0.2 l/s/km^2. In conjunction with Fig. 3(b), many areas have an opportunity to be irrigated by many methods of irrigation. The flow morphology also presents a chance for rainwater harvesting technologies in the district hence providing a storage means for irrigation water. This could also help in the mapping of the potential areas for irrigation when these rainwater harvesting sites where flow accumulates more have easily been identified. Fig. 3 (e) displays the protected áreas comprising of national parks and forest reserves, and road networks in Kasungu district. Many parts of the district are accesible due to good road networks hence presenting an opportunity for easy access to markets. FAO (2002) asserted that road networks are very important when siting an irrigation land for easiness of scheme accessibility, labour accessibility and transportation of farm inputs and outputs. Table 1 considered feasible closeness of roads to a suitable irrigation area. As noted by Andersson *et al.,* (2009), in small land holdings, areas close to the river or roads are highly suitable for development than those which are at a distance. The respective soil properties considered in this study were soil type, soil depth, soil pH, and colour as shown in Figs 4 and 4(a) showed that most soils in the district have the acceptable range of acidity and alkalinity of 5.5 to 8.0 for most crops. Soils which are highly acidic or highly alkaline normally decrease crop yields and not good for irrigation. Fig. 4(b) exhibited that the predominant soils in the district are loamy sand, sandy clay and sandy loam. Fig. 4(c) indicated that the district is dominated by deep soils within the range of 100 cm and greater than 150 cm. This is the most effective root zone depth for most crops. Fig. 4(d) indicates the soil colour for the district. This attribute is related to the distribution of organic

Table 1: Suitability class levels for irrigation development in Kasungu district

Spatial dataset	Suitability reclassification level		
	Class (%)	Weight	Description
Slope	0 - 2	4	Highly Suitable
	2 - 7	3	Moderately Suitable
	7 - 16	2	Lowly Suitable
	More than 16	1	Not Suitable
	Class (cm)	Weight	Description
Soil depth	>150 (Very Deep)	4	Highly Suitable
	100 - 150 (Deep)	3	Moderately Suitable
	50 - 100 (Moderately Deep)	2	Lowly Suitable
	0 - 50 (Shallow)	1	Not Suitable
	Class (cm)	Weight	Description
Drainage	>150 (Very Deep)	4	Well drained
	100 - 150 (Deep)	3	Moderately drained
	50 - 100 (Moderately Deep)	2	Poorly drained
	0 - 50 (Shallow)	1	Very Poorly drained
	Class	Weight	Description
Soil texture	Loamy sand	4	Highly Suitable
	Sandy loam	3	Moderately Suitable
	Sandy Clay	2	Lowly Suitable
	Sand	1	Not Suitable
	Class (pH)	Weight	Description
Soil PH	5.5 – 7.0	4	Highly Suitable
	7.0 – 8.0	3	Moderately Suitable
	4.5 – 5.5	2	Lowly Suitable
	> 5.5	1	Not Suitable
	Class range (km)	Weight	Description
Distance to perennial rivers	0 – 1.5	4	Highly Suitable
	1.5 - 3	3	Moderately Suitable
	3 - 4.5	2	Lowly Suitable
	More than 4.5	1	Not Suitable
	Class (km)	Weight	Description
Distance to access roads	0 - 1	4	Highly Suitable
	1 - 2	3	Moderately Suitable
	2 - 3	2	Lowly Suitable
	More than 3	1	Not Suitable

manure in the soil. Black or brown soils normally are rich in organic manure, are fertile and are suitable for arable crops. This is one of the soil's characteristic of Kasungu-Lilongwe plain. The correct siting of these areas would hence improve the incorporation of sustainable and effective irrigation to improve the livelihood of the people in the area. Fig. 4(e) shows the land use/cover patterns in Kasungu district. Most land (55.11%) is arable, 22.42% is covered with forests, and 21.87 % is covered with wetlands and dambos whilst the remainder is used for settlements. A careful examination in the cultivation land revealed that not all the cultivation land is irrigable. This was because some areas were very far from potential water sources. These areas present an opportunity for rainwater harvesting for agriculture. This is in line with FAO (2002) which highlighted that the process of land use/cover classification is the appraisal and grouping of specific areas of land in terms of their suitability for defined uses. Fig. 4(f) pinpoints landforms where most flat uplands are the mostly cultivated áreas. The landforms reveales that the district has a weathered basement aquifer lithology that provides groundwater yields within the range of 0.05 to 0.62 litres per second. The district also has a rich network (16.9%) of dambos which feasible for small scale irrigation. The outputs from these landforms suggested that irrigation is feasible in most parts of the districts.

Fig. 5 highlights the criteria weights that were

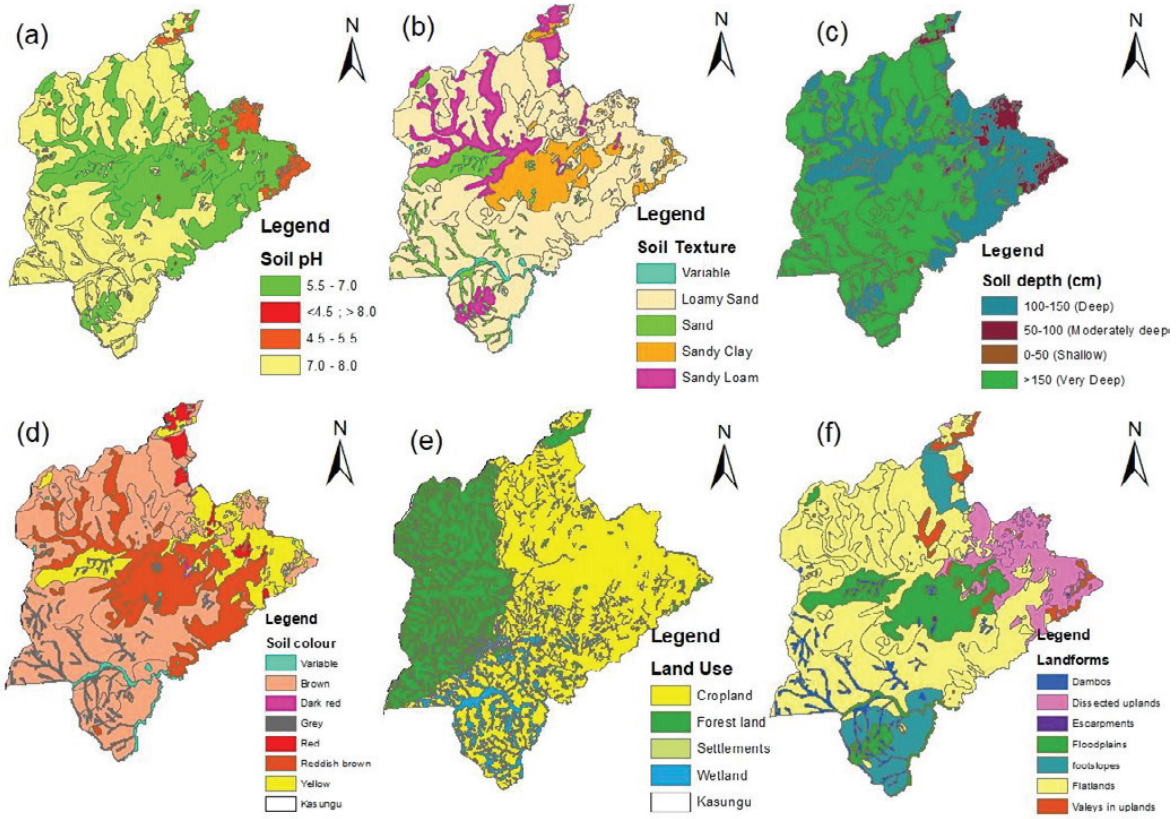

Fig. 4: Soil characteristics, Land uses and Land forms in Kasungu district

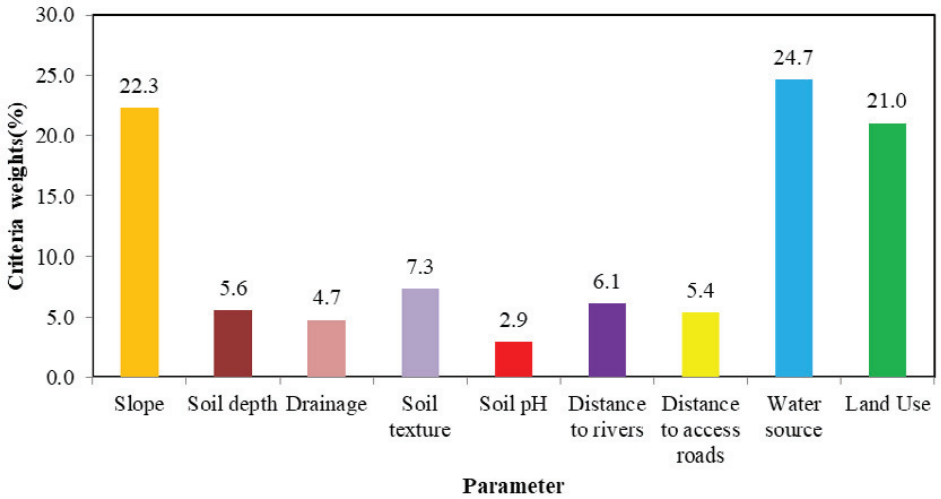

Fig.5. Criteria weights of irrigation site selection parameters

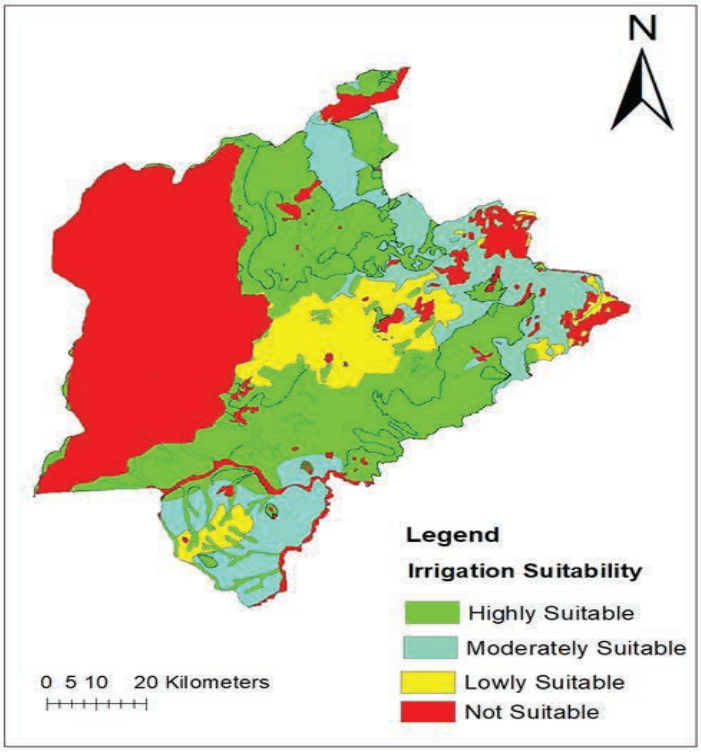

Fig. 6: Irrigation Suitability Levels in Kasungu

used to determine the level of influence of each parameter. These weights were dependable as the consistency ratio (CR=0.09) was less than 0.1 as recommended by Saaty (2008).

The results indicated that wáter source, slope and land use had significant influence in siting a feasible irrigation área. However, soil type, soil depth and distance to the wáter sources were also crucial in decisión making. The AHP approach employed in ArcGIS revealed best areas for irrigation in Kasungu district. The feasible irrigable areas were the ones showing an intersection of all the variables utilized, not only being the ones present, but also as of great importance and significance where irrigation is influenced. Fig. 6 shows suitable irrigation sites with different suitability levels. It was observed that 36.9% is highly suitable, 20.7% is moderately suitable, 33.1% is lowly suitable and 9.3% is not suitable for irrigation. Similar to Girma *et al*., (2019), the findings showed that GIS-based results aid decision makers to easily understand and visualize results. The suitability map enhances an easy and quick identification of best sites thereby aiding easy decision making. This further reinforces the observation of Mbilinyi *et al*., (2007) that GIS is a great tool in deciding sites for developmental projects. The processing of the data was timely harmonizing the notion of Raza (2018) that the use of satellite data and its processing using Remote Sensing and GIS saves time and helps in the identification of best sites for developmental projects. The findings as seen in Fig. 6 would easily guide irrigation engineers on the best irrigation systems to propose depending with the suitability level which would enhance sustainable irrigation systems. This concurs with the assertions of Rasooli (2015) and Kavurmaci (2019) that site suitability maps enhance the development of sustainabe water infrastructure and investment plans.The áreas which were not suitable for irrigation were protected áreas, áreas prone to flooding and very high escarpments.

CONCLUSION

The prime objective of this study was to identify irrigation sites using a multi criteria analysis algorithm in GIS. The study used alot of important spatial datasets such as slope, drainage, road networks, soil types, soil texture, flooding buffers, protected áreas,

land forms, soil pH, soil depths and water quality. The results have revealed that when hybridization of spatial datasets is considered in irrigation site selection, best and accurate areas can easily be determined within a very short period of time. With regards to data acquisition, GIS further serves as a better data management tool so imperative in the monitoring of environmental parameters for different projects. The availability of open source software GIS application should enhance the availability and usage of GIS in agricultura projects such as irrigation site selection. Contrary to the traditional methods which have been used for sometime in Malawi, this study has illustrated that using a hybrid GIS approach is easy, time effective and accurate. This study has also provided an insight that GIS can be used as a management tool towards sustainable land management practices through the siting of best areas for development projects. The findings from this study shows that most parts in Kasungu are irrigable. This study observed that expert advice differed insignificantly to the requirements of FAO (2002). This suggests that expert advice must be referred to when siting áreas for irrigation. In the light of the above highlights, this study recommends the adoption of GIS technology by government agencies, academia, investors, Non-Governmental organizations and other stakeholders on decision making for project planning, implementation, monitoring and evaluation. This study attempted to delineate áreas feasible for irrigation in Kasungu district by means of GIS and has found that GIS is a proper tool for environmental data analysis and sequential siting of feasible irrigation areas.

AUTHOR CONTRIBUTIONS

S. R. Chikabvumbwa conceptualized, analyzed the data and prepared the manuscript. D. Sibale and S. W. Chisale aided in analysis and interpretation. All authors have read, agreed and approved the final manuscript.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

ABBREVIATIONS

GIS	Geographical Information System
MCDA	Multi Criteria Decision Analysis
GBI	Green Belt Initiative
FAO	Food Agriculture Organization
DSS	Decision Support System
%	Percent
NIP	National Irigation Policy

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ORIGINAL RESEARCH PAPER

Locational analysis of child streetism in urban centers

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ABSTRACT

BACKGROUND AND OBJECTIVES: Against the background of the growing awareness of the need to provide empirical answers to the fundamental questions of the location of human activities, the construction of social space and the relationship between social space and physical environment, this study examines the locational implications of child streetism in selected urban centres in South-western Nigeria.

METHODS: Using simple random sampling, 45 locations were drawn from the three urban centres for the purpose of data collection. The required data was collected through the instrumentation of head count and analysed using Relative Incidence of Street Children (RISC) and Hierarchical Cluster Analysis (HCA).

FINDINGS: The results of RISC show that Oja-oba Central Mosque, Ibadan (247), Gbagi-Dugbe Market, Ibadan and Gbagi-Dugbe Motor Park, Ibadan generated highest incidence of street children. However, the results of HCA show that the problem of child streetism is most severe in Oja-oba Market (Akure); Igbona Market (Osogbo); Oja-oba Central Mosque (Ibadan).

CONCLUSION: The study concludes that incidence of street children is greatly influenced by social, economic and physical attributes of locations. The study recommends physical planning measures to combat the menace of child streetism.

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INTRODUCTION

Child streetism, a concept that describes the desperate situations of children working, living or surviving on the street, is a complex phenomenon and certainly one of the challenges presented by urban poverty. However, its prevalence, intensity and visibility have made society to accept it as part and parcel of normal phenomenon of the world and Nigerian urban centres are not exempted from this phenomenon. In recent years, the number of street children on Nigerian streets has grown exponentially (Oloko, 1993; Okpukpara and Odurukwe, 2006; Fakoya, 2009). Although, there are no accurate statistical evidences to support this claim, it has been reported that over 7.3 million Nigerian children of school age were not in school (UNICEF, 2005, Faloore, 2009; Fakoya, 2009). Most of these children were probably on the street. Attempts at understanding the fundamentals of child streetism have often been preserved as exclusive rights of social science disciplines such as Sociology, Anthropology, Economics, Political Science and Psychology to mention but a few. In the aforementioned disciplines, emphasis have always been placed on the sociological, demographic, economic and psychological analyses of social phenomenon (Oloko, 1993; Heinonen, 2000; Kangsangbata, 2008; Faloore, 2009; Fawole *et al*, 2010; Etuk *et al.*, 2012). However, in recent times, there have been a growing recognition by spatial analysts that understanding the spatial context of social issues is key to understanding how the problem can be controlled and prevented (Goodchild and Janelle 2004; Voss, 2007; Shammai *et al*, 2013). This raises fundamental questions about the location of human activities, the construction of social space, and the relationship between social and physical space. As a response to the growing awareness of the need to provide empirical answers to the fundamental questions about the location of human activities, the construction of social space and the relationship between social space and physical environment, begging, crime, sexuality among other social issues have been confirmed to have spatial implications (Adedibu, 1989; Adeboyejo and Onyeonoru, 2008; Onyeonoru and Adeboyejo, 2007; Jelili, 2009; Ogunkan and Jelili, 2010; Fawole, Ogunkan and Adetunji, 2010; Adigun, 2012). Nevertheless, attention to the spatial dimensions of street children phenomena is still much less apparent. Even at that, the sparse literature on spatial analysis of street children has almost exclusively focused only on the intra–urban variation of the phenomenon (Ogunkan and Adeboyejo, 2013; Ogunkan, 2014; Ogunkan and Adeboyejo, 2014). These studies situate their spatial analysis within a confinement of a single city. However, the emanating recommendations may not be useful to solve similar problem in other urban centres because such spatial pattern may vary from city to city given the varying levels of urbanisation of the urban centres. There is, therefore, an obvious need to give more attention to comparative research on social phenomenon within a geo-political zone in order to compare the same social phenomenon in similar areal level. In the light of this, this study is designed to bridge this gap by focussing on the locational variations of street children in Ibadan, Akure and Osogbo in South-western Geo-political Zone (SWGPZ) of Nigeria.

Child streetism and street children: conceptual clarification

It is conventional in studies on streetism to use the concepts of "child streetism" and "street children" synonymously (Kangsangbata, 2008; Tettegah, 2012). While acknowledging the fact that the interchangeable usage of these concepts has not generated heat or intellectual argument, it is essential to make clarification on these concepts so as to clear any mix up that may emanate from their usage. Both concepts – child streetism and street children - can be used to mean the same thing when the latter is used to refer to the phenomenon of street children rather than street children as individuals. In this case, both concepts refer to the situation in which children find their means of survival and or refuge on streets. The concepts describe the activities of the under aged who are on the street without the supervision of a responsible adult. Almost all street activities are directed towards earning income (Mercer, 2009), and nearly all are considered, in one-way or another, illegal, particularly by law enforcers (Beers, 1996). While the streets present opportunities for work and freedom, they also violate a child's dignity and adversely affect their physical, mental, emotional, moral and overall well-being (Kaime-Atterhog, 2012), especially those ones that involve children living permanently on the street as they bring great

difficulties, including unemployment, poverty, hunger and lack of shelter on those children. On this premise "child streetism" becomes more appropriate to describe the precarious situation of children on the street. It also describes the strengthening of harmful habits, such as smoking, drug use, gambling, sniffing glue and prostitution among street children Kaime-Atterhog, 2012). From the foregoing, it can be deduced that while both concepts are referring to the same activities, child streetism is more encompassing as it has deeper meaning than street children. Having established that street children phenomenon describes the activities of the under aged who are on the street without the supervision of a responsible adult, the literature equivocates over the definition of the concept of street children as individuals i.e. who should be classified as street children (Aptekar, 1988; Panter-Brick, 2002). The concept has brought about a repetitive debate regardless of being a focus of attention for international organisations of all types since the United Nations International Year of the Child in 1979 (Ennew, 2003). The debate stems from the fact that street children lacks universally adopted definition. However, many practitioners, scholars and policy makers have adopted the Inter-Non-governmental Organisations (NGO, 1995) definition of street children as any girl or boy who has not reached adulthood, for whom the street (in the broadest sense of the word, including unoccupied dwellings, wasteland etc.) has become her or his habitual abode and/or sources of livelihood, and who is inadequately protected, supervised or directed by responsible adults. The above definitions of street children have been functional and useful, but are fraught with many problems. For instance, (Muchini (2001) argues that placing many children under this all-encompassing label of street children seems to obliterate any differences that may exist between them and their grounds for being in the street. To address this flaw, (UNICEF (1998) grouped these children into "children on the street," and "children of the street." "Children on the street" or street working children are children who work in the street, and sleep at home; while, "children of the street" or street living children are children who work and sleep on the street. Nonetheless, street children shall be conceptualised in this study as children living and/or working on the streets who are not under the supervision of responsible adults. Therefore, while the concept of child streetism denotes the action and ways of life of street children, street children are the actors whose ways of life is known as child streetism. For the reason that child streetism and street children phenomenon have the same contextual meaning, both concepts are used interchangeably in this study. However, in the appropriate sections, street children are also used to refer to children as individual street occupiers. The study was conducted to examine inter and intra urban pattern of incidence of street children in the South-West Geo-Political Zone (SWGPZ) of Nigeria. This is with a view to analysing the influence of locational attributes on child streetism. The study was conducted in the last quarter of 2019 in Ibadan, Akure and Osogbo, the administrative headquarters of Oyo, Ondo and Osogbo respectively.

