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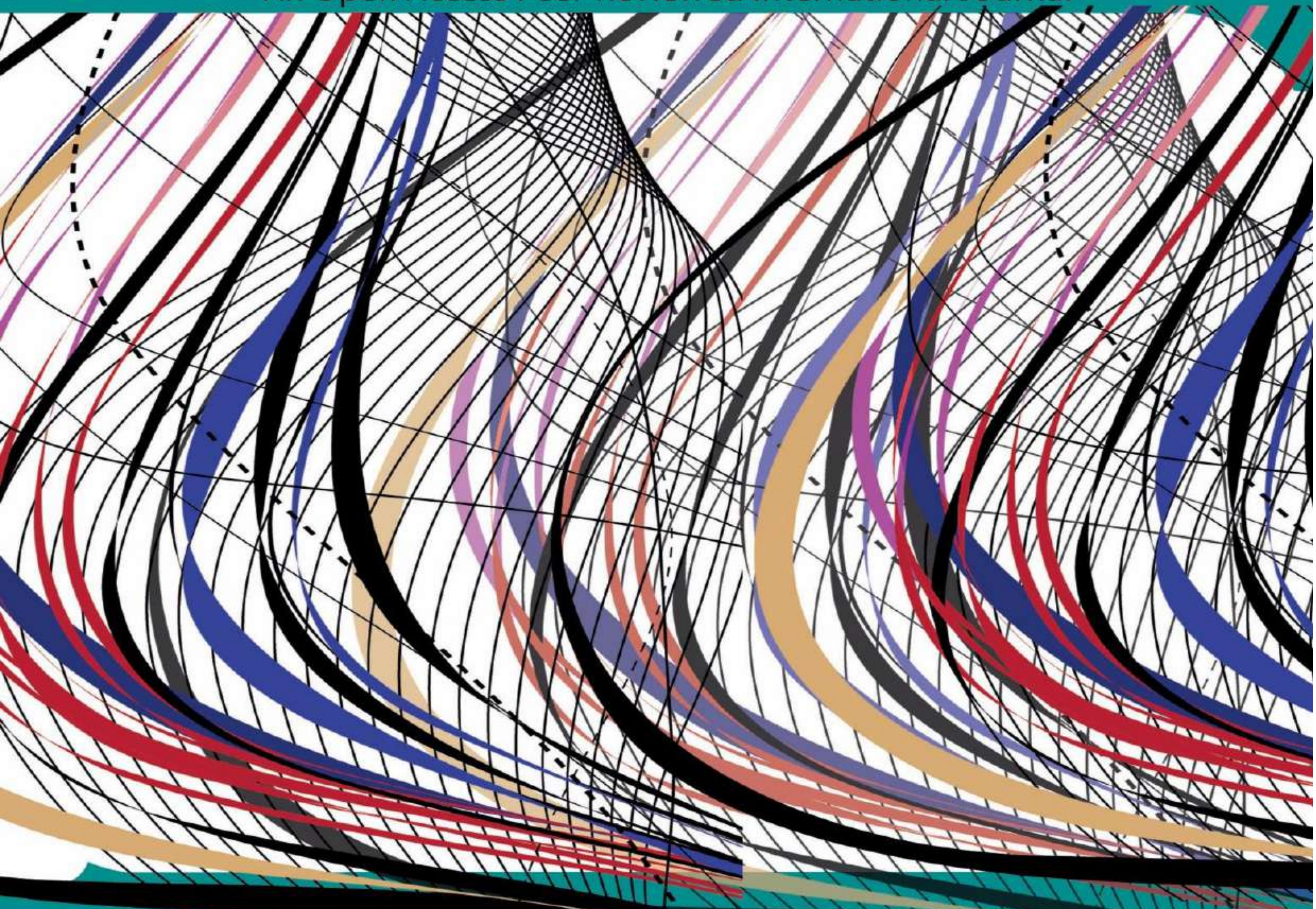

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Financial Resource Management Towards Sustainable Operations of RCEP-funded Farm Machinery Enterprises in Science City of Muñoz

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Abstract *– This descriptive study looked at the financial resource management of Rice Competitiveness Enhancement Program (RCEP)-funded farm machinery firms in the Science City of Muñoz. To obtain data, a survey questionnaire with a consent form was employed. The data gathered were analyzed using frequency counts and percentages. All of the Rice Farmers Associations (RFAs) who were chosen purposively as respondents of this study own and operate four-wheel tractor services in the form of an enterprise. Findings of the study show that the preparedness of most respondents was attributed to the existence of a financial and operational plan. Also, using tools for up-to-date recordkeeping of financial transactions was an indicator of sustainable operations. On the other hand, financial dilemmas such as the lack of operating capital and incorrect allocation of funds, so as the inability to collect unpaid obligations and delayed payments from farmers, consequently led to unsustainable operations.*

Keywords— Financial resource management, sustainable operations, rice farmers' associations, rice farm machinery enterprise.

I. INTRODUCTION

Agriculture is one of the prime movers of the Philippine economy. However, farming is still not considered profitable in the country due to the low mechanization level of the farmers. Thus, the Philippine government strives to develop and promote the use of agricultural machinery and other mechanized technologies, which led to the creation of the RA 11203 or the Rice Tarrification Law (RTL), The RTL, specifically the Rice Competitiveness Enhancement Fund (RCEF), is set to provide critical interventions to support Filipino farmers and enhance their competitiveness and profitability through farm mechanization and other technologies.