MATERIALS AND METHODS

The Study Setting

The setting for this study is the South Western Geopolitical Zone (SWGP) of Nigeria. The zone contains some of the leading urban centres with the greatest concentration of human agglomeration in the country. However, three urban centres were selected to represent the zone. These uran centres are Ibadan, Akure and Osogbo. The three urban centres are the administrative headquarters of Oyo, Ondo and Osun states respectively.

Sampling Procedure

In the previous studies (Beauchemin, 1999; Jelili, 2009; Faloore, 2009), several locations have been identified as street child prone areas. Within these locations, street children are observed to be more concentrated in markets, mosques, churches, motor parks and road junctions (Jelili, 2009; Ogunkan and Adeboyejo, 2013; Ogunkan, 2014) and thus can be regarded as street child "hot spots". It is therefore, convenient to use those locations as Data Delineated Areas (DDAs). However, for objective comparison among the selected urban centres and to ensure that the rules of 'representativeness' and 'equal chance', which are essential features of probability sampling methods (Asika, 1991), are not violated, the DDAs were selected, using simple random sampling. From

Table 1: Data Delineated Areas in the three urban centers

Urban Centres	Mosques	Churches	Markets	Junctions	Motor parks
Ibadan	Oja Oba Central Mosque; Alhaji Arisekola Mosque; Bodija Community Mosque	Oke Padre Catholic Church; Orita Mefa Baptist Church; Living Spring Church	Gbagi-Dugbe Market; Agodi – Gate Market; Bodija Market	Dugbe junction; Iwo Road Round about; Sango/Poly junction	Gbagi –Ogunpa-Dugbe Motor Park; Iwo Road Motor Park; Sango Motor Park
Akure	Akure Central Mosque; Oke Aro Community Mosque; Ijoka Central Mosque	Cathedral Catholic Church; St David Anglican church; Winners Chapel	Oja Oba Market; Isinkan Market; NEPA Market	Post Office Junction; High Court Junction; Road Block Junction	Old Garage Motor Park; Ondo Garage Motor Park; Benin Garage Motor Park
Osogbo	Oja Oba Central Mosque; Ansarudeen Central Mosque; Ajisebiyawo Mosque, Service	All saint cathedral, Balogun Agoro; Grace Baptist Church; RCCG, Zion Mega Parish	Oja Oba Market; Igbona Market; LAMECO	Ola-iya Junction; Stadium Junction; NUT Round about	Ogbomoso Garage Motor Park; Offa garage Motor Park; Iyana Offa Motor Park

the foregoing, fifteen (15) locations (DDAs) in each city (45 for the three urban centres) were recognised and selected for the purpose of data collection. The locations are as shown in Table 1

Method of Data Collection

Having determined the spatial framework for this study, data on incidence of different categories of street children were collected through the method of head count. This was done with the help of trained field assistants. The head count was conducted in each DDA between 10 am and 11 am on different days of the week (Monday to Sunday). It was recognised from the onset that street children would inevitably move between DDAs – perhaps carrying a moveable business. Therefore, to avoid the problem of double counting, the head count was conducted simultaneously in the same city. The children who were merely passing by or who were accompanied by adults were not included in the count

Method of Data Analysis

The incidence of street children which defines the magnitude or extent of the problem in the selected DDAs of the urban centres was measured in ratio scale through a surrogate or index "Relative Incidence of Street Children" (RISC). The RISC is defined as the total number of street children identifiable in each DDAs for seven days divided by seven. The RISC was normalised by population density of each city. The output was subjected to Hierarchical cluster analysis. Hierarchical cluster analysis is an algorithm that groups similar objects into groups called clusters. The method was used to group street children locations into distinct clusters such that locations within each cluster are broadly similar to each other.

RESULTS AND DISCUSSION

Inter-Urban Locational Analysis of Incidence of Street Children

A comparison of RISC 45 selected locations across the three urban centers shows differences of several orders of magnitude to reflect the spatial, social and economic attributes of each location (Fig.1).

It is evident that the descriptive locational analysis as depicted by Fig 1 shows a remarkable order of magnitude of child streetism in each location of the urban centers. However, to show locational variations along high and low concentrations, the raw distributions of street children in all locations were transformed into standard score. The standard score is the number of standard deviations by which the value of a raw score is above or below the mean value of what is being observed or measured. Raw scores above the mean have positive standard scores, while those below the mean have negative standard scores. According to Adana (1996) Standard scores otherwise known as z-scores can be used to compare two distributions (in this case, high and low concentration of child streetism) with different units (selected locations across the urban centers). The results of z-scores are as contained in Table 2

It follows from Table 2 that relative to other locations, Oja-oba central mosque (Ibadan), Gbagi

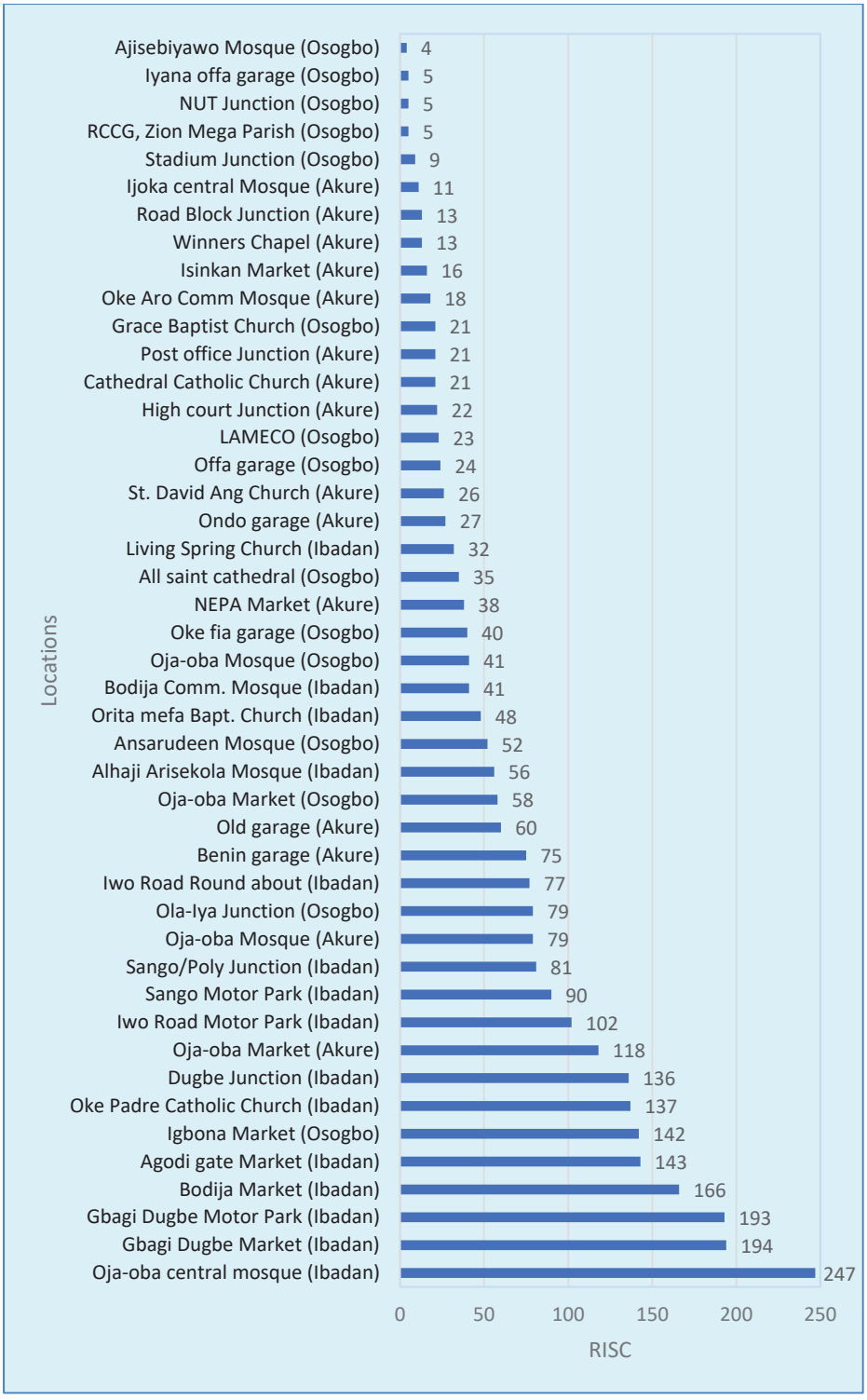

Fig. 1: Locational Variations of Child Streetism in the three selected urban centres

Table 2: Locational Distributions of Street Children in Urban centres: Standard Scores

Locations	Urban centres	z-score	Remarks
Oja-oba central mosque	Ibadan	3.108	High
Gbagi Dugbe Market	Ibadan	2.212	High
Gbagi Dugbe Motor Park	Ibadan	2.195	High
Bodija Market	Ibadan	1.738	High
Agodi gate Market	Ibadan	1.349	High
Igbona Market	Osogbo	1.332	High
Oke Padre Catholic Church	Ibadan	1.248	High
Dugbe Junction	Ibadan	1.231	High
Oja-oba Market	Akure	0.927	High
Iwo Road Motor Park	Ibadan	0.656	High
Sango Motor Park	Ibadan	0.453	High
Sango/Poly Junction	Ibadan	0.301	High
Oja-oba Mosque	Akure	0.267	High
Ola-Iya Junction	Osogbo	0.267	High
Iwo Road Round about	Ibadan	0.233	High
Benin garage	Akure	0.2	High
Old garage	Akure	-0.054	Low
Oja-oba Market	Osogbo	-0.088	Low
Alhaji Arisekola Mosque	Ibadan	-0.122	Low
Ansarudeen Mosque	Osogbo	-0.189	Low
Orita mefa Bapt. Church	Ibadan	-0.257	Low
Bodija Comm. Mosque	Ibadan	-0.375	Low
Oja-oba Mosque	Osogbo	-0.375	Low
Oke fia garage	Osogbo	-0.392	Low
NEPA Market	Akure	-0.426	Low
All saint cathedral	Osogbo	-0.477	Low
Living Spring Church	Ibadan	-0.528	Low
Ondo garage	Akure	-0.612	Low
St. David Ang Church	Akure	-0.629	Low
Offa garage	Osogbo	-0.663	Low
LAMECO	Osogbo	-0.68	Low
High court Junction	Akure	-0.697	Low
Cathedral Catholic Church	Akure	-0.714	Low
Post office Junction	Akure	-0.714	Low
Grace Baptist Church	Osogbo	-0.714	Low
Oke Aro Comm Mosque	Akure	-0.764	Low
Isinkan Market	Akure	-0.798	Low
Winners Chapel	Akure	-0.849	Low
Road Block Junction	Akure	-0.849	Low
Ijoka central Mosque	Akure	-0.883	Low
Stadium Junction	Osogbo	-0.916	Low
RCCG, Zion Mega Par	Osogbo	-0.984	Low
NUT Junction	Osogbo	-0.984	Low
Iyana offa garage	Osogbo	-0.984	Low
Ajisebiyawo Mosque	Osogbo	-1.001	Low

Table 3: Hierarchical Clusters of Child Streetism Locations

Cluster	Locations	Remark
1	Ajisebiyawo Mosque (Osogbo); RCCG, Zion Parish (Osogbo); NUT Junction(Osogbo); Iyana offa garage(Osogbo); Stadium junction(Osogbo);	Very Low
2	LAMECO (Osogbo); Oja-oba Mosque (Osogbo) Ijoka Central Mosque (Akure); Winners Chapel (Akure); Road Block Junction (Akure); Isinkan Market (Akure); Oke Aro Community Mosque (Akure); Cathedra Catholic Church (Akure); Post office Junction (Akure); Grace Baptist Church (Osogbo); High court Junction (Akure); Offa garage Motor Park (Osogbo); St. David Anglican Church (Akure); Ondo garage Motor Park (Akure); Living Spring Church (Ibadan); All saint Cathedral (Osogbo); Oke-fia garage Motor Park (Osogbo); Bodija Community Mosque (Ibadan); Oja-oba Mosque; Orita-meffa Baptist Church (Ibadan); Alhaji Arisekola Mosque (Ibadan)	Low
3	NEPA Market (Akure); Ansarudeen Central Mosque (Osogbo); Oja-oba Market (Osogbo); Iwo Road Round about (Ibadan); Sango/Poly Junction (Ibadan); Sango Motor Park (Ibadan); Iwo Road Motor Park (Ibadan)	Very Moderate
4	Old garage Motor Park (Akure); Ola-Iya Junction(Osogbo); Dugbe Junction (Ibadan); Oke Padre Catholic Church (Ibadan); Agodi-Gate Market (Ibadan)	Moderate
5	Oja-Oba Market (Ibadan) Benin garage Motor Park (Akure); Oja-Oba central Mosque (Akure); Bodija Market (Ibadan); Gbagi Dugbe Market (Ibadan)	High
6	Oja-oba Market (Akure); Igbona Marke(Osogbo); Oja-oba Central Mosque (Ibadan)	Very High

Dugbe Market (Ibadan), Gbagi Dugbe Motor Park (Ibadan), Bodija Market (Ibadan), Agodi gate Market (Ibadan), Igbona Market (Osogbo), Oke Padre Catholic Church (Ibadan). Dugbe Junction (Ibadan). Oja-oba Market (Akure), Iwo Road Motor Park (Ibadan), Sango Motor Park (Ibadan), Sango/Poly Junction (Ibadan), Oja-oba Mosque (Akure), Ola-Iya Junction (Osogbo), Iwo Road Round about (Ibadan) and Benin garage (Akure) are locations with high incidence of street children. What can be observed in this pattern is that the incidence of street children is a function of locational attributes in terms of social, economic and physical characteristics. For a finer locational analysis of child streetism and to reveal different levels of spatial distribution of child streetism in the urban centers, the Hierarchical Cluster Analysis was used to order by classes relatively homogenous locations in terms of street children distributions. For an objective grouping of locations in the three urban centers, RISC was normalized by the density of each city. The results were employed as input data for the Hierarchical Cluster Analysis. The Centroid Clustering Method was employed to ensure that the dissimilarity between one cluster and another cluster is represented by the distance between the centroid for the cases in the first cluster and the centroid for the cases in the second cluster. For the purpose that Centroid Method was specified, the Squared Euclidean Distance as a measure of interval was assigned as an appropriate measure of interval. The squared Euclidean Distance shows a dissimilarity matric that attenuates the differences between clusters of similar cases thereby making cluster boundaries more obvious. The result of the Hierarchical cluster Analysis shows 6 distinct clusters (Table 3). Locations in each cluster, irrespective of their urban centers, depict level of magnitude of child streetism.

The first cluster is saturated with locations that are relatively very low in the incidence of street children. This comprises of Ajisebiyawo Mosque, RCCG Zion Parish, NUT Junction, Iyana Offa garage and Stadium Junction all in Osogbo. Cluster 2 has locations with low incidence of street children. In this cluster, there are LAMECO (Osogbo); Oja-oba Mosque (Osogbo) Ijoka Central Mosque (Akure); Winners Chapel (Akure); Road Block Junction (Akure); Isinkan Market (Akure); Oke Aro Community Mosque (Akure); Cathedra Catholic Church (Akure); Post office Junction (Akure); Grace Baptist Church (Osogbo); High court Junction (Akure); Offa garage Motor Park (Osogbo); St. David Anglican Church (Akure); Ondo garage Motor Park (Akure); Living Spring Church (Ibadan); All saint Cathedral (Osogbo); Oke-fia garage Motor Park (Osogbo); Bodija Community Mosque (Ibadan); Oja-oba Mosque; Orita-meffa Baptist Church (Ibadan); Alhaji Arisekola Mosque (Ibadan). The third cluster

has NEPA Market (Akure); Ansarudeen Central Mosque (Osogbo); Oja-oba Market (Osogbo); Iwo Road Round about (Ibadan); Sango/Poly Junction (Ibadan); Sango Motor Park (Ibadan); Iwo Road Motor Park (Ibadan). The locations in the fourth cluster have relatively moderate incidence of child streetism. These include Old garage Motor Park (Akure); Ola-Iya Junction (Osogbo); Dugbe Junction (Ibadan); Oke Padre Catholic Church (Ibadan); Agodi-Gate Market (Ibadan). The fifth cluster comprises of Oja-Oba Market (Ibadan) Benin garage Motor Park (Akure); Oja-Oba central Mosque (Akure); Bodija Market (Ibadan); Gbagi Dugbe Market (Ibadan). The last cluster are made of three locations - Oja-oba Market (Akure); Igbona Marke(Osogbo); Oja-oba Central Mosque (Ibadan). These locations have very high incidence of street children. Of all the DDAs in the three urban centres, child streetism is most pronounced in Oja-ba Central Mosque (Ibadan), Igbona Market (Osogbo) and Oja-oba Market (Akure) in that order while the street children are least visible in Stadium Junction, Iyana Offa garage, NUT junction, RCCG Zion Parish, and Ajisebiyawo Mosque (all in Osogbo) in descending order.

Intra-Urban Locational Analysis of Street Children

For intra-urban analysis, the distributions of child streetism were mapped to show the intra-urban spatial variations of child streetism in each city. The data input for the mapping were generated from the Hierarchical Clusters Analysis of Child Streetism as shown on Table 3. It follows, therefore, that Oja-oba Central Mosque is the location with the highest incidence of child streetism in Ibadan (Fig. 2), followed by Gbagi- Dugbe Motor Park, Gbagi- Dugbe Market and Bodija Market in descending order.

The exceptionally high incidence of street children observed in Oja-oba Central Mosque may not be unconnected with the fact that the location is a juxtaposition of the religious land use and market land use. Therefore, it enjoys both economic and social benefits to attract quite a number of street children. While, Oja-oba Central Mosque generate quite a number of street children for alms begging, the influence of Oja-oba as traditional Central Business District (CBD) attracts a significant proportion of child hawkers and child traders for commercial activities. The high incidence in Gbagi-Dugbe Market and Gbagi-Dugbe Motor Park may be attributed to the fact that both are located inside Ibadan central districts. Moreover while Gbagi-Dugbe Market is the nerve center of Ibadan trading network, Gbagi-Dugbe Motor Park is an important transport center in Ibadan. Therefore, both locations enjoy “economies of location” to attract a significant number of street children. Bodija Market is a mixture of open space trading and concrete and wooden stalls but due to lack of patronage, most of the traders send their children to hawk around the market or stay at the adjacent roads to sell to passers-by. This increases child streetism activities in and around the market. The relatively low incidence of street children observed in Bodija Community Mosque is attributed to the less concentration of economic activities in the area. Moreover, the Mosque is an architectural grandeur located at the choicest area in a well-planned Bodija estate. Other locations with low concentration of child streetism such as Oja-oba Mosque, Orita meffa Baptist Church and Alhaji Arisekola Mosque also have less economic activities and may have social and physical attributes that are “unattractive” to street children. Fig. 3 shows the locational distributions of street children in Akure. It revealed that street children are most visible in Oja-oba Market.

Oja-oba Market is highly “favoured” as a concentrate of street children because of its locational attributes. Located at the heart of CBD in Akure,Oja-oba is the nerve centre of Akure’s transport and trading network, attracting street children from every part of the city for commercial and other activities. Located adjacent to the market is Akure Central Mosque which is also concentrated with street children. The locational attributes of Oja-oba Market can also be deployed to explain high incidence of child streetism around Akure Central mosque. Benin Garage is one of, if not the busiest Motor Park in Akure. It is a major transit point from Akure to major towns and urban centres in Eastern and Northern Nigeria. Therefore, it is a beehive of economic activities. As a result, it attracts a significant number of street children for a number of economic activities such as selling of packaged pure water, selling of recharge cards and in some cases

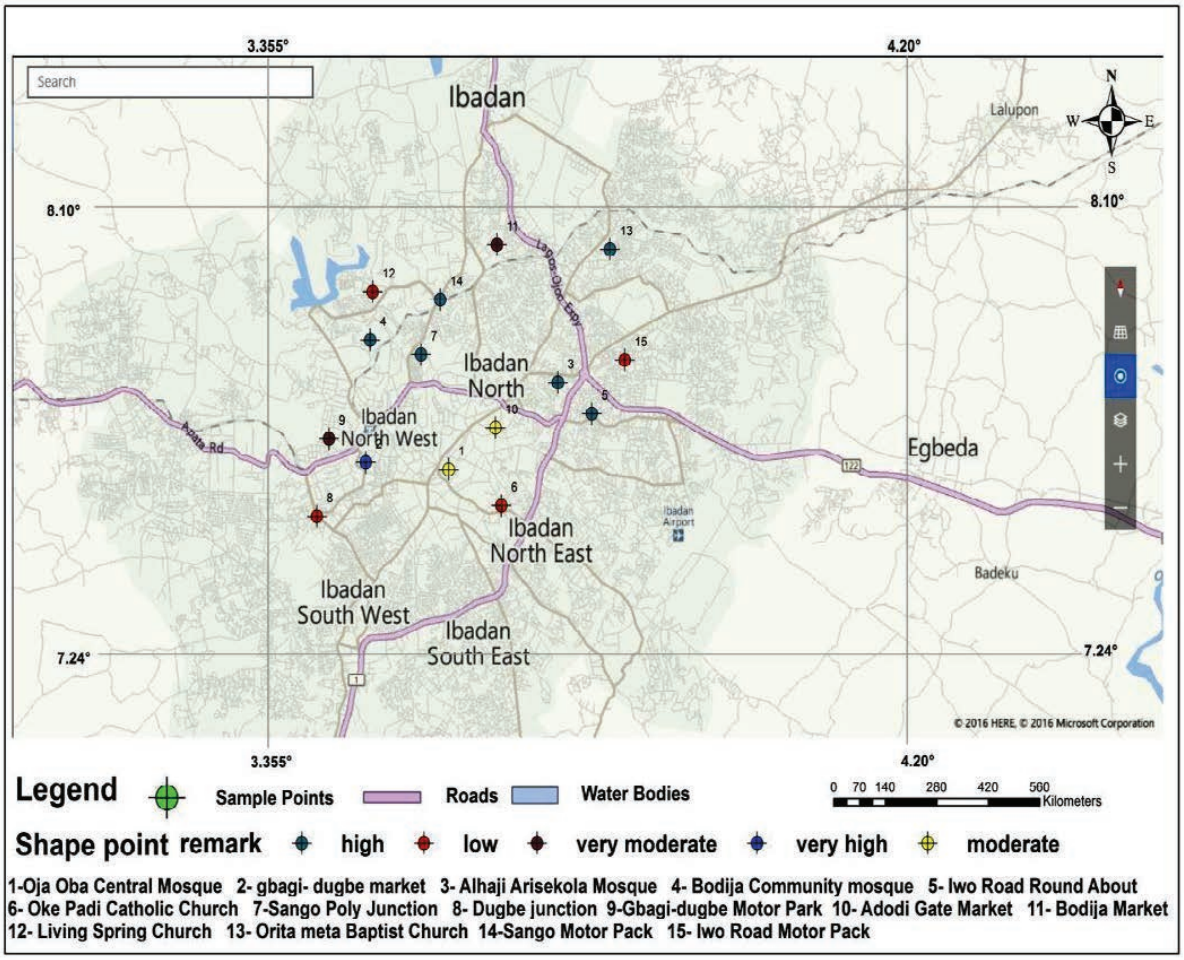

Fig. 2: Intra Urban Locational Distribution of Child Streetism in Ibadan

begging for alms. The low concentration of child streetism in such locations as Isinkan Market, Road Block Junction, Winners Chapel, Ondo Garage among others is a function of their locational characteristics. For instance, Isinkan Market is a well-planned market, fully fenced and with well organised stalls. Therefore, the Market does not give room for hawking and other activities usually engaged in by street children. The few identified street children around the market were those hawking along adjacent street. The low incidence of child streetism in Road Block Junction underscores the importance of physical attributes of location in the distribution of street children. Road Block Junction is one of the major junctions in Akure but the design is such that allows free flow of vehicular traffic and as a result does not give room for street children to congregate for economic and other street activities. In Osogbo, Igbona Market is observed to have the highest concentration of street children (Fig. 4). There are evidences to suggest that the economic, social and physical attributes of Igbona Market came to play in the high concentration of street children in the market. Igbona is an important market in Osogbo which attracts the patronage of people from within and outside Osogbo. Therefore, the market serves as important trading centre for street children from far and near. The physical structures of the market also provide a ground for child streetism to thrive. The market comprises of shops, timber kiosks, metal containers, sheds and open space displays lined with

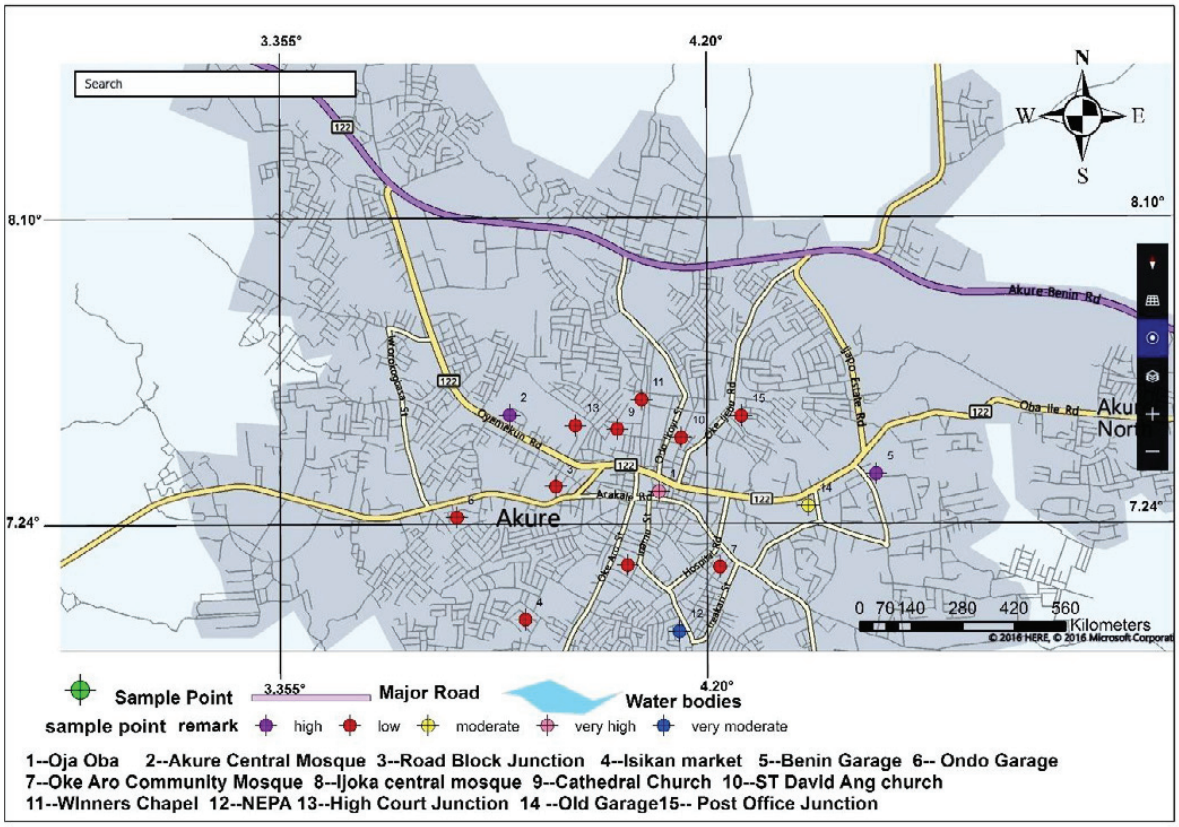

Fig. 3: Intra Urban Locational Distribution of Child Streetism in Akure

the major road.

It has been posited that a poorly managed road junction which usually results in traffic congestions, traffic jam, "go- slow" usually attracts street children and thereby generates high incidence of street children (Ogunkan, 2014). This is the situation at Ola-Iya Junction, where different categories of street children were seen either begging or selling to the motorists. The point to be stressed, therefore, is that the high concentration of street children at Ola-Iya junction is a function of its locational characteristics-high publicity value inherent in the location. The high concentration of street children in Oja-Oba Market is a function of its economic attributes as the nucleus of the CBD in the Core Areas of the city. Its features as a street market and major transport node of the city also encourage the influx of street children. The low concentration of child streetism as witnessed in other parts of the city further reveal the influence of economic, social and physical attributes of the location on the phenomenon of child streetism. Ajisebiyawo Mosque recorded the least incidence of street children in Osogbo. This is attributable to the fact that the Mosque is located in a well-planned environment far away from city centre. The same reason could be advanced for the low concentration of child streetism in RCCG, Zion Mega Parish, NUT Junction, Stadium Junction and Grace Baptist Church. From the foregoing analysis, it can be inferred that the potential of any spatial unit to generate high or low incidence of child streetism is dictated by its locational attributes. Evidences to support this claim are as highlighted:

i. A central place (Location in the city where all forms of business enterprises are concentrated) where informal activities are located indiscriminately tends to generate high incidence of street children irrespective of where it is located. The

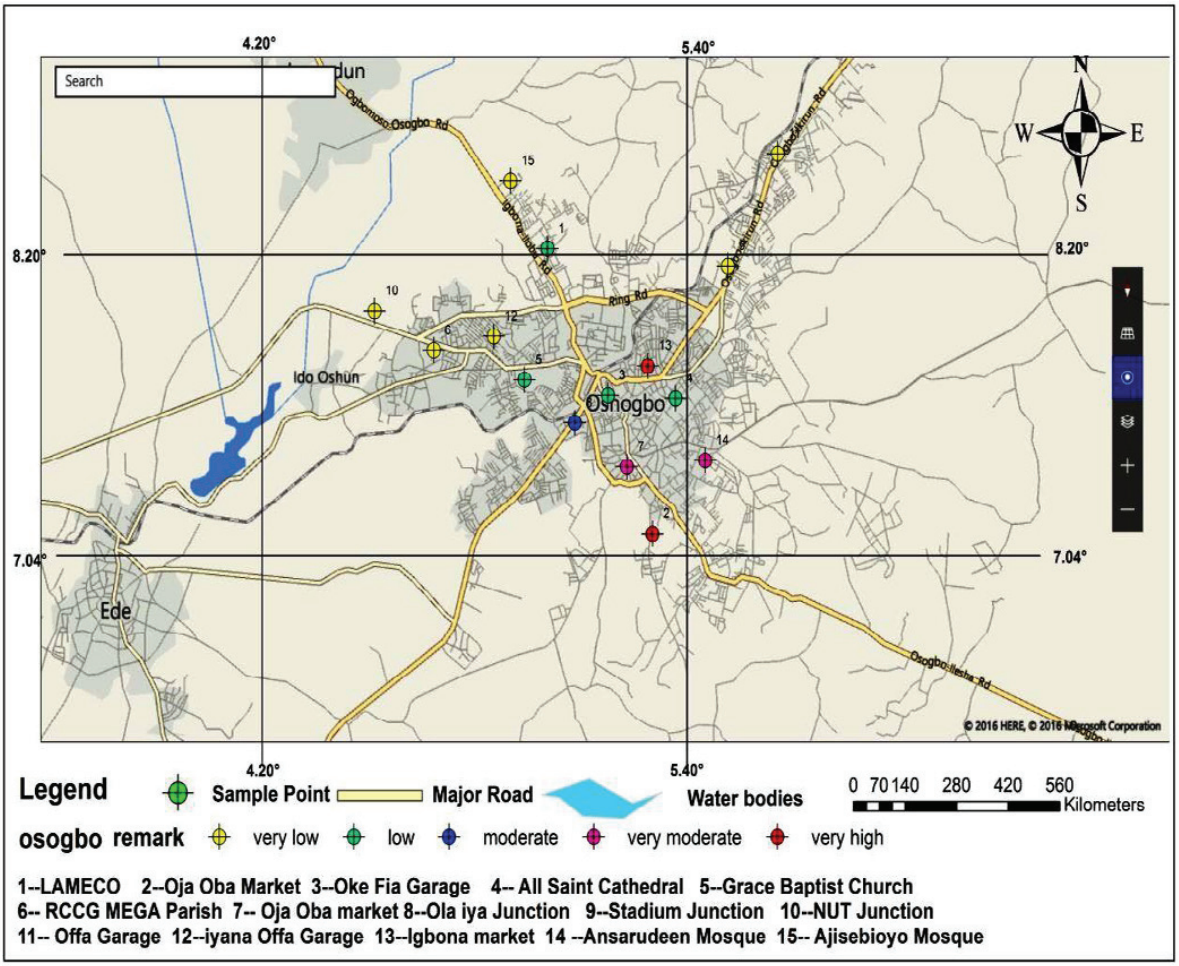

Fig. 4: Intra Urban Locational Distribution of Child Streetism in Osogbo

high incidence of street children in Gbagi - Dugbe Market, Agodi- Gate Market and Bodija (Ibadan), Oja-oba Market, Igbona Market (Osogbo), Oja-oba Market and NEPA Market (Akure) provides good examples.

ii. Religious land use especially, mosques located at the core areas of urban centres usually generates high incidence of street children. The high incidence of street children in Oja-oba Central Mosque, Akure Central Mosque and Oja-oba Mosque respectively in Ibadan, Akure and Osogbo justifies this.

iii. A well-planned area with good quality environmental services, a well-managed and well landscape environment tends to generate low incidence of street children. Bodija Community Mosque in Ibadan, Cathedral Catholic Church, Winners Chapel in Akure and Ajisebiyawo Mosque, RCCG Mega Parish are good examples.

iv. A poorly managed road junction which usually results in traffic congestions, traffic jam, and "go-slow" usually attracts certain categories of street children and thereby generates high incidence of street children. This is evident at Dugbe Junction and Ola-iya Junction respectively in Ibadan and Akure where considerable number of street children were identified

Based on the findings in this study, the following

recommendations are put forward

i. Town planners should ensure proper locational planning in a way that will guide against springing up of indiscriminate location of squatter-informal-sector activities which street children of different categories mingle with. It should also be incumbent on urban planners to ensure proper planning of urban centres to discourage the convergence of street children. Such could be achieved by insisting on proper landscaping of each project environment
ii. Urban Planners should deploy development control measures to ensure that the physical attributes of markets do not encourage hawking around the market. They can also decongest the existing markets, especially in the central areas of the urban centres through the provision of organized markets at planned alternative locations with adequate facilities in place.
iii. Urban authorities should collaborate with urban planners to embark on redevelopment, rehabilitation or spot clearance of central places of the urban centres This is to address the indiscriminately located informal activities which attract street children to the city centres.
iv. Physical planning attention should be directed to the core areas of the urban centres through revitalization approach to decongest or discourage the convergence of street children in this part of the urban centres.
v. Urban authorities in conjunction with transportation planners and engineers should review the designs of the road intersections to address the narrowness of the intersecting roads. Also, road-side hawking and trading and all forms of commercial activities should be prohibited at the intersections.
vi. In addition to iv above, Town planning control mechanism should be used to control developments around the intersections to address indiscriminate informal activities at the road intersections.
vii. The extant planning and environmental laws on streetism should evaluated and reviewed, where necessary. The laws should also be properly implemented to discourage the child streetism in the urban centres
viii. Lastly, the government should enforce labour regulations for children street vendors and support. This should be complimented with free and compulsory basic education as it would be very difficult for any policy on street children to be effective without first making education compulsory

CONCLUSION

In recognition of the growing awareness among spatial analysts that understanding the spatial context of social issues is key to understanding how the problem can be controlled and prevented, the study examined the incidence, inter and intra-urban variations of child streetism in South-western, Nigeria. The study compared the incidence of child streetism across the three cities as well as among different locations within the cities. Inter urban analysis of child streetism revealed that the degree of severity varies significantly across the cities while the intra-urban analysis showed significant variations of the phenomenon across different locations. These variations were adduced to the influence of urbanisation and locational attributes. Consequently, the findings can be articulated towards spatially oriented analysis, assessment, control and management of child streetism in Nigerian urban centres. The study, therefore, places conscientious emphasis on the centrality of space in studying child streetism and consequently serves as the key to the formulation and evaluation of physical planning initiatives in combating the menace of street children. From the foregoing, the study recommended a number of physical planning measures to control the menace of child streetism. However, it must be noted that the workability of any of these recommendations cannot evaluated in isolation of other non-physical planning measures. While it could be stated that the recommendations mentioned in this study are by no means, exhaustive, it is highly suggested that they can go a long way in addressing the problem of street children in Nigerian urban centres.

AUTHORS CONTRIBUTION

D.V. Ogunkan collected, analysed and interpreted the data, prepared the Tables and Figures, prepared the final manuscript. A.T. Deboboyejo performed the

literature review, made additional Tables and edited the manuscript.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely addressed by the authors.

ABBREVIATION

RISC	Relative Incidence of Street Children
HCA	Hierarchical Cluster Analysis
SWGPZ	South West Geo-political Zone
DDA	Data Delineated Area

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ORIGINAL RESEARCH PAPER

The impact of business intelligence on enablers of EFQM excellence model with mediating role of knowledge sharing

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ABSTRACT

BACKGROUND AND OBJECTIVES: The European Foundation for Quality Management excellence model includes a framework for evaluating the improvement of organizations that excellence organizations must achieve them. Also, business intelligence as a management philosophy and tool helps organization to achieve enduring advantage and organization excellence. Therefore, the purpose of the present study is to investigating the impact of business intelligence on enablers of excellence model with using the mediating role of knowledge sharing.

METHODS: According to purpose, the research method is applied and based on data collection is descriptive-survey. The statistical population of this study includes employees of Marvdasht Banks at the Fars province in Iran that 127 respondents were selected based on group sampling. Research data were collected using standard questionnaires (enablers of excellence model questionnaire, Popovic questionnaire for business intelligence and Wang questionnaire for Knowledge sharing) and analyzed through structural equation modeling by Smart-PLS.

FINDINGS: Results showed that business intelligence has a positive and significant direct and indirect effect on enablers of excellence model. The direct effect of business intelligence on enablers of excellence model is equal to 0.482. The indirect effect of business intelligence on enablers of excellence model with the mediating role of Knowledge sharing is equal to 0.780. Also, the indirect effect of knowledge sharing on enablers of excellence model is equal to 0.410. The indirect effect of business intelligence on Knowledge sharing is equal to 0.726.

CONCLUSION: Considering the research community, it can be said that in order to increase organizational excellence, bank managers should pay special attention to the variables of business intelligence and knowledge sharing and take action towards business intelligence by integrating data, increasing analytical capacity, increasing information quality, access quality of information and analytical decision-making. With these proceedings, not only affect knowledge sharing in the organization, but also increase organizational excellence.