Philippine farmers' awareness of farm mechanization and land reformation appears to be very low, and they also have financial problems when they consider adopting farm mechanization and land reformation (Bautista et al., 2017). Financial problems are one of the major concerns why most rice farmers, specifically the Rice Farmers' Associations (RFAs), fail to patronize the use of farm machinery. With the help of RCEF, 100 million pesos is given to PHilMech to provide extension services such as training and workshops on farm machinery operation, management and enterprise development. A number of RFA recipients were trained and taught how to handle their farm machinery services as an enterprise. In these trainings, PHilMech focuses on managing the RFAs' financial resources.

The Financial Management Theory states that the way a manager makes decisions results in either the success or failure of any organization (Brigham & Ehrhardt, 2013).

The lack of an efficient and effective financial management system is a core problem area among the RFAs. Thus, it is essential that the management team of the RFAs will undergo training in financial management in order to better handle their finances towards sustainable operations.

The Rice Farm Machinery Enterprise requires knowledge and skills in the effective operation of farm machinery as well as managing a business. To address this, training materials and capacity strengthening in improved agronomy, operation, and maintenance of machines, as well as business skills for service providers, were provided. (Van Loon et al., 2004). The Philippine government intervention does not stop the provision of farm types of machinery. Interventions such as training on operations and management and institutional enterprise and sustainability are conducted to ensure that the farm machinery is optimally utilized. According to a study conducted by Philippine Center for Postharvest Development and Mechanization (PHilMech), to be sustainable, all businesses operating as an enterprise through the use of four-wheel tractors will need to allocate Php 42,000.00 for depreciation costs for every cropping, Php 21,000.00 for repair and maintenance for every cropping, at least Php 1,000.00 for administrative costs for every cropping, and at least Php 1000.00 for contingency for every cropping. Therefore, in order for the RFA's business to survive, for every cropping season, considering the fluctuating price of fuel/diesel (Php 80.00 per liter x 19 liters per hectare) and the operator's honorarium (Php 400.00), their enterprise would need an operating capital at around Php 200,400.20.

In line with this, this study is of great importance because this will help the RFAs in the Science City of Muñoz assess whether their financial resources are well-managed for sustainable operations or not. In addition, this study recommended solutions to address the current issues faced by the RFAs in the Science City of Muñoz.METHODOLOGY

The study is descriptive in nature and focuses on determining how the RFAs, operating as FMEs in the Science City of Muñoz manage their financial resources. The instruments utilized were survey questionnaires with a consent form and purposive sampling. The respondents were chosen based on the classification of their organization and based on where they operate in Science City of Muñoz, Nueva Ecija.

The list of RFAs operating as farm machinery enterprises in the Science City of Muñoz was requested from the Enterprise Development Division (EDD) of the Philippine Center for Postharvest Development and Mechanization (PHilMech). From the list provided by PHilMech, a total of 8 RFAs were chosen purposively through the following criteria (Subia, 2018): The 8 RFAs are from different barangays, namely, Brgy. Bagong Sikat (2), Brgy. Balante (1), Brgy. Villa Cuizon (1), Brgy. San Andres (1), Brgy. Rizal (1), Brgy. Pandalla (1), and Brgy. Gabaldon (1) in Science City of Muñoz, Nueva Ecija. They are among the barangays where RFAs operating as FMEs are recorded by EDD. A total of 8 respondents were gathered with data. Basic descriptive statistics such as frequency count and percentages were used.

II. RESULTS AND DISCUSSION

1. Financial Resource Management Towards Sustainable Operations of RCEP-funded Farm Machinery Enterprises in Science City of Muñoz

1.1 Current Practices/Preparedness of the Respondents in Managing Financial Resources

Table 1. Current Practices/Preparedness of the Respondents

Statement	Frequency (f)	Percentage (%)
1. We have an operational plan.	8	100
2. We have a financial plan.	8	100
3. We use a tool for a record-keeping system.	8	100
4. We keep up-to-date records of all our financial transactions.	8	100
5. We have the right funding source for our farm machinery enterprise.	0	0

Table 1 shows the results from the responses of the respondents regarding their current practices and/or preparedness in managing the financial resources of their Farm Machinery Enterprise (FME): 100% of the respondents have an operational plan with a financial plan included in it; 100% of the respondents uses a tool for a record-keeping system; 100% of the respondents keep an up-to-date record of all their financial transactions, and 0% of the respondents has a suitable source of funding/beginning fund for their farm machinery enterprise.

The finding shows that all of the respondents are utilizing an operational plan for their operations and management of farm machinery services. This is advantageous as the operational plan provides a comprehensive guide to the day-to-day operations of the FME to achieve its long-term goals. Having a tool used for record-keeping system and using it to update all their financial transactions also make a good start as an enterprise. However, the majority of the respondents do not have adequate funding.

"Unfortunately, too many entrepreneurs were never taught about basic financial literacy" (Laney, 2013). The importance of having the right source of funds is to not mix the farm machinery enterprise's income with the income of their other source of fund.

1.2 Issues Encountered by the Respondents in Managing Financial Resource

Table 2. Issues Encountered by the Respondents

Statement	Frequency (f)	Percentage (%)
1. With issue on poor management of the fund