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48	4	6

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INTRODUCTION

The rapid pace of economic, social, and technological developments at both national and international levels has led to instability in organizations, and in addition to the inability of organizations to cope with these developments, has put many large global organizations at risk of being destroyed. In this context, the most important management challenge in organizations today is to move towards improvement and excellence (Haidari *et al.*, 2018). Over the last few decades, Business Excellence Models (BEMs) have appeared as very important management frameworks aimed at determining management practices and results, and leading organizations in improving performance (Dahlgaard *et al*., 2013; Escrig and de-Menezes, 2015; Mohammad *et al.*, 2011). BEMs involves the development and use of plenty tools and processes in industries such as Total Quality Management (TQM) and EFQM Excellence model (EFQM) (Zhang *et al.*, 2019). In essence, EFQM Excellence Model has been creating by European Foundation for Quality Management. This model is a non-normative management framework that is widely used by over 30,000 public and private sector organizations in the world (Para-Gonzalez *et al.*, 2018). The EFQM Excellence Model is a holistic recognizing tool for retaining excellence (Liu and Ko, 2018). The EFQM Excellence Model is flexible in nature and can be used to large and small organizations, in the public and private segments, also to industrial and service companies (EFQM, 2003, 2010, 2013). Therefore, in order to have the opportunity of excellence of the organization, business managers must be able to develop, change or change the organization's resources (Safari *et al.*, 2019). In fact, information is an important element of strategic resources and marketing tools (Nazarpoori *et al.*, 2016), and Business Intelligence (BI) is about utilizing information to make strategic decisions (Jayakrishnan *et al.*, 2018). Enterprises have been investing in technology in an effort to manage the information and to glean knowledge that can be leveraged for an organizational excellence. These technologies are Business Intelligence (BI) and Knowledge Sharing (KM) (Cody *et al.*, 2002). Every day, with the use of innovative technologies, huge amount of data is generated exponentially from big data sources. Data collected from separate sources lead to the emergence of a variety of structured, semi-structured and unstructured data. Analysis and predictions of this huge amount of data is typically difficult and requires unpredictable period for decision making to the business executives (Reddy *et al.*, 2019). Today, strategic decision making is a challenge that engages many organizations in a dynamic business environment (Richards *et al.*, 2019). Economic organizations are exposed to external forces and must live in an internationally competitive environment, responding appropriately to the increasing complexity of competitors, customers and suppliers, and the globalization of businesses; perhaps the most critical requirement for the success of modern companies is their ability to use all the information available (Safarzade *et al.*, 2009). BI include a way to taking numerous information and showing an effective set of reports that pave information into the premise of business activities, empowering managers to stand on decisive business choices (Reddy *et al.*, 2019). BI include analyzing the vast amounts of data that companies cause and/or purchase in the course of business as a means of improving profitability and competitiveness (Williams, 2016). The main purpose of BI is to enable interactive access to data (and models), to enable manipulation of data and to provide managers, analysts, and professionals with the ability to perform appropriate analysis for their needs. BI analyze past and present data and converts it into valuable information (and knowledge), leading to more informed and better decision making (Sharda *et al.*, 2013). BI and Knowledge Sharing (KS) have some degree of similarity in their objectives. The main purpose of both concepts is to develop environments that can support knowledge workers in decision-making processes and complex problem-solving activities (Rud, 2009). Knowledge and related practices, including knowledge management and sharing, play an important role in empowering the organization, and the proper use of knowledge resources is considered a sustainable competitive advantage (Shakki *et al.*, 2018). Since, the application of organizational excellence models has a decisive role in improving the performance of organizations (Hosseini Ezzabadi *et al.*, 2015; Kafetzopoulos *et al.*, 2019; Para-Gonzalez *et al.*, 2018) but, most Iranian organizations have not yet fully succeeded in implementing the overall dimensions of the EFQM excellence model, despite drawing structured and methodical

models in the EFQM excellence model. While its implementation leads to improved organizational performance. One of these organizations is the bank that improving the performance of banks in the community can have positive effects on the lives of people. It should be said that one of the ways to better implement this model is to study the factors affecting it so that by strengthening them, the model of excellence can be better implemented. Therefore, the present study seeks to investigate the impact of business intelligence on the enablers of the EFQM excellence model with respect to the mediating role of knowledge sharing. The innovation of the present study is the simultaneous use of these three variables and the study of the research question entitled "Does business intelligence have a significant effect on the enablers of the EFQM excellence model in the banks of Marvdasht city due to the mediating role of knowledge sharing?"

Literature Review

Business intelligence

For the first time, BI was described by Dresner (1989) of the Gartner Group in 1989 as a set of concepts and methods that improve decision-making using computer support systems. BI is an umbrella term that integrates architectures, tools, databases, analytical tools, applications, and methodologies. The process of BI is based on the transformation of data to information, then to decisions, and finally to actions (Turban *et al.*, 2018). The term BI can refer to various computerized methods and processes of converting data into information and then into knowledge and insight (Lonnqvist and Pirttimali, 2006), which is ultimately used to enhance the quality of organizational decision making (Williams and Williams, 2010). According to Reddy *et al.* (2019), BI is the most innovative approach for tracking information and introducing significant data to help corporate executives, business supervisors and various customers that guide them about business choices. Madsen (2012) explains BI as "the integration a set of data related to different systems and resources to optimize business application and comprehension through a user-friendly interface". To answer this question, "Do the company need BI?" Madsen (2012) illustrates, if the company uses data to decision making then the answer is yes. If the company plan is to hire a team of knowledge analysts then the answer is no, because the BI is intended to provide information to a broad audience. The degree to which the company have to invest and create itself BI program is what should modify (Madsen, 2012). BI has four major components: 1- A data warehouse and data source; 2- Business analytics, a collection of tools for manipulating, mining, and analyzing the data in the data source; 3- Business Performance Management (BPM) for analyzing performance; and 4- A client interface (e.g., a dashboard) (Sharda *et al.*, 2017). Also, Popovic *et al.*, (2012) Provide 31 manifest variables and 6 latent constructs for measuring BI, including: 1- Data integration; 2- Analytical capability; 3- Information content quality; 4- Information link quality; 5- Use of information in business analysis; and, 6- Analytical decision-making culture. Rud (2009) identifies four components for the cycle of BI analysis that include: 1- Analysis: in the analysis component, the problem must be identified and expressed accurately. Decision makers then identify critical factors that are related to the perceived components in order to create a mental representation of the phenomenon under analysis; 2- Insight: this component will enable decision makers to understand issues better and more deeply. 3- Decision: in the third component, the knowledge acquired in the second component is transformed into decision making and subsequently into practical action. The availability of BI methods makes it possible for analysis and insight components to be implemented more quickly in order to make more effective decisions that are appropriate to an organization's strategic priorities. 4- Evaluation: the fourth component in the BI cycle is performance measurement and evaluation. In this component, several criteria are designed that are not limited to the financial aspects but also, define key performance indicators for different parts of the organization.

EFQM excellence model

The EFQM excellence model includes a comprehensive and integrated approach through which strategic, managerial, and operational control processes are implemented (Kafetzopoulos *et al.*, 2019). This model was proposed in 1988 by 14 major European companies. Their goal is to make European companies aware from that excellence is essential to the process of continuous improvement to help European companies become more competitive in

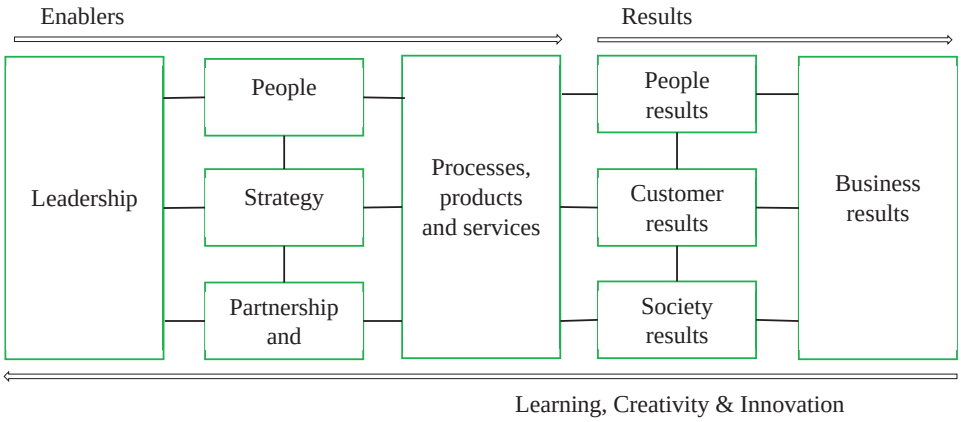

Fig. 1: EFQM excellence Model. Source: EFQM (2013)

global markets (Para-Gonzalez *et al.*, 2018). Excellent organizations show a high level of performance and move in the direction of meeting the expectations of all their stakeholders which is achieved through three sets of integrated components (EFQM, 2012):

1- The fundamental concepts of excellence: To achieve sustainable excellence in any organization, eight fundamental concepts of excellence are described. These concepts can be used as a basis for describing the characteristics of an organizational culture in order to create a common language for senior management (EFQM, 2012). The fundamental concepts of excellence include: results orientation; customer orientation; leadership and consistency; management by processes; development and involvement of people; development of alliances; continuous process of innovation, learning and improvement and organizational responsibility (Calvo-Mora *et al.*, 2015).

2- The criteria: According to Fig. 1, EFQM Excellence model based on nine criteria is expressed in two sections. Enablers include Leadership, Strategy, People, Alliances and Resources, Processes, Products and Services. Results include Customer results, People results, Society results, and Key performance results. Enabler criteria show how things are done in the organization, the results criteria indicate the achievement of output from the implementation of empowerment criteria (Para-Gonzalez *et al.*, 2018). Enablers shows how the organization works, while the results show the achievements of stakeholders so that they can be measured targeted (Zhang *et al.*, 2019).

3- The radar logic: This logic is a kind of structural scheme for self-assessment based on EFQM model. Elements of this approach include deployment, assessment, and refinement, which provide evidence of how the organization operates (Calvo-Mora *et al.*, 2018). Suarez *et al.*, (2017) describe the EFQM excellence model as a non-deterministic framework that analyzes the relationships between what an organization does (Enabler criteria) and its results that it can achieve. As clients, employees, society and other key results assuming that there are different approaches to reaching excellence. The EFQM excellence model is a descriptive and extensible model that describes the quality of implementation and how to manage organizational processes in most areas, without prioritizing actions and determining any superiority in their implementation (Safari *et al.*, 2015). This model is designed to help organizations for change and realize continuous improvement using total quality concepts and enables managers to increase the effectiveness of their leadership and decision-making capabilities and to maximize organization beneficiaries' satisfaction, identify positions for their actions. In other words, the EFQM excellence model assists organizations in understanding their current status as well as applying continuous improvement flow modeling and guidance through evaluation based on the model's nine criteria and based on eight fundamental concepts (Safari *et al.*, 2019).

Knowledge sharing

A community is formed when a group of people

come together with the same concepts, goals, or similar interests. However, the generality and success of such a society depends on whether there are positive and ongoing interactions between members. Interactive content usually includes personal information, experience, and recombinant knowledge. Hence, the key to the success and popularity of communities in the Knowledge Sharing (KS) lies with members of the community (Chen and Kuo, 2017). KS refers to the process of transfer, communication, interaction and coordination of knowledge or expertise and helps to improve productivity, absorption capacity, innovation and maintain the competitive advantage of the organization (Liao *et al.*, 2007; Wang *et al.*, 2014). KS is described as the exchange or dissemination of explicit or tacit data, ideas, experiences, or technology between employees (Al-Kurdi *et al.*, 2018). The process of explicit knowledge sharing involves the sharing of codified knowledge that can be created and transmitted in an organization. This type of knowledge can be found in documents and reports, procedures and policies, or handbooks and databases. On the other hand, tacit knowledge includes knowledge that is in people's minds but is difficult to express symbolically or in writing form. This knowledge is related to experience and expertise, understanding, insight, intuition and "more than can be said" (Wang *et al.*, 2016). Creating a knowledge-sharing context is critical to improving the performance and accomplishing the organization's goals (Sabzi *et al.*, 2019). KS in organizations improves the process of individual learning, develops creativity and thus increases individual performance. On the other hand, if institutionalization of the process of the KS doesn't occur in the organization, the organization will gradually lose its competitive advantage (Samiei and Salavati, 2015). Therefore, KS is critical issue to the success and excellence of an organization and is a sustainable competitive advantage for organizations. According to the theoretical foundations of research, business intelligence emphasizes the use of information, and since organizations need information to obtaining and sharing knowledge that can be used for organizational excellence, so business intelligence can affect organizational excellence by creating and sharing knowledge. Based on the literature and the theoretical foundations of the research, the conceptual model is plotted in Fig. 2.

In the above conceptual model, business intelligence as an independent variable, enablers of EFQM excellence model as a dependent variable and knowledge sharing as a mediating variable, and according to the conceptual model, research hypotheses were formulated as follows:

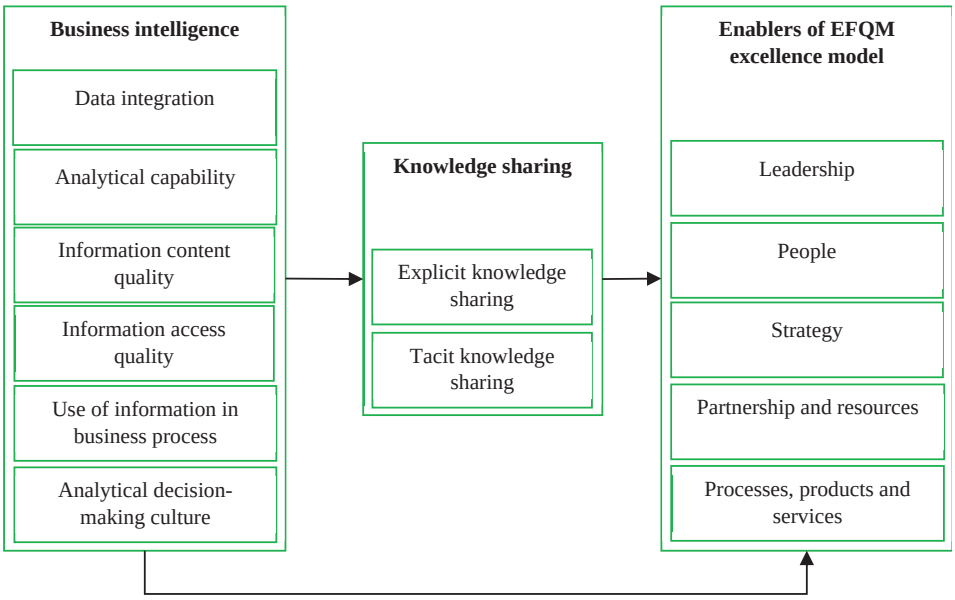

Fig. 2: Conceptual model of research

H1: BI has a significant impact on KS.

H2: BI has a significant impact on enablers of EFQM excellence model.

H3: KS has a significant impact on enablers of EFQM excellence model.

H4: BI has a significant impact on enablers of EFQM excellence model due to the mediating role of KS.

Today, many organizations want to establish a cycle of continuous improvement, achieve organizational excellence and enhance customer satisfaction. The banking system, as one of the service organizations, needs to provide quality services to its customers, and business intelligence can help in providing efficient services and along with it, creating a transcendent organization. In this way, the role of knowledge sharing cannot be overlooked. The current study has been carried out in Marvdasht city of Fars province in February 2020.

MATERIALS AND METHODS

The purpose of the present study is investigating the impact of BI on enablers of EFQM excellence model considering the mediating role of KS. According to this purpose, the research method based on purpose is applied and it is a descriptive research based on data collection. The present study is also based on the relationship between research variables is correlation method and specifically based on structural equation modeling using Smart-PLS software. Smart-PLS software was used to complete the data analysis and estimation for present study. This software is useful for low volume data and in this software, there is no need for data to be normal. The statistical population of this study includes the employees of the banks of Marvdasht city of Fars province in Iran. Krejcie and Morgan (1970) table were used to obtain the number of samples and 127 people were selected as group sampling and 127 questionnaires were distributed among the respondents. 110 questionnaires were returned. Out of 110, 10 responses were incomplete, and, hence, were discarded from further analysis. Making a final sample size of 100 with a response rate of 79%. The sample included 71% married bankers and 67% were male and the rest were female. All of the respondents were Muslim. The main tool for data collection is the standard questionnaire. For this purpose, have been used standard questionnaires that repeatedly used and verified by various researchers. Standard questionnaire that developed by European Foundation of Quality Management was used to measure the enablers of EFQM excellence model. Components of this questionnaire included: leadership, people, strategy, Partnership and resources and Processes, products and services. Popovic *et al.,* (2012) standard questionnaire was used to measure BI variable. Components of this questionnaire include: data integration, analytical capability, quality in information content, quality in information access, Application of information in the business process and analytical decision-making culture. Finally, Wang *et al.,* (2014) standard questionnaire was used to measure KS variable. Components of this questionnaire include: explicit KS and tacit KS.

RESULTS AND DISCUSSION

In the present study, structural equation modeling has been used to analyze the research data. For this purpose, Hulland's (1999) two-step method has been used: 1- measurement model; 2- structural model.

Measurement model

In this section, reliability and validity tests were performed to ensure the effectiveness of the model and the validity of hypotheses testing. Cronbach's alpha and composite reliability values are used to measure the reliability of the survey tool. According to George and Mallery (2016), the construct reliability is approved when the Cronbach's alpha and composite reliability are above 0.7. Table 1 shows the Cronbach's alpha and composite reliability amounts.

Structural validity should also be considered. For this purpose, convergent validity and discriminant validity are used. The AVE index is used to evaluation convergent validity and Fornell and Larcker's (1981) test is used to evaluation divergent validity. According to Fornell and Larcker (1981), convergent validity is confirmed when AVE amount for all variables is greater than 0.5. Table 2 shows the AVE amount. As Table 1 shows, AVE index for all dimensions is convenient.

Discriminant validity was tested following Fornell and Larcker (1981) who suggested that discriminant validity is achieved if the square root of the AVE is greater than all the correlations in the same row and column of the particular construct. As shown in Table 3, discriminant validity of constructs was achieved.

Table 1: Cronbach's alpha and composite reliability values

Dimensions	Cronbach's alpha	Compound reliability
Business intelligence	0.938	0.944
EFQM excellence model	0.943	0.949
Knowledge sharing	0.912	0.925

Table 2: AVE index

Dimensions	average variance extracted
Business intelligence	0.609
EFQM excellence model	0.659
Knowledge sharing	0.690

Table 3: Discriminant validity test (Fornell and Larker, 1981)

Dimensions	Business intelligence	EFQM excellence model	Knowledge sharing
Business intelligence	0.781		
EFQM excellence model	0.780	0.812	
Knowledge sharing	0.725	0.760	0.831

Table 4: CV-Redundancy and CV-Communality indexes

Dimensions	CV-Red	CV-Com
Business intelligence	0.361	0.361
EFQM excellence model	0.297	0.432
Knowledge sharing	0.239	0.459

Finally, cross-validated should be considered. For this purpose, it should be used from Cross Validated Redundancy (CV-Red) and Cross Validated Communality (CV-Com) indexes. The communality index measures the quality of the measurement model for each block and the redundancy index measures the quality of the structural model for each endogenous block (Tenenhaus *et al.*, 2005). CV-Red and CV-Com have to be positive to confirm structural validity. Table 4 shows that CV-Red and CV-Com is achieved.

Structural model

The structural model is a model in which the relationship between the independent and dependent variables is considered. In fact, this section involves evaluating research hypotheses. Fig. 3 shows the evaluation of the conceptual model. Also, Fig. 4 shows the t statistics values.

The criteria considered in the structural model are:

1- R-squared (R^2) criteria: This criterion indicates the extent of the impact of one or more independent variables on a dependent variable and the values of 0.25, 0.50, and 0.75 are considered as standard values for detecting weak, medium, and strong values (Hair et al., 2011). Table 5 shows that R^2 criteria for EFQM excellence model and KS are 0.688 and 0.527. R^2 amount for EFQM excellence model indicates that more than 68% can be measured by BI and KS. Also, table 5 shows that R^2 amount for knowledge management is 0.527 which is more than 52% predictable by BI.

2- Q-squared (Q^2) criteria: Another assessment of the structural model involves the model's capability to predict. The predominant measure of predictive relevance is the Stone–Geisser's Q^2, which postulates that the model must be able to adequately predict each endogenous latent construct's indicators (Hair *et al.*, 2011). Q^2 Criterion specifies the predictive power of the structural model in the dependent variables. Values of 0.02, 0.15, and 0.35 are defined

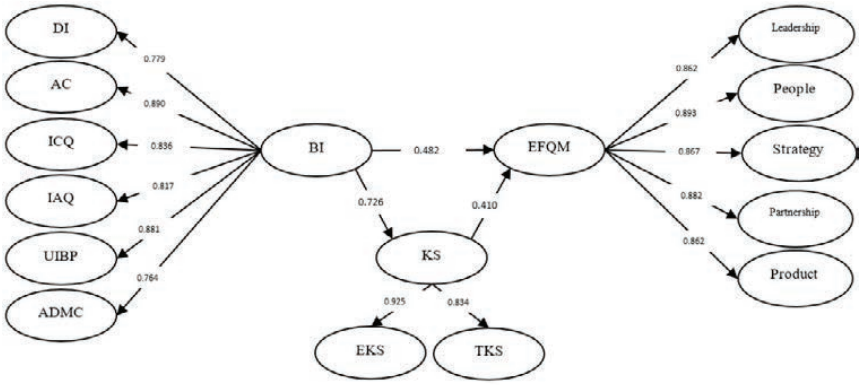

Fig. 3: Evaluation of the conceptual model

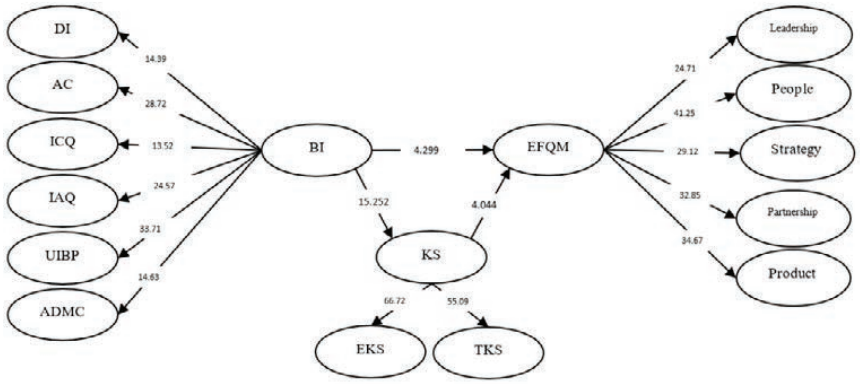

Fig. 4: t statistics values

as low, medium, and strong predictive power. Table 5 shows that dimensions have strong predictive power.

3- F-squared (F^2) criteria: F^2 criterion defines the severity of the relationship between the dimensions. Whatever this criterion is higher indicates the higher the severity of the relationship. The values of 0.02, 0.15, and 0.35 indicate the measurement of the weak, medium, and strong influence of an independent variable on a dependent variable (Mousavi Jarrahi and Azizie, 2019). Table 5 shows that the impact of BI on KS is very weak, but the other two relationships have a higher-than-average impact.

4- Goodness of Fit (GoF) criteria: To evaluate the overall fit of the model, GoF criterion is used (Tenenhaus *et al.*, 2004). GoF equation is shown in eq. 1.

$$GoF = \sqrt{\overline{communality} \times \overline{r^2}} \quad (1)$$

Amounts of 0.01, 0.25 and 0.35 are considered as weak, medium and strong indicators for this criterion (Tenenhaus *et al.*, 2004). According to table 5, amount of GoF is 0.411 and shows that the model fit is strong.

5- Path coefficients and t statistics: In this section, research hypotheses are reviewed. Critical t-Values for a Two-Tailed test are 1.65 (significance level = 10 percent), 1.96 (significance level = 5 percent), and 2.58 (significance level = 1 percent) (Hair *et al.*, 2011). Table 6 shows the analysis of research hypotheses.

According to Table 6, the t-value amount for all the hypotheses is higher than 1.96 and therefore the hypotheses are significant. The result of first hypothesis about the relationship between BI and KS are fully consistent with previous studies (Shokry and Ghazizadeh, 2020; Moscoso-Zea *et al.*, 2019). Since one of the most important bases for KS and transferring in organizations is information and knowledge that

Table 5: Fit criteria for structural model

Dimensions and path	R-square	Q-square	F-square	Goodness of Fit
Business intelligence	-	0.361		
EFQM excellence model	0.688	0.432		
Knowledge sharing	0.527	0.459		0.411
Business intelligence > EFQM excellence	-	-	0.256	
Business intelligence > Knowledge sharing	-	-	0.004	
Knowledge sharing > EFQM excellence	-	-	0.353	

Table 6: The analysis of research hypotheses

Impact	Direct effect	Indirect effect	Total effect	t-value	Condition
Business intelligence > knowledge sharing	0.726	-	0.726	15.25	Accepted
Business intelligence > EFQM excellence model	0.482	-	0.482	4.29	Accepted
Knowledge sharing > EFQM excellence model	0.410	-	0.410	4.04	Accepted
Business intelligence > knowledge sharing > EFQM excellence model	0.482	0.298	0.780	14.64	Accepted

flows in the organization, so this information must be have high quality content in order to be a competitive advantage for organization. Also, the quality of the knowledge and information transfer network in the organization, the integration of information and knowledge, and the quality of communication between members of the organization are important issues of KS in the organization that is the focus of BI. Therefore, with emphasizing this importance, the first hypothesis shows that BI has a very strong impact on KS, and by creating appropriate information platforms in the organization, it helps to develop more KS among the members of the organization. Regarding the second hypothesis, can be say, in most cases, BI has been conceptualized as the term in information technology. This concept not only encompasses information technology capabilities, but also affects the leadership abilities and capabilities of employees. On the other hand, BI has a great impact on such things as the vision and strategy of the organization and the production processes of the organization, which to a large extent affect organizational excellence. Hence, the second hypothesis of the research is taken into consideration and the result of the analysis of the second hypothesis of the research shows that BI has a significant impact on the enablers of EFQM excellence model. The result of this study about the relationship between each two variables are fully consistent with previous studies (Taghvaeeyazdi and Niaz Azari, 2020). Regarding the third hypothesis, the result of this study about the relationship between KS and the enablers of EFQM excellence model are fully consistent with previous studies (Criado-García *et al*., 2019; Heidari *et al*., 2018; Amirkabiri and Sadeghi, 2015). Typically, Leaders will determine business direction based on influences and/or direct knowledge about customer's needs, product trends, technology advances, competitor's pressures, shareholders objectives, financial performance and market share being the prime drivers. Knowledge, therefore, has a decisive role in the decision making of leaders and consequently affects organizational excellence. Sharing of knowledge assets will lead to quicker and smarter customer solutions. Thus, organizations dedicated to the enablers of EFQM excellence model can increase knowledge capabilities that may make a difference. Hence, KS can play a decisive role in building knowledge capabilities and consequently organizational excellence. The EFQM Excellence Model helps organizations take effective steps in all aspects to improve efficiency and effectiveness, thereby providing customer and stakeholder satisfaction. Also, organizations that prioritize BI provide employees with the opportunity to learn and be creative by engaging employees and engaging them in the workplace, ensuring long-term success. KS is like a bridge that links employee learning and creativity to efficiency, effectiveness, and ultimately customer satisfaction. According to the results of data analysis, paying attention to business intelligence can be effective in increasing organizational excellence. This effect can be both

direct and indirect and mediated by other variables. In this study, the effect of the mediating variable of knowledge sharing was investigated. Considering the research community, which is a bank, it can be said that in order to increase organizational excellence, bank managers should pay special attention to the variables of business intelligence and knowledge sharing and take action towards business intelligence by integrating data, increasing analytical capacity, increasing information quality, access quality of information and analytical decision-making. With these proceedings, not only affect knowledge sharing in the organization, but also increase organizational excellence. Also, strengthen organizational excellence by strengthening knowledge sharing among employees.

CONCLUSION

The purpose of this study was to investigate the impact of BI on enablers of EFQM excellence model that for this relationship was used KS mediator variable. In relation to the evaluation of the first hypothesis, analysis results showed that BI has a positive and significant effect on KS. The value of this relationship was 0.726. The results of the second hypothesis showed that the impact of BI on enablers of organizational excellence model is moderate. The value of this relationship was 0.482. In the third research hypothesis, the effect of KS on the enablers of EFQM excellence model was investigated. The results of the analysis of this hypothesis showed that KS has a significant effect on the enablers of EFQM excellence model and this effect was almost average. The value of this relationship was 0.410. In the fourth hypothesis of the research was investigated to the impact of BI on the enablers of EFQM excellence model with regard to the mediating role of KS. The results of the fourth hypothesis showed that BI due to the mediating role of KS has a very strong impact on enablers of EFQM excellence model. The value of this relationship was 0.780. Also, the reliability and validity values of the measuring instruments and, on the other hand, the model fit indices were within the acceptable range.

Suggestions

Based on what has been achieved:

1- To promote organizational excellence, use information technology prioritize for banks to improve the quality of information and communication networks.

2- To avoid confusing employees and members of the organization, it is suggested to collect organizational data into central database and use functional dashboards.

3- It is suggested to reduce the uncertainty in decision making and improve the operational efficiency of employees, use information analysis processes such as trend analysis and scenario. Also, recommended for researchers to examine other variables as mediating variables in the relationship between business intelligence and enablers of organizational excellence model.

Limitations

The use of a deductive reasoning approach was limitation of the study, because it is always unlikely for the researchers' sake to be value-free, neutral, and objective. Individuals experience the world through their own perception and lens. The use of cross-sectional data limits the causal inference of the result. A longitudinal survey might prevent the result from the problem of causality. One way to overcome this issue is to split the measures of variables by time. The small sample size (n = 100) shows another constraint on the findings. A larger sample size is useful for the further investigation.

AUTHOR CONTRIBUTIONS

F. Ahang has reviewed the research literature, prepared the required resources and edited them. A. Hosseini has referred to the banks and collected the required data. H. Ghaffari performed the methodology and analyzed and prepared the data. A. Keshtegar and M. Ghasemi helped in the literature review and manuscript preparation.

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CONFLICT OF INTERESTS

The authors declare that there is not any conflict of

interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy has been completely observed by the authors.

ABBREVIATION

AVE	Average Variance Extracted
BI	Business Intelligence
CV-Com	Cross Validated Communality
CV-Red	Cross Validated Redundancy
EFQM	The European Foundation for Quality Management
GoF	Goodness of Fit
KS	Knowledge Sharing

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ORIGINAL RESEARCH PAPER

Labile metal evaluation, speciation and accumulation in harvested plant from urban major dumpsites

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ABSTRACT

BACKGROUND AND OBJECTIVES: Disinterred manures from dumpsites in the cities are believed to be readily available source for soil nutrient for backyard farming. Health hazards posed on human due to labile metals contaminants are not considered or evaluated before consumption. Three major municipal dumpsites from Okitipupa (Waste Management (OKA), Igodan(OKB), and Okitipupa Oil Mill Road (OKC)) were analyzed for the concentrations, forms of labile metals in the soil and also concentration in green vegetables from the sites. The objectives of the research were to investigate the labile metal concentration, forms of the labile metals in the soil and their accumulation in plants from these major urban dumpsites.

METHODS: Dried and digestedSoil and vegetable samples from the sites were analyzed for total concentration of labile metals and their forms through speciation in the soil were equally quantified. Concentrations from sample solutions were determined by Atomic Absorption Spectrophotometer.

FINDINGS: Labile metals concentrations from the soilof Waste Management Dumpsite (OKA), IgodanDumpsite (OKB) and Okitipupa Oil Mill Road Dumpsite (OKC) indicated that Cadmium (Cd) values range from87.453mg/kg-106.500mg/kg). Copper (Cu) in the three samples ranged between 3.100-5.510mg/kg, which are significantly low and beyond the toxicity level as well as cobalt (Co). Chromium (Cr) was higher in OKA (22.980mg/kg) and OKC (10.560mg/kg) and least in OKB (2.900mg/kg).Iron was the most abundant ranging from 3690.000-6780.000mg/kg, followed by zinc ranging from385.000-2880.000mg/kg. Speciation of the labile metal indicate that the metal exist mostly in the inert fraction and easily absorbed by plant.

CONCLUSION: The concentrations of the most labile metals in soil samples were high and majorly exist in inert fraction after speciation. Also, the concentrations in the plants were almost half of the concentration in the soil which indicated that they are not desirable for human consumption due to their toxicity level.

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INTRODUCTION

Labile metals constitutes a major category of pollutants in land because in large enough doses it can

Prove lethal to organisms including humans. These metals can be released into the terrestrial system by both natural and anthropogenic sources and during the course of their transportation can be distributed in water bodies, suspended sediment and bed sediment. Labile metals occur in an unusual or abnormal concentration in terrestrial system as a result of pollution from domestic wastes, mining process and other industrial activities (Olajire and Imeokparia, 2000; Adefemi and Awokunmi, 2010). These metals can be transported by particulate matters to the atmosphere. There is very large set of health consequences from exposure to soil contamination depending on pollutant type, pathway off attack and vulnerability of the exposed population, lead is especially hazardous to young children and for whom there is a high risk of developmental damage to the brain, while to all population kidney damage is a risk. Although, many potential contaminants are required in trace amounts by plants for food production but they become hazardous when they occur in excess in the soil (Adefemi and Awokunmi, 2010). Labile metal toxicity can cause several diseases affecting almost all the vital organs and functions (Nwajei *et al*., 2012). Unlike organic pollutants, labile metals do not decay and hence persist in the environment. They have the potential of bioaccumulation and biomagnifications also (Fagbote and Olanipekun, 2010). Soil often forms a repository of these elements because soil particles such as clay and humus have charges that help the metal cations to bind themselves with the soil, and thus prevents their release, though temporarily. The soluble forms of labile metals are more dangerous because they are readily available to plants and animals (Srivastava and Singh, 2012).

Labile Metal Pollution in Vegetables

Swift industrialization and urbanization have contributed to the eminent levels of labile metals in the urban environment. The developing countries such as United States of America, European communities, China and India are most affected as explained by Wong *et al.,* 2003; Tripathi and Singh, 1997; Sharma *et al.,* 2009; Sharma *et al*., 2008, . Labile metals are non-biodegradable and unrelenting ecological contaminants which may be deposited on the top soil and sub soil from dumping waste and then adsorbed into the tissues of the vegetables (Singh and Agarwa, 2010).

Effects of Labile metals on the growth of plants

The effects of labile metals on plants are different in diverse growth stages of plants (Shuiping, 2003). Cd inhibits the photosynthesis and growth of rice in the early stage, then inhibits the reproductive organs' differentiation, and lastly distributes the nutrients transport and mobilization (Wang, 1996), but a stumpy concentration of Hg (10^{-5} mol/L) stimulated the growth of wheat seedlings. The reason for this may be as a result of low concentrations of Hg which increased the activities of amylase, proteinase and lipase and speed up the decomposition of endosperm and the respiration rate, so that the germination was more rapid (Ma and Hong, 1998). Cd and Pb are labile metals which are non-essential elements for plants development (Xu and Shi, 2000). The germinating ratio of barley was lower than 45 % and the growth of roots were dormant under 10 -2 mol/L Cd application (Shuiping, 2003).The seedlings of bean turned brown and died under Cd stress (Mo and Li, 1992). The target organs by Cd pollution were the roots. That the root growth of crops such as wheat (Shuiping, 2003; Hong *et al.,* 1991), maize, pumpkin (Liu and Cui, 1991), cucumber (Chen, 1990), and garlic *(Allium sativum L*) (Liu *et al.,* 2000) were inhibited.

Effects on absorption of nutrients

The hydroponical experiment of oat revealed that the absorption aptitude of K and Mg declined in suspended cultivated cells, and the absorption of Ca, Fe and Zn increased by Cd pollution. Conversely, absorption of Zn reduced in higher concentrations of Cd solution (Xu and Yang, 1995). Wang (1990) also reported that Cd drastically inhibited maize seedlings from absorbing N, P and Zn and enhanced the absorption of Ca. Cd also affected the absorption of Mn and Zn by roots of B. chinensis seedlings (Qin *et al.,* 1994), inhibited the absorption of Fe, Mn, Cu, Zn, Ca and Mg by rye grass *(Loliumperenne),* maize (*Zea mays*), shamrock (*Trifoliumrepens*) and cabbage (*B. oleracea var. capitata)* and increased the absorption of P (Yang *et al.,* 1998).

Contradictory effect of Labile Metals on Fertilization

Through continuous composting using dumpsite manure, the contents of labile metals in municipal waste did not become declined, but the bioavailable contents for plants were seen to reduce to the concentration in the waste (Shuiping, 2003). Fertilizing the highway greenbelt by the composting of sludge or dumpsite waste showed no more accumulation

of heavy metals in plants (Xue *et al.*, 2000) and bioavailability contents of heavy metals were decreased by comprehensive composting. Generally, there are lower bioavailability contents of labile metals in the composted fertilizer due to more organic carbons with a higher pH (Guo-hang *et al.*, 2018). In bio-solids used as fertilizer, most of the labile metals were combined with organic carbon and carbonate, the mobility was declined and also correlated to pH, elements in the soil and distinctiveness of the organic substances (Shuiping, 2003). Therefore, using plants to remediate the municipal waste solids is possible (Shuiping, 2003).

Water Contamination by Labile Metals

Water contamination by labile metals in some areas is practically unavoidable due to natural process (weathering of rocks) and anthropogenic activities (industrial, agricultural and domestic effluents). These elements, at concentrations exceeding the physiological requirement of the plants, not only could administer toxic effect in them but also could enter food chains, get biomagnified and pose a potentials threat to human health (USEPA, 2000).

The Environmental Risks

Pollution to lakes, river and the ocean by labile metals can be toxic to marine and fresh water organisms; additionally the ford chain can be affected via bioaccumulation. This initial effect to aquatic animals will eventually spread through the ecosystem making its way to the top of the food chain-which is often humans (USEPA, 2000). However, this research aimed at determining the concentration of labile metals from three major dumpsites in Okitipupa town in southern part of Ondo State and the rate of absorption of labile metals in green vegetable harvested after three weeks of planting obtained from these dumpsites. The objectives are to determine the concentration of labile metals in various soil samples collected from the sites, to evaluate the rate of absorption of labile metals in green vegetables harvested from different dumpsites investigated. The current study has been carried out in Okitipupa in Ondo State, Nigeria in year 2019.

MATERIALS AND METHODS

Collection of material

Soil samples were obtained from different dumpsites (Waste Management Dumpsite, Igodan Dumpsite and Okitipupa Oil Mill Road Dumpsite) as indicated in Fig.1 and shown in Figs. 2, 3 and 4 in Okitipupa town,Okitipupa local government area, which is part of Ikale geographical location in Ondo State, Nigeria. Okitipupa had geographical coordinates of $6^{0}30^{1}$ North and $4^{0}48^{1}$ East of the meridian. Okitipupa has an area of 803 meters square and population of 272,030(2011 estimation) in Ondo state, Nigeria. The green vegetable (*Amaranthus hybridus*) seeds were purchased from king's market in Akure town in Ondo state, Nigeria. The samples from the studied sites in

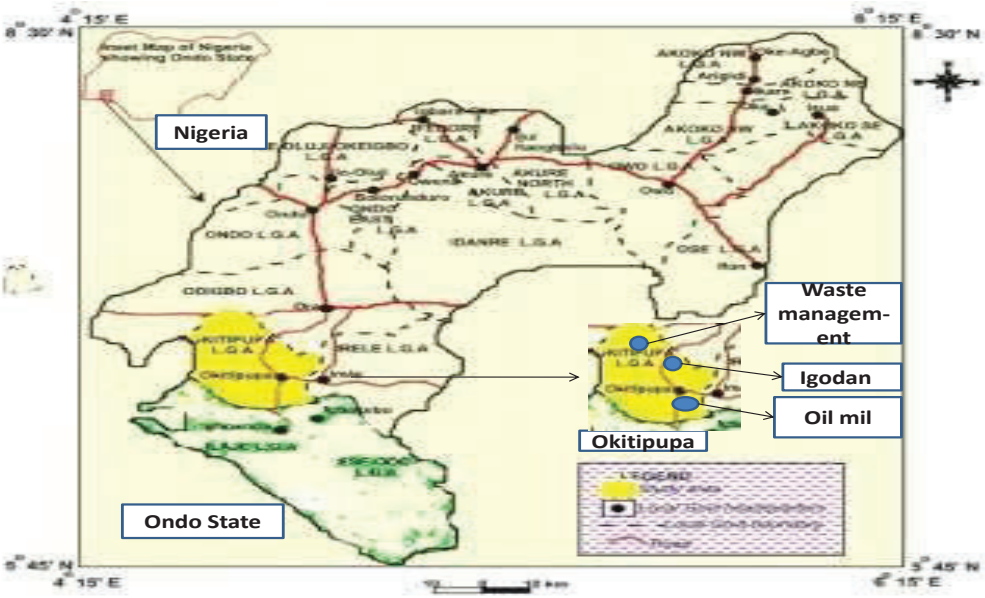

Fig. 1: Location of the sampling area in Okitipupa

Fig. 2: Waste Management dumpsite,

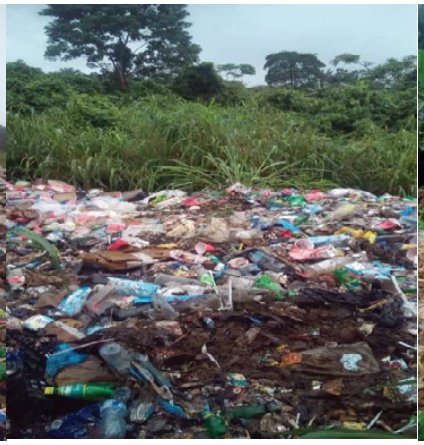

Fig. 3: Igodan road dumpsite,

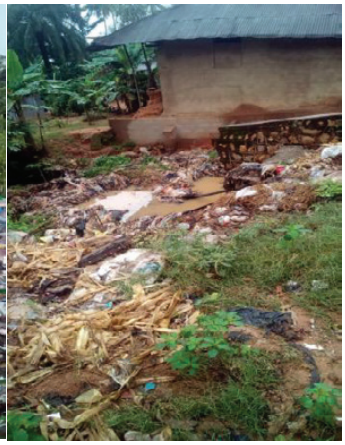

Fig. 4: Oilmill dumpsite

Okitipupa were collected and brought to Analytical research laboratory, Rufus Giwa Polytechnic, Owo and analyzed for the total concentration of Labile metals, forms at which the metals exist and the rate of absorption in green vegetables after three weeks of growth.

Preparation of Soil and Plant Samples

Soil samples were manually dug from different point source by random sampling method in the site and kept inside a clean five litter buckets. Green vegetables were planted at the different point source after minor clearing for easy germination and harvested after three weeks. Both the soil and the vegetable were oven dried at 105^0C in thermosetting oven. The vegetable samples were reduced to fine powder with the aid of a mechanical mince to pass through 40 mesh sieves to increase the surface area for proper analysis. The milled powder samples were collected and stored in glass jars, tightly covered and kept for analysis.

Analytical Methods

AOAC (2000) was followed for proper digestion of dried soil and green vegetable samples for total concentration of labile metals and Sequential extraction of different forms of labile metals in the soil helps in quantifying the fractions or forms of labile metals in different phases as explained by (Tessier *et al.,* (1979) and made up to 100cm^3 mark with distilled water. The absorbance of the sample solutions were read by already standardize Atomic Absorption Spectrophotometer with appropriate lamp for the required metals.

Labile metal speciation- forms of labile metals (fractionation)

The procedure of Tessier *et al.,* (1979) was selected for this study. In this method, labile metals are separated into five operational defined fractions: exchangeable fraction, bound to carbonates, bound to iron and manganese oxide, bound to organic matter and residual fraction. The sequential extraction is as follows:

Step I, Exchangeable fraction: Following Tessier *et al.,* (1979), Samples (2g) were extracted at room temperature for 1hour with 16ml of $MgCl_2$solution (1M $MgCl_2$) at pH 7. Sediment and extraction solution were thoroughly agitated throughout the extraction. This is mainly an adsorption – desorption process. Metals extracted in the exchangeable fraction include weakly adsorbed metals and can be released by ion-exchange process. Changes in the ionic composition of the water would strongly influence the ionic exchange process of metal ions with the major constituents' of the samples like clays, hydrated oxides of iron and manganese. The extracted metals were then decanted from the residual samples for AAS analysis while the residue was used for the next extraction.

Step II- Bound to carbonates: Following Tessier *et al.,* (1979), the metals bound to carbonate phase are affected by ion exchange and changes of pH. The residue of Fraction 1 was extracted with 16ml of 1M sodium acetate/acetic acid buffer at pH 5 for 5 hours at room temperature. Significant amount of trace metals can be co-precipitated with carbonates at the

appropriate pH. The extracted metal solution was decanted from the residual bitumen samples for AAS analysis. The residue was used for the next extraction.

Step III- Bound to iron and manganese oxides: Following Tessier *et al.,* (1979), the residue from fraction 2 was extracted under mild reducing conditions. About 13.9g of hydroxylamine hydrochloride ($NH_2OH.HCl$) was dissolved in500ml of distilled water to prepare 0.4M $NH_2OH.HCl$. The residue was extracted with 20ml of 0.4M $NH_2OH.HCl$ in 25% (v/v) acetic acid with agitation at 96°C in a water bath for 6hours. Iron and manganese oxides which can be present between particles or coatings on particles are excellent substrates with large surface areas for absorbing trace metals. Under reducing conditions, Fe (III) and Mn(IV) could release adsorbed trace metals. The extracted metal solution was decanted from the residual sediment for AAS analysis while the residue was used for the next extraction.

Step IV – Bound to organic matter and sulphide

Following Tessier *et al.,* (1979), the residue from fraction 3 was oxidized as follows: 3ml of 0.02M HNO_3 and 5ml of 30% (v/v) hydrogen peroxide, which has been adjusted to pH2, were added to the residue from fraction 3. The mixture was heated to 85°C in a water bath for 2hours with occasional agitation and allowed to cool down. Another 3ml of 30% hydrogen peroxide, adjusted to pH2 with HNO_3, was then added. The mixture was heated again at 85°C for 3hrs with occasional agitation and allowed to cool down. Then 5ml of 3.2M ammonium acetate in 20% (v/v) HNO_3 was added, followed by dilution to a final volume of 20ml with de-ionized water. Trace metals may be bound by various forms of organic matter, living organisms and coating on mineral particles through complexation or bioaccumulation. These substances may be degraded by oxidation leading to a release of soluble metals. The extracted metal solution was decanted from the residual bitumen samples for AAS analysis while the residue was used for the next extraction.

Step V – Residual or inert fraction: Following Tessier *et al.,* (1979), residue from fraction 4 was oven dried at 105oC. Digestion was carried out with a mixture of 5ml conc. HNO3 (HNO_3, 70% w/w), 10ml of hydrofluoric acid (HF, 40% w/w) and 10ml of perchloric acid (HClO4), 60%w/w) in Teflon beakers. Fraction 5 largely consists of mineral compounds where metals are firmly bonded within crystal structure of the minerals comprising the sediment. Analysis was carried out with AAS using GBC Avanta PM. Ver 2.02. To validate the procedure, the instrument was programmed and it carried out metal detection by displaying two absorbance readings and what was reported was the average. Blanks were also used for correction of background and other sources of error. Apart from calibration before use, quality checks were also performed on the instrument by checking the absorbance after every ten sampleruns.2 gram of the sample was extracted using 16ml of 1M $MgCl_2$solution (pH = 7.0 with stirring at room temperature for 1 hour.

RESULTS AND DISCUSSION

Tables 1 to 3 revealed the results obtained from labile metal concentration, forms in which the labile metals exist during speciation and the rate of absorption in green vegetables.

Sample Code: 1: Exchangeable Fraction, 2: Bound to Carbonates, 3: Bound to Iron or Manganese oxide, 4: Bound to Organic Mater or Sulphide, 5: Inert Fraction

OKA(1-5)= Waste Management Dumpsite

OKB(1-5)=Igodan Dumpsite

OKC(1-5)= Okitipupa Oil Mill Road Dumpsite

OKAV= Waste Management Dumpsite Vegetable

OKBV=Igodan Dumpsite Vegetable

OKCV- Okitipupa Oil Mill Road Dumpsite Vegetable

This research work was carried out to investigate the effect that the labile metals posed on human indirectly by seepage into water bodies during rainfall due to their concentration in the soil, the forms at which each metals exist in the soil during speciation and to investigate the effect of labile metals absorption in plants from the dumpsites when the soil from the sites were directly utilized for agricultural purposes. Ten labile metals concentration analyzed were shown in Table1, their forms were shown in Table 2 during speciation from1: Exchangeable Fraction, 2: Bound to Carbonates, 3: Bound to Iron or Manganese oxide, 4: Bound to Organic Mater or Sulphide, 5: Inert Fraction and the rate of absorption in green vegetables in

Table 1: Concentrations of Labile Metal from Three Dumpsites Soil in Okitipupa Region

Soil Sample Codes	Cd (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Fe (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	Ni (mg/kg)	As (mg/kg)	Pb (mg/kg)
OKA	87.453	3.100	22.980	0.140	3690.000	210.250	2880.000	74.150	0.025	12.000
OKB	106.500	3.150	2.900	0.730	5250.000	147.800	1217.000	73.900	0.014	18.000
OKC	91.500	5.510	10.560	0.048	6780.000	37.450	385.000	46.200	0.063	12.000

OKA= Waste Management Dumpsite,OKB=Igodan Dumpsite, OKC- Okitipupa Oil Mill Road Dumpsite

Table 2: Chemical Speciation of Labile Metals from Three Major Dumpsites in Okitipupa Region

Sample Codes	Cd (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Fe (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	Ni (mg/kg)	As (mg/kg)	Pb (mg/kg)
OKA1	0.042	0.090	0.400	0.020	1.500	0.090	0.350	0.130	0.006	0.080
OKA2	0.031	0.420	0.410	0.030	1.000	0.120	0.630	0.060	0.004	0.190
OKA3	0.210	1.090	1.000	0.010	0.700	0.170	1.180	0.320	BDL	0.050
OKA4	0.150	0.040	0.290	0.010	2.600	0.140	0.150	0.010	BDL	0.020
OKA5	87.000	1.360	20.86	0.070	3684.000	209.700	2877.940	73.620	0.015	11.65
OKB1	0.110	0.530	0.160	0.020	2.800	0.070	0.550	0.030	BDL	0.140
OKB2	0.070	0.080	0.310	0.020	3.600	0.060	0.490	0.060	BDL	0.020
OKB3	2.320	1.450	0.780	1.030	8.100	1.040	5.650	0.010	BDL	1.040
OKB4	0.510	0.920	0.300	BDL	1.800	0.120	0.500	BDL	0.001	BDL
OKB5	103.97	0.160	1.34	0.650	2503.500	146.500	1209.780	73.700	0.013	16.600
OKC1	0.160	1.380	0.390	BDL	0.800	0.150	0.240	0.040	BDL	BDL
OKC2	0.310	0.080	0.250	BDL	5.000	BDL	0.610	1.040	0.009	0.100
OKC3	0.180	1.150	0.250	0.010	3.500	0.050	0.310	0.410	0.005	0.150
OKC4	0.150	1.630	0.310	0.020	1.100	BDL	0.670	0.100	BDL	BDL
OKC5	90.710	1.25	9.340	0.018	6769.400	37.440	383.15	44.610	0.049	11.730

Note: BDL= below detection Limit

Table 3: Rate of Absorption of Labile Metals in Green Vegetables Planted on the Major Three Dumpsites in Okitipupa Region.

Sample Codes	Cd (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Fe (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	Ni (mg/kg)	As (mg/kg)	Pb (mg/kg)
OKAV	23.660	0.2209	11.100	0.049	224.050	32.780	515.000	7.300	0.027	12.000
OKBV	28.960	0.260	1.290	0.130	197.000	18.960	319.000	18.750	0.047	18.000
OKCV	19.080	0.340	3.280	0.021	296.600	5.460	347.000	12.350	0.024	10.000

Table3.

Cadmium (Cd) from OKB (106.500mg/kg) was higher than the results obtained from OKC (91.500mg/kg) and OKA (87.453mg/kg).during speciation higher percentages were observed at the inert fraction, that is non-reactive state when Cadmium is ingested caused immediate poison and damage to the liver and kidney (Rahimzadeh *et al.*, 2017).Cadmium from OKB should be avoided because of the higher concentration to avoid liver damage.

Copper (Cu) in the three samples ranged between 3.100-5.510mg/kg, which are significantly low and beyond the toxicity level as well as cobalt (Co). Chromium(Cr) was higher in OKA(22.980mg/kg), followed by OKC(10.560mg/kg) and least in OKB(2.900mg/kg) They are metals of no advantage or benefit to humans (Marian and Ephraim, 2009) except in industrial application in plating and coating..

Iron (Fe) is the most abundance in the three dumpsites ranging from 3690.000-6780.000mg/kg from OKA to OKC respectively in ascending order. Iron is imperative in hemoglobin formation in animal and healthy development. The hazards pose by other toxic labile metals present outweigh the advantages of the consumption of the Iron present and should be discouraged. Reverse was the values obtained for Manganese (Mn) that increased from OKC to OKA (37.450 - 210.250mg/kg) as observed in the results.

Zinc (Zn) is an essential metal for the regular performance of numerous enzyme systems. Zn shortage, mostly in children, results to loss of appetite, growth impedance, weakness, and even immobility of sexual growth (Saracoglu *et al*., 2009).Zinc was the second abundance in the dumpsites. The results obtained from these sites were OKA (2880.00mg/kg), OKB (1217.000mg/kg) and OKC (385.000mg/kg) respectively. However, noxious labile metals in the soil should be avoided in consumption of green vegetables from the sites.

Nickel (Ni) decreased from OkA to OKC (74.150, 73.900 and 46.200) in mg/kg. According to the Environment Agency (2014), more than 30mg of Nickel may cause changes in muscle, brain, lings, liver kidney and can also cause cancer, tremor, paralysis and even death. The values obtained were higher than acceptable level for Nickel consumption in human and should also be discouraged for consumption. Arsenic was generally low in the three samples. Lead values were the same in OKA and OKC (12.000mg/kg), while OKB had 18.000mg/kg. Nontoxic limit of lead, which is 2.5 mg/kg) as reported by Sharma *et al*., (2006) and Chirenje *et al*., (2004) was exceeded in the three dumpsites. The labile metals were present in the inert fractions in all the analyzed soil samples in the region.

These showed that the most abundant of these metals were in forms that were not desirable and not useful in human diet if consumed. Though, the absorption rate in the green vegetables as indicated in Table 3 were not up to 50% of the total concentrations in the soil, but the concentration observed in the vegetables for human consumption were exceeded with higher value observed in the OKA and OKB. According to World Health Organization (2019), all metalloid elements are poisonous compounds in which some of the labile metals belong like arsenic since as explained by World Health Organization, 2019 till date.

CONCLUSION

The human body requires a numeral of minerals in order to maintain good health, but not all are essential as some are labile metals which are sinister to human health.Soils are the major sink for labile metals released into the environment by anthropogenic activities and unlike organic contaminants which are oxidized to carbon (IV) oxide by microbial action. Most labile metals do not undergo microbial or chemical degradation, which are less toxic or biodegradable and most of these metals exist in the inert fractions in most of the soil examined and persist in the environment. Labile metals constitute an ill-defined group of inorganic chemical hazards, and those most commonly found at contaminated sites are cadmium (Cd), copper (Cu),chromium (Cr),cobalt (CO), zinc (Zn), nickel (Ni),arsenic (As), and lead (Pb). Most of these metals were fund in the residual fraction contained higher concentrations in all the sites irrespective of plant absorption, though higher values were observed in iron (Fe) and Zinc (Zn).The results obtained from the three dumpsites analyzed indicated that the concentrations of labile metals from these sites were undesirable for human utilization except iron which is required for hemoglobin formation in mammals. The concentrations of the most labile metals in soil samples analyzed were higher in the inert fractions after speciation. This showed that they abundantly reside in the soil and detrimental to human health if consumed. The most threatening were dumpsites from waste management (OKA) and Igodan (OKB), which some of the labile metals aforementioned for their toxicity were accumulated. Though, Plants from the three dumpsites should be discouraged for human consumption because their toxicity level was exceeded. This will avert the menace which the presence of these labile metals will cause to man, animals, plants and their environment.The tolerable protection and restoration of soil ecosystems contaminated by labile metals require regular characterization and remediation. This will provide adequate environmental protection and public health awareness, at both national and international levels.

AUTHOR CONTRIBUTIONS

G. Aladekoyi performed the literature review, experimental design, analyzed and interpreted the data, prepared the manuscript text, and manuscript edition. A. Akinnusotu developed the study methodology that also comprised preparing a checklist that was used in data collection. He further interpreted and analyzed the data. G. Aladekoyi and A. Akinnusotu also performed the experiments and literature review, compiled the data and manuscript preparation. Both authors edited the paper to ensure completeness and consistency with the journal's formatting guidelines.

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CONFLICT OF INTREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript. In addition, the ethical issues; including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy has been completely observed by the authors

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ORIGINAL RESEARCH PAPER

The effect of human resources financial literacy and risk attitude on investor motivation

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ABSTRACT

BACKGROUND AND OBJECTIVES: The financial literacy is required as an ability for investor who require making decisions in a complex financial scenario. Therefore, the aim of the study was to investigation the effect of human resource's financial literacy and risk attitude on investment motivation in joint venture funds in Iran.

METHODS: The present study is descriptive-applied. the data was gathered using the literature review and survey information and data gathering method, was according to semi-structural questionnaire. The population included all individuals and Mutual Funds (MF) investors. The sample size was selected using Morgan table and 384 people. In order to analyze data, SPSS19 statistical method and correlation coefficient test, multivariate regression analysis and determination coefficient (R2) and variance analysis were utilized.

FINDINGS: Generally, the results indicated that the human resource's financial literacy and attitude toward risk has significant influence on investor motivation in joint venture funds in Iran. Because, determination coefficient (R2) resulting from regression suggests that variables related to investors financial literacy (as independent variables included: ability to interact and communication with financial concepts, financial concepts knowledge, skills in managing personal financial affairs, skillful in using appropriate financial decisions, confidence in effective planning for future financial needs, financial literacy in the field of financial jobs, knowledge of statistics and financial mathematics concepts and knowledge of computer concepts) explain 73% of motivation in joint venture funds in Iran (as dependent variable).

CONCLUSION: The results showed that human resource's financial literacy and attitude influenced on risk attitude on investment motivation in joint venture funds in Iran. Hence, the outcome can be useful for investors in process of policy makers in joint venture funds from of in Iran.

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INTRODUCTION

Reviewing the theoretical foundations of financial area and investment indicates that investors' decision making in classic finance, neoclassic finance, behavioral finance and neuro-finance fields in different periods of time, each have concentrated on the same dimension; there is no doubt that moving along time will justify the reason of discussion about concepts of the same time (Jalilvand and Rostami, 2018). Of course, decision-making is a complex process which includes analysis of several factors and following various steps. It is believed that the decision is based on two issues: personal, and technical. Similarly, investors tend to rely on these two factors when deciding on a stock exchange (Chandra, 2008). In fact, decision making in human beings is based on combination of cost-benefit (Quartz, 2009) and behavioral economics / behavioral finance (Ritter, 2003; Gutnik *et al*., 2006). In financial decision making, it is useless to imitate financial models based on efficient market and intellectual human being, So, it is required that behavioral models find their position in financial decision making and a realistic analysis is made from personal financial behavior to present financial consultation (Haratian and Najafi Moghaddam, 2019). In this way, in accordance with the evolution of financial theories, investment, and with regard to presenting different and supplementary perspectives in relation to the issue of investor decision-making; reviewing and present a new comprehensive structure in order to understand and recognize structure the decision-making process of investors; It can give a more comprehensive view of researchers and participant in the field of investment and finance about how they make decisions (Jalilvand and Rostami, 2018). One of the key and pivotal issues that has been raised and highlighted in recent years among other issues in the financial field, has been the knowledge and literacy of the organization's human resources. In fact, considering complexity of market and their competitiveness and privatization, one of the main requirements of an organization is to have strong human resources specially in the field of management (Zare Reis Abadi *et al*., 2013). In this regard, it seems that human resource literacy significantly influences organizations performance. Because, in present age, knowledge and information is the capital that creates wealth and economic value. Then, it is expected that people and organizations with higher Financial Literacy (FL), have better financial performance. Today, Intellectual Capital (IC) and financial literacy, due to creation of knowledge and information and as a result generating wealth in economy based on knowledge plays important role in creating added value and gross domestic production. This significance may be caused by factors including revolution in information technology, increasing importance of knowledge and science-based economy and influence of innovation and creativity as elements determining competition (Guthrie, 2001). Thus, FL is required as an ability for investor who require to make decisions in a complex financial scenario (Potrich *et al*., 2015). It should be mentioned that FL is an issue that was not paid so much attention in the past, but in present world it has found its special position, considering the existing necessity (Zare Reais Abadi *et al.,* 2013). Therefore, the first study in conduct to financial literacy and making decision for investment in Singapore was implemented in 2005 and it asked Singaporeans and with corporatation of the Organization for Economic Co-operation and Development (OECD), if they have information about public financial products and services and if they make efficient decisions in relation to managing their financial affairs and investments. Results of research indicated that Singaporeans have appropriate attitude toward money management, financial planning and investment affairs. Most of them save money and supervise their personal expenses and decide about their financial planning themselves (OECD, 2005). So, importance of improving financial literacy, due to factors including development of new financial productions, financial markets and tools complexity, political changes and economic factors (Hassan Al-Tamimi *et al*., 2015). Financial literacy is recognized as an important element for economic stability and development (The Group of Twenty (G20), 2012). It is also believed that FL plays an important role in recognizing investors' behavior in advanced and emerging stock markets. While previous studies have shown that there is a positive relationship between increasing the level of financial literacy and the quality of investors' decision performance, however, the dynamics of this trend have not been sufficiently investigated (Jalilvand and Rostami, 2018). Therefore, the role and sensitivity of finance and providing services tailored to the different needs of society is increasingly increasing, and It is, as well as, one of the

main factors in developing of financial services, which may have different consequences (Ghanbari Alamdari *et al*., 2016). The research in area of influence of human resource's (HR) financial literacy and attitude to risk on motivation of attracting investors, made in different researches, that all relatively confirm the importance of literacy and financial education influence on economic performance of organization and individuals. Henc, considering the review of theoretical foundations of financial literacy of human resources, attitude toward risk, and motivation attracting investors, The main purpose of this study is to investigate the effect of human resource financial literacy and risk attitude motivations in attracting investors in Mutual Funds in Iran.

Literature review and research background

Human resource financial literacy

Nowadays considering complexity of new commercial environments and diversity of services and products delivered by credit institutions, gaining financial welfare, requires appropriate understanding of financial issues. This requirement has been felt in most modern societies since long ago and has been discussed since 1990 as titles including financial literacy and personal finance and its importance has been increased in a way that nowadays concepts related to it has been taught in countries including United State (US) and United Kingdom (UK), are considered as part of curriculum in high schools lessons and various academic disciplines at the university (Yaghoobnejad *et al*., 2011). Therefore, it may be stated that emergence of a theoretical construct is linked to specific economic- social situations and in this way, theoretical concepts are not created in vacuum, but they reflect their social life issues. Financial literacy, as a theoretical concept, is not excluded from this rule (Eslami Bidgoli and Karimkhani, 2016). Financial literacy was first discussed in 1997 in US, in the ceremony of Jump Start Coalition for Personal Financial Literacy (PFL). This coalition defined financial literacy as the ability of someone to use his knowledge and skill to manage financial resources in an efficient way to achieve financial security during his life (Jump start Coalition, 2007). In academic forums, FL has also found different meanings and is used to refer to knowledge about financial products (such as stocks compared to bonds, the difference between mortgages at fixed and floating rates, etc.), also, knowledge about financial concepts (inflation, compound interest, diversity, credit scores, etc.), mathematical or numeral skills required for making effective financial decisions and involving in specific activities such as financial planning (Hastings *et al*., 2012). There is no doubt that in some of the developed countries non-profit foundations have undertaken the duty to develop financial literacy and organize different tests to measure Financial Knowledge (FK) advancement in their own country. In spite of the importance of financial literacy, concepts and issues related to it have not been paid attention so much and there is no proper tool to measure it (Yaghoob Nejad *et al*., 2011).

Financial literacy and investment decision making of investors

Today, achieving the economic goals of a country is impossible without the participation of its people: one of the ways for people to participate in economic development is to invest in the capital market and the stock market. Because in this way, little savings will be directed to productive activities and the economy will flourish. Individuals increasingly participate in financial markets and participation in financial markets has been accompanied with emergence of new products and financial services. Hence, some of these financial complex products are difficult for investors' understanding, especially novice financial investors. Although investment in stock exchange market begins with buying a security, buying this financial asset requires exact analysis of its present and future situationExperience has shown that people who invest on the basis of suspicion do not make as much profit as they expect. So, confronting this situation, one should ask himself if they are equipped enough for financial decision making. Do they have enough literacy and financial information? A main factor which prevents one from stock ownership is lack of proper understanding from economy and financial affairs. Different measurements of financial literacy indicate that lack of financial literacy prevents one from participation in stock market. Welfare due to non-participation in stock market is significant and on the other hand, it is obvious that unaware investors may not utilize stock market completely or have efficient investment and it is impossible for them to have reasonable choice when investing in

financial market (Moradi and Izadi, 2014).

Research background

In a study by The Organization for Economic Co-operation and Development (OECD), 2005) studying about the financial literacy in 12 countries including United States of America, Britain, European countries, Australia and Japan, it was found that financial literacy of most respondents is very low. Remund (2010) conducted a survey of the financial literacy and found that different definitions declared about financial literacy may be classified to five classes that was incudes: a) Knowledge about financial concepts; b) communicating about financial concepts; c) Having skill in managing personal financial affairs; d) having skill in utilizing proper financial decisions; and, e) confidence in efficient planning for future financial requirements. Van Rooij Maarten *et al*., (2011.b) examined the relation between financial literacy and participation in stock exchange and concluded that most respondents are acquainted with financial knowledge and some concepts like interest compound, inflation and time value of money but very few knew beyond this and many respondents didn't know difference between bond and stock, the relation between bond price and interest rate and principles of risk diversity. Van Rooij *et al*., (2011.a) addressed the relation between financial literacy and plans for retirement period of people in Holland and concluded that complexity of financial decision making in families have increased very much and it seems that considering this condition, families unfamiliar with financial literacy confront problems in the field of saving method and investment for retirement period. In other words, those who are literate in the field of finance, are more powerful in planning for their retirement period. Gathergood (2012) points to the relation between self-control, financial literacy and over-debt of customers in England. The results showed that customers with self-control problems use daily payment loans and store cards as rapid access but expensive credit solutions. Also, results of research indicated that these customers mostly confront with problems such as income shock, credit withdrawal and unanticipated exchanges in long run and this indicates that exposure to lack of self-control will expose the individual to different risks. Of course, the research concluded that in most cases, the role of lack of self-control in relation to financial illiteracy in explaining customer debt is insignificant. Yaghoob Nejad *et al*., (2011) investigated the issue by presenting a model for measuring Iranian students financial literacy using fuzzy Delphi method. In this research, the issue of financial literacy, theoretical foundations and background of researches made in this field is discussed first, then fuzzy Delphi technique is presented to gain consensus of 12 financial experts (as Delphi panel) and a questionnaire including 25 questions is used to measure financial literacy of Iranian students and presented as the model for measuring financial literacy in university level. Results indicated that questions selected as a result of expert consensus include various concepts including money time value, investment in stock and participatory papers, inflation, electronic banking, different ways for borrowing money, insurance, retirement etc. Van Rooij Maarten *et al*., (2012), studied the the relationships between Financial literacy, retirement planning and household wealth. The results showed (indicate) that was significant association between financial literacy and net worth. Rahmati and Nayebzade (2013), studied the influence of literacy and entrepreneurship on performance of Yazd Steel Companies and stated that research model is formed using entrepreneurship, financial literacy and commercial literacy variables as independent variable and job performance as dependent variable. Zare Reis Abadi *et al*., (2013), examined the influence of demographic characteristics on financial literacy in between the managers in Yazd city. After data analysis using statistical techniques, results indicated that managers are literate in the field of general financial literacy but illiterate in the field of specialized financial literacy. Also, results suggest that among demographic characteristics, educational major and age of individuals, there had been the more influence on financial literacy. Zandi *et al*., (2014), investigated the relation between financial literacy, participation in stock market and saving behavior in Tehran citizens. The results showed (indicate) that level of financial literacy and risk taking of individuals influence their participation level in stock market but familiarity with brokers doesn't influence their participation in stock market. Variance analysis of financial literacy and saving behavior of individuals suggest the existence of significant positive relationship between two factors. Ghalmagh *et al*., (2016), studied the influence

of financial literacy on behavioral biases of investors in Tehran securities market and stated that financial literacy and behavioral biases are two major factors influencing investors' decisions and financial behavior. Data analysis results showed that there is significant positive relation between financial literacy level and behavioral biases of investors. Samsami *et al*., (2013) investigated the issue of financial literacy and participation in stock market. In order to compare groups average Scheffe paired test and in order to study the relation between two abnormal variables, Spearman correlation coefficient was used. In order to study different hypotheses, results indicate that stockholders are financially literate. Stockholders' financial literacy is influenced by components including level of education, college, and high school. Childhood experiences influence financial literacy. Financial literacy influences investment diversity, stock portfolio diversity and background of investment. Moradi and Izadi, (2014), investigated the influence of investors' financial literacy on making decisions about investing in securities. Using the gather data, the questionnaire and distributed it between in 384 investors of Tehran Stock Exchange (TSE) market, the statictic results of this research, showed that, financial literacy was significant influence on decision-making investing of investors in Tehran Stock Exchange (TSE). Eslami Mofid Abadi *et al.*, (2015), in a research investigated the survey of the relationship between investment incentives and opportunities to make a profit of the stock price based on economic psychological factors and advances behavioral finance in the capital market of Iran. The results showed that there are significant positive relationship between investment incentives and opportunities for profit stock price, according to new behavioral finance economic and psychological variables is among shareholders the Tehran Stock Exchange (TSE) and given the positive and significant coefficient of the regression line equation was estimated, is confirmed the main hypothesis of research. Rahnamay Roodposhti *et al*., (2016), in a research revealed the role of investors' objective financial knowledge on the assessment of risk disclosures in mix Mutual Funds advertisements with the evidence of Mutual Funds in Iran. Finally, their data in this reearch was analyzed by SPSS software. The results showed that financial literacy of investors influences the risk disclosure of promotion mix by Nutual Funds in Iran. The financial literacy of investors reduces uncertainty of future decisions and increases predictability of investment policies in financial markets. Moreover, their was show that financial literacy of investors leads to predictable risk and return among those who are interested in investment in Iranian mutual funds. Eslami Bidgoli and KarimKhani, (2016), investigated the issue of financial literacy, and political - economical background of their emergence in market economy and stated that emergence of any theoretical construct is related to specific economic social situation. For this purpose, in this research was explored the relation between financial literacy and financialization and explained financialization phenomenon, and was attempt to explain the reasons for emergence of neoliberalism though. After explained existing economic and social situation of financial literacy and its influence and position, different definitions provided for this word, measurement methods and was important the findings of recentently research that be reviewed. Toghyani and Moradi Basiri, (2016) addressed critical analysis of general education model of financial literacy from Islamic economy point of view and explained that nowadays, USA has designed a model in financial literacy domain and is trying to promote it in the world through expanded advertisements. Results of this data analysis path indicated that self-control of financial managers has significant positive influence on information disclosure quality but obeying religious obligations don't influence information disclosure quality. These results contribute to theoretical expansion of disclosure quality through identifying factors influencing this field. Its results may be used in appointing future managers which will increase clarity of information and enhance quality of disclosed information. Molazade *et al*., (2016) studied the influence of financial literacy of managers on profit management and reviewed the difference of earning management in companies with Chief Executive Officer (CEO), who has financial knowledge and other companies. The results indicated that CEO financial knowledge doesn't influence profit management according to optional accruals and real events. On the other hand, there is no significant difference between profit management based on optional accruals and real events. On the other hand, there is no significant difference between profit management based on

optional accruals and real events in companies with CEO who has financial knowledge and other companies. Molaee and Rostami, (2016), investigated the relation between financial disagreement and financial knowledge in companies established in Isfahan research complex and indicated that there is significant relation between financial knowledge and financial conflict among managers of science based companies. It means that people with high level of education experience financial conflict and reaction toward it less than others. Also, in their research findings of demographic section indicated that there is significant relation between demographic characteristics and financial literacy level and experience of financial conflict. Ziaiipoor and Miladian, (2016) examined the issue of financial literacy on financial behavior of investors in Tehran Stock Exchange (TSE). Results were analyzed by version 14 of SPSS software using Spearman and Pierson correlation coefficient tests and the results indicate that financial literacy influences overconfidence behavioral biases in prediction, status quo bias and loss aversion in a positive way and influences representativeness biases negatively and inversely and in other cases no significant relation was observed. Shen *et al*., (2016a) found that there is a significant relation between financial literacy and financial disagreement among managers, in a way that people with higher financial literacy report less financial disagreement experience and reaction to it. Shen *et al*., (2016b) indicated that increase in financial literacy of a company, will result in reduction of financial disagreements and also increase in money management and saving literacy, finance and credit management literacy, investment planning literacy will lead to reduction of financial literacy. Stolper and Walter., (2017) examined the issue of financial literacy, financial counsellorship and financial behavior. Their referendum indicated that evidences related to plan efficiency is disappointing. They also evaluated the role of individuals' financial literacy in using professional financial counsellorship and found that intermediate role of experts is considered a major option for financial literacy and they also talked about the role of financial literacy, counsellorship and financial behaviors from several dimensions for their future research. Alizade Kettenlooi *et al*.,(2017) point to the attention made to financial literacy and economic components in elementary school books. Face and content analysis of research tools, are calculated according to experts' opinion and its reliability is assessed by Holsti (1969) method with reliability coefficient equal to 95% for economic literacy and 93% for financial literacy; data obtained from content analysis process suggest that level of attention paid to financial and economic literacy in textbooks is different and also economic literacy components are addressed more than financial literacy. Considering the results of this research and the role of financial and economic literacy in today world, more emphasis on financial and economic literacy components in elementary school textbook contents seem to be more necessary than before. Jalilvand and Rostami, (2018) investigated the issue of financial literacy, investors sentiment, risk understanding and inclination to invest presenting evidences from Tehran exchange market. Results of their study used the expanded data in relation to investors' behavior in Tehran exchange market in 2016 in which evidences about the effect of investors' behavior in Tehran exchange market are presented. On the other hand, financial knowledge, risk understanding and sentiments influence investors' decisions in Tehran exchange market collectively in a significant way and furthermore they found evidences based on the influence of gender, and risk understanding and incline to investment. Eftekhari Aliabadi, (2019) studied the influence of financial intelligence on the behavior of using credit cards among Bank Mellat subsidiaries' customers in Tehran and for this purpose from 3600 customers of Bank Mellat, using Cochran equation, 347 individuals in the level of 5% error were selected. Research results indicate that financial intelligence influences behavior of using credit cards among Bank Mellat subsidiaries' customers. Also, financial behavior and financial education influence the behavior of using credit cards directly and indirectly; but financial literacy doesn't influence the behavior of using credit card. Haratian and Najafi Moghaddam, (2019) investigated and studying financial subjective diagram, a new approach in personal financial consultation in order to present a new solution as subjective financial diagram. Considering the necessity of managing personal financial affairs in the life of individuals and the influence of financial behavior and intelligence in financial decision making, in this research it was tried to enter these points as key elements in financial

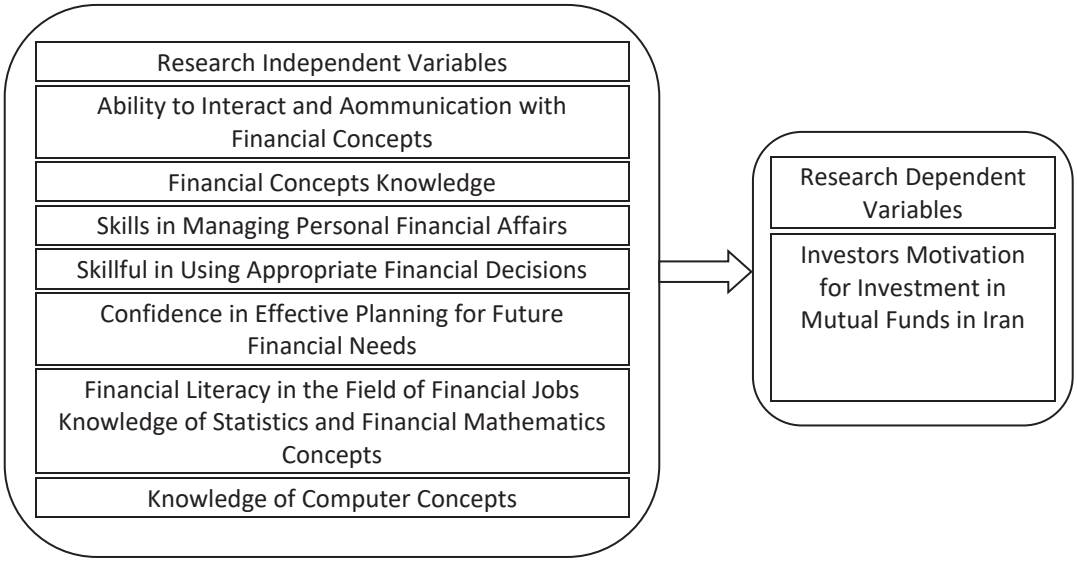

Fig. 1: Research conceptual model

subjective diagram. After researches, it was found that many factors including financial intelligence, behavioral biases and so on influence financial subjective diagrams. Furthermore, since financial diagram has been derived from one's own mind, reviewing it for delivering financial consultation will prove to be useful in improvement and increase of financial consultation influence on financial thinking and continuing financial empirical behavior of the person applying for consultation. Balasubramnian and Springer Sargent, (2020) examined the impact of inflated perceptions of financial literacy on financial decision making and indicated that inflated perceptions of financial literacy affect on financial decision making.

Research conceptual model

The purpose of survey theoretical design, is a theoretical attitude or perspective in which it is decided to review the issue designed in the first question (Quivy and Van Campenhoud, 2006). According to studies made in present research, some important dimensions and key variables included in Fig. 1.

Fig.1 shows the causal relationships of the independent and dependent variables of the research. Where research is dependent variable Investment motivation ($Y_{i,t}$), for investors in Mutual Funds in Iran, and also independent variables include, human resources financial literacy and risk attitude ($X_{i,t}$). The current study have been carried out in Tehran in 2020.

MATERIALS AND METHODS

Research in the social sciences, due to the problems they face in the deductive method, is done through the inductive method and is based on the study of the sample and the generalization of its results to the whole. But in deductive method, initially total society is reviewed and after real results is obtained it will be generalized to all components (Rasouli and Bahranfar, 1998). The method was applied in terms of purpose and descriptive-survey in terms of research design. the data was gathered using the literature review and survey information and data gathering method, was according to semi-structural questionnaire. The population included all individuals and mutual funds investors. The sample size was selected using Morgan table and 384 people. Research data was analyzed using Statistical Package for the Social Sciences (SPSS). In order to determine the validity of the assessment tool and to remove the ambiguity of the questionnaire, the opinions of some experts in the field of financial literacy was used to determine the validity of the content, which the result indicated the desired validity of the test

Table 1: the design and development of the research questionnaire

Variable Type	Variable	N. Question	Source
Dependent ($Y_{i,t}$)	Motivation of investors' investment in mutual funds of Iran	1-12	Study and literature review based on survey information
Independent ($X_{i,t}$)	Confidence in efficient planning for future financial requirements	13-17	
	The ability to communicate with financial concepts	18-22	
	To enjoy from financial, statistics, and mathematics concepts knowledge	23-27	
	To enjoy from computer concepts knowledge	28-32	
	To enjoy from financial concepts knowledge	33-35	
	Financial literacy in the field of financial job	36-39	
	Skillful in using appropriate financial decisions	40-44	
	Skillful in managing personal financial affairs	45-50	

Table 2: Description of research variables' statistical characteristics

Variable Type	Variable	Observation no.	Aaverage	Minimum	Maximum	Mean	Variance	Standard Deviation
Dependent	Motivation of investors' investment in mutual funds of Iran	384	30.127	8.12	45.65	29.501	38.891	6.236
Independent	Confidence in efficient planning for future financial requirements	384	19.0900	5.33	25.32	19.515	2.830	1.682
	The ability to communicate with financial concepts	384	20.026	11.70	23.00	20.006	3.447	1.856
	To enjoy from financial, statistics, and mathematics concepts knowledge	384	19.0900	5.33	21.00	19.504	2.465	1.570
	To enjoy from computer concepts knowledge	384	20.011	11.70	28.96	20.01	3.851	1.962
	To enjoy from financial concepts knowledge	384	34.09	9.188	51.655	33.381	44.008	7.057
	Financial literacy in the field of financial job	384	21.60	6.031	28.65	22.082	3.203	1.904
	Skillful in using Appropriate financial decisions	384	22.66	13.239	26.02	22.638	3.901	2.101
	Skillful in managing personal financial affairs	384	21.59	6.031	23.764	22.065	2.790	1.777

content. In addition, Cronbach's alpha method was used to determining the reliability of multiple choice tests of the questionnaire. As shown in Table 1 all dimensions of questionnaire used in present research have the required reliability, because Cronbach's alpha coefficient has been 0.79.

RESULTS AND DISSCUSION

Description of research variables' statistical characteristics

Description of research variables: Table 2 indicates independent and dependent variables, including frequency average, observation, variance, standard deviation, kurtosis coefficient, extension coefficient and for each variable used in the research.

One sample Kolmogorov- Smirnov test to measure data normality

In this study, Kolmogorov- Smirnov test was used to identify the normality of related data in research questionnaire to identify if parametric and non-parametric tests should be used for testing hypotheses. As shown in Table 3, and considering comparisons made with critical value in the level of 5% error, it is observed that test statistics Located in the area of H_0, and it may be argued that data is

Table 3: Research normality results (dependent and independent variables)

Variable Type	Variable	Observation no.	Test level (Z)	Level of Significance	Variable Situation	Normality Situation of Hypothesis	Cronbach's Alpha Coefficient
Dependent	Motivation of Investors' Investment in Mutual Funds of Iran	384	2.237	.741	Normal	(H_0) is Accepted	0.86
Independent	Confidence in Efficient planning for future financial requirements	384	3.349	.512	Normal	(H_0) is Accepted	0.77
	The Ability to Communicate with Financial Concepts	384	1.283	.669	Normal	(H_0) is Accepted	0.83
	To Enjoy from Financial, Statistics, and Mathematics Concepts Knowledge	384	3.259	.451	Normal	(H_0) is Accepted	0.85
	To Enjoy from Computer Concepts Knowledge	384	1.248	.214	Normal	(H_0) is Accepted	0.77
	To Enjoy from Financial Concepts Knowledge	384	3.847	.325	Normal	(H_0) is Accepted	0.78
	Financial Literacy in the Field of Financial Job	384	2.624	.413	Normal	(H_0) is Accepted	0.72
	Skillful in Using Appropriate Financial Decisions	384	3.294	.368	Normal	(H_0) is Accepted	0.84
	Skillful in Managing Personal Financial Affairs	384	1.965	1.03	Normal	(H_0) is Accepted	0.77
	Total	384	1.246	2.18	Normal	(H_0) is Accepted	0.79.

normally distributed.

H_0: Data is normal (data has been brought from normal population)

H_1: Data is not normal (data has not been brought from normal population)

Table 3 indicates the normality results test bassed on one sample Kolmogorov- Smirnov test (Z test level and significance level) for all variables (dependent and independent variables) that applied in research conceptual model (Fig. 1). Hence, the result of this test showed that there are significant level (Sig.) is more than significance level (α or Alpha= 0.05) and have been accepted the hypothesis (H_0) or normality of data distribution. in other words, data distribution in these variables has been normal. One of the main presumptions of linear regression is that distribution of dependent data distribution should be normal or near normal. So, since research variables follow normal distribution method, in order to implement regression, data logarithm is utilized.

Cronbach's alpha to address validity and reliability of questionnaire

Generally, measuring reliability and validity of research data should be determined based on Cronbach's alpha test. If the results obtained for this test are more than 0.70, the accuracy of the research data can be assured. In this research, it was mentioned that after gathering data from primary sample, data is entered in SPSS software and Cronbach's alpha coefficient was calculated which the intended coefficient for questionnaires was determined to be nearly 0.79 Therefore, as shown table 3 thet questionnaire have the required validity and reliability for measuring data.

Results of examining research hypotheses

*Research hypothesis***:** Human resource financial knowledge and attitude toward risk has significant influence on motivation for attracting investors in Iran mutual funds.

Table 4 and 5 indicates the results obtained from regression test related to research hypothesis. Therefore, the outcome from regression test suggests that investors financial literacy (confidence in efficient planning for future financial requirements, the ability to communicate with financial concepts, to enjoy from financial, statistics, and mathematics

Table 4: results of regression test

Research Model	Entered Variables	Eliminated Variables	Research Method
Dependent	Investors financial knowledge (Confidence in efficient planning for future financial requirements, the ability to communicate with financial concepts, to enjoy from financial, statistics, and mathematics concepts knowledge , to enjoy from financial concepts knowledge, financial literacy in the field of financial job, being skillful in using appropriate financial decisions, being skillful in managing personal financial affairs)	In the model, no eliminated variable was observed	Input
Independent	motivation for attracting investors in Iran mutual funds	In the model, no eliminated variable was observed	Input
Model estimating variables: motivation for attracting investors in Iran mutual funds			

results of regression test and Summary of estimated regression				
Research Model	R Model Correlation Coefficient	R square (R^2) Square of Model Ccorrelation Coefficient	Adjusted R Square Model Adjusted Correlation Coefficient	Standard Deviation of Model Estimate error
Input	.730	.533	.523	1.114
Model predicting variables Investors financial literacy (Confidence in efficient planning for future financial requirements, the ability to communicate with financial concepts, to enjoy from financial, statistics, and mathematics concepts knowledge , to enjoy from financial concepts knowledge, financial literacy in the field of financial job, being skillful in using appropriate financial decisions, being skillful in managing personal financial affairs)				

Table 5: Final regression model coefficients of research main model

Research estimated regression model coefficients					
Research Model	Unstandardized beta Coefficients		Standardized Beta Coefficients	(t)	Level of Significance (sig)
	(B)	Standard Deviation	(Beta)		
Fixed Coefficient	2.528	.283	-	8.946	.000
Confidence in Efficient Planning for Future Financial Requirements	.347	.52	.437	6.626	.000
The Ability to Communicate with Financial Concepts	-.34	.053	-.42	-.645	.519
To Enjoy from Financial, Statistics, and Mathematics Concepts Knowledge	.368	.37	.429	10.048	.000
To Enjoy from Computer concepts Knowledge	.120	.43	.156	2.793	.005
To Enjoy from Financial Concepts Knowledge	-.37	.38	-.53	-.979	.328
Financial Literacy in the Field of Financial Job	-0.68	.042	-.083	-1.619	.106
Being Skillful in Using Appropriate Financial Decisions	-.093	.036	-.127	-2.580	.010
Being Skillful in Managing Personal Financial Affairs	.102	.037	.135	2.736	.007
Model predictable variables: motivation for attracting investors in Mutual Funds in Iran.					

concepts knowledge, to enjoy from financial concepts knowledge, financial literacy in the field of financial job, being skillful in using appropriate financial decisions, being skillful in managing personal financial affairs) influence motivation of attracting investors in Mutual Funds of Iran. In other word, Table 4 suggests that variables related to investors financial literacy explain 73% of motivation of attracting investors in Mutual Funds in Iran.

Table 6, shows Spearman correlation coefficient in the sample related to research hypothesis, it may explain that the obtained correlation coefficient

Table 6: Final Spearman correlation coefficient test

Correlations										
Rsearch Variables		Motivation of Investors' Investment in Mutual Funds of Iran	Confidence in Efficient planning for future financial requirements	The Ability to Communicate with Financial Concepts	To Enjoy from Financial, Statistics, and Mathematics Concepts Knowledge	To Enjoy from Computer Concepts Knowledge	To Enjoy from Financial Concepts Knowledge	Financial Literacy in the Field of Financial Job	Skillful in Using Appropriate Financial Decisions	Skillful in Managing Personal Financial Affairs
Motivation of Investors' Investment in Mutual Funds of Iran	Pearson Correlation	1								
	Sig. (2-tailed)									
	N	384								
Confidence in Efficient planning for future financial requirements	Pearson Correlation	.617**	1							
	Sig. (2-tailed)	.000								
	N	384	384							
The Ability to Communicate with Financial Concepts	Pearson Correlation	.529**	.832**	1						
	Sig. (2-tailed)	.000	.000							
	N	384	384	384						
To Enjoy from Financial, Statistics, and Mathematics Concepts Knowledge	Pearson Correlation	.623**	.522**	.511**	1					
	Sig. (2-tailed)	.000	.000	.000						
	N	384	384	384	384					
To Enjoy from Computer Concepts Knowledge	Pearson Correlation	.138**	.062	.086	.095	1				
	Sig. (2-tailed)	.007	.000	.000	.000					
	N	384	384	384	384	384				
To Enjoy from Financial Concepts Knowledge	Pearson Correlation	.086	.109*	.182**	.099	.713**	1			
	Sig. (2-tailed)	.094	.000	.000	.000	.000				
	N	384	384	384	384	384	384			
Financial Literacy in the Field of Financial Job	Pearson Correlation	.150**	.179**	.172**	.210**	.610**	.565**	1		
	Sig. (2-tailed)	.003	.000	.001	.000	.000	.000			
	N	384	384	384	384	384	384	384		
Skillful in Using Appropriate Financial Decisions	Pearson Correlation	.139**	.212**	.204**	.234**	.530**	.564**	.584**	1	
	Sig. (2-tailed)	.006	.000	.000	.000	.000	.000	.000		
	N	384	384	384	384	384	384	384	384	
Skillful in Managing Personal Financial Affairs	Pearson Correlation	.238**	.216**	.194**	.191**	.555**	.478**	.612**	.583**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	
	N	384	384	384	384	384	384	384	384	384

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-ailed).

Table 7: ANOVA test results, coefficient of comparing model coefficient averages

Research Model	Sum of squares	Degree of freedom (df)	Mean Square	F (Fischer test statistics)	Level of significance (Sig.)
Regression	530.936	8	66.367		
Residual	465.689	375	1.242	53.443	.000[a]
Total	996.625	383			

a. Model predicting variables: investors' financial literacy (confidence in efficient planning for future financial requirements, the ability to communicate with financial concepts, to enjoy from financial, statistics, and mathematics concepts knowledge , to enjoy from financial concepts knowledge, financial literacy in the field of financial job, being skillful in using appropriate financial decisions, being skillful in managing personal financial affairs). Model predicted variables: and motivation of attracting investors in mutual funds in Iran.

Table 8: Summary of comparison of research results with previous researches

Dependend variable	Test results of researchers' hypotheses (Effect)											References
	Independend variable ($X_{i,t}$)											
	Factors of of Financial literacy									Other Factors		
$Y_{i,t}$	Constant Coefficients	Confidence in Efficient Planning for Future Financial Requirements	The Ability to Communicate with Financial Concepts	To Enjoy from Financial, Statistics, and Mathematics Concepts Knowledge	To Enjoy from Computer concepts Knowledge	To Enjoy from Financial Concepts Knowledge	Financial Literacy in the Field of Financial Job	Being Skillful in Using Appropriate Financial Decisions	Being Skillful in Managing Personal Financial Affairs	demographic characteristics	investment incentives	
Classified as financial literacy	NA	+	+	+	+	+	+	+	+	NA	NA	The Organization for Economic Co-operation and Development (OECD) (2005)
Classified as financial literacy	NA	+	+	+	+	+	+	+	+	NA	NA	Remund (2010)
Plans for retirement	NA	+	+	+	+	+	+	+	+	NA	NA	Van Rooij *et al*., (2011.a)
Participation in stock	NA	+	+	+	+	+	+	+	+	NA	NA	Van Rooij *et al*., (2011.b)
Over-debt of customers	NA	+	+	+	+	+	+	+	+	NA	NA	Gathergood (2012)
Measuring financial literacy in university	NA	+	+	+	+	+	+	+	+	NA	NA	Yaghoob Nejad *et al*., (2011)
Entrepreneurship on performance	NA	+	+	+	+	+	+	+	+	NA	NA	Rahmati and Nayebzade (2013)
Financial literacy in between the managers	NA	NA	NA	NA	NA	NA	NA	NA	NA	+	NA	Zare Reis Abadi *et al*., (2013)
Participation in stock market and saving behavior	NA	+	+	+	+	+	+	+	+	+	NA	Zandi *et al*., (2014)
Participation in stock market	NA	+	+	+	+	+	+	+	+	+	NA	Samsami *et al*., (2013)
Decision-making investing of investors in securities	NA	+	+	+	+	+	+	+	+	NA	NA	Moradi and Izadi, (2014)
Opportunities to make a profit of the stock price	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	+	Eslami Mofid Abadi *et al*, (2015)
Risk and return in mix Mutual Funds in Iran	NA	+	+	+	+	+	+	+	+	+	NA	Rahnamay Roodposhti *et al*., (2016),
Market placing for finance	NA	+	+	+	+	+	+	+	+	NA	NA	Eslami Bidgoli and KarimKhani, (2016)
Information disclosure quality and obeying religious obligations	NA	+	+	+	+	+	+	+	+	NA	NA	Toghyani and Moradi Basiri, (2016)
Profit management	NA	No	No	No	No	No	No	No	No	NA	NA	Molazade *et al*., (2016)
Financial conflict among managers	NA	+	+	+	+	+	+	+	+	+	NA	Molaee and Rostami, (2016),
Financial behavior of investors	NA	+	+	+	+	+	+	+	+	+	NA	Ziaiipoor and Miladian, (2016)
Financial disagreement of managers	NA	+	+	+	+	+	+	+	+	+	NA	Shen *et al*., (2016a)
Financial disagreement of managers	NA	+	+	+	+	+	+	+	+	+	NA	Shen *et al*., (2016b)

Continued Table 8: Summary of comparison of research results with previous researches

Dependend variable	Test results of researchers' hypotheses (Effect)											References
	Independend variable ($X_{i,t}$)											
	Factors of of Financial literacy									Other Factors		
$Y_{i,t}$	Constant Coefficients	Confidence in Efficient Planning for Future Financial Requirements	The Ability to Communicate with Financial Concepts	To Enjoy from Financial, Statistics, and Mathematics Concepts Knowledge	To Enjoy from Computer concepts Knowledge	To Enjoy from Financial Concepts Knowledge	Financial Literacy in the Field of Financial Job	Being Skillful in Using Appropriate Financial Decisions	Being Skillful in Managing Personal Financial Affairs	demographic characteristics	investment incentives	
Behavioral biases of investors	NA	+	+	+	+	+	+	+	+	NA	NA	Ghalmagh *et al*., (2016)
Financial counsellorship and financial behavior	NA	+	+	+	+	+	+	+	+	+	NA	Stolper and Walter., (2017)
Economic literacy in textbook	NA	+	+	+	+	+	+	+	+	NA	NA	Alizade Kettenlooi *et al*., (2017)
Influence investors' decisions	NA	+	+	+	+	+	+	+	+	NA	NA	Jalilvand and Rostami, (2018)
Behavior of using credit cards Bank Mellat	NA	No	No	No	No	No	No	No	No	NA	NA	Eftekhari Aliabadi, (2019)
Influence financial subjective diagrams	NA	+	+	+	+	+	+	+	+	NA	NA	Haratian and Najafi Moghaddam, (2019)
Financial decision making	NA	+	+	+	+	+	+	+	+	NA	NA	Balasubramnian and Springer Sargent, (2020)

*No: was not effect.
**No: was not available at the time of the present research.

and calculated level of significance approves the correlation between investors' financial literacy. Furthermore, motivation of attracting investors in Mutual Funds in Iran is significant that means the main hypothesis is confirmed. In other words, it may be argued at the 95% confidence level there is significant relationship between investors' financial literacy and motivation of attracting investors in Mutual Funds in Iran.

Table 7, indicates results obtained from ANOVA test in the sample relating to research hypothesis which suggests that results of regression test in 95% confidence level is significant. Interpreting test results of research model: Briefly Tables 3 and 7, indicate research hypothesis statistical description. So, considering the fact the test statistical value in level of significance (Sig.) for all independent variables is less than 5%, it may be stated that this variable is significant and according to it results of research hypothesis is confirmed too. It means that investors' financial literacy has significant influence on the dependent variable of motivation of attracting investors in Mutual Funds in Iran. In other words, there is significant relationship between investors' financial literacy and motivation of attracting investors in Mutual Funds in Iran. Furthermore, larger estimation standard error which measures level of point distribution around regression line in two dimensional space increases distribution around regression line. Thus, with 95% confidence level can be generalized to all population of present study, which is Mutual Funds in Iran. Moreover, the results and findings of the current research was compareed with the previouse studies in Table 8, which illustrate, at a glance, a comparison between the results obtained in this study and other researches conducted (as mentioned in the research literature review part) in the field of Financial Literacy.

CONCLUSION

The financial literacy is required as an ability for investor who require to make decisions in a complex financial scenario. The aim of the current research was to investigate the effect of human resources financial literacy and risk-taking attitudes on investors' motivations in joint venture funds in Iran

The statistical population included all the people who are the Investors in the Mutual Funds in Iran (IFMI) and are active in the field of financial and economic businesses in Iran. The statistical sample was 384 people, using Morgan table. This research was methodologically a descriptive-applied research. Also, in order to collect the required data, library and field information methods and questionnaire distribution were used. In order to analyze the archived data, SPSS19 statistical method and correlation coefficient test, multivariate regression analysis and determination coefficient (R2) and variance analysis were utilized. The results indicated that the human resources' financial literacy and attitude toward risk has significant influence on investor motivation in joint venture funds in Iran. As determination coefficient (R2) resulting from regression suggests that variables related to investors financial literacy of independent variables including: ability to interact and communication with financial concepts, financial concepts knowledge, skills in managing personal financial affairs, skillful in using appropriate financial decisions, confidence in effective planning for future financial needs, financial literacy in the field of financial jobs, knowledge of statistics and financial mathematics concepts and knowledge of computer concepts, explain 73% of motivation in joint venture funds in Iran as dependent variable, Therefore it can be concluded that human resource's financial literacy and attitude influenced on risk attitude on investment motivation in joint venture funds in Iran. Hence, the outcome can be useful for investors in process of policy makers in joint venture funds of in Iran.

Suggestions

According to the findings, investors of Mutual Funds in Iran (IMFI) are recommended to apply the following items:

1-The all mangers of mutual funds in Iran, should abale creating a strong and up-to-date mechanism and database for reporting the knowledge and financial literacy of investors of Mutual Funds (MF) in Iran.

2- Generaly, the result of this study would be beneficial for investors and brokerage companies of Mutual Funds (MF) in Iran as they will focus on financial literacy and try to management of risk attitude to enjoy gains or profits.

AUTHOR CONTRIBUTIONS

H. Eslami Mofid Abadi, performed the study conception and design, data collection, analysis of data and interpretation of results, and manuscript preparation, followed by rewising, and was also extensively involved in reviewing literature and preparing the manuscript and writing original draft preparation. Z. Houshmand Neghabi, performed methodology, reviewed and edited the final manuscript. S. Morshedian Rafiee performed the data analysis, data correction, results interpretation, and discussion. M. Mirzapou reviewed the data analisis and helped in the data interpretation and moreover, did the proofreading and literature review references editing.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy have been completely observed by the authors.

ABBREVIATIONS

CEO	Chief Executive Officer
FL	Financial Literacy
FK	Financial Knowledge
FM	Financial Mathematics
HRC	Human Resource's Capital
II	Investors' Incentives
IC	Intellectual Capital
IM	Investment Motivation
MF	Mutual Funds

OECD	The Organisation for Economic Co-operation and Development
PFL	Personal Financial Literacy
TSE	Tehran Stock Exchange

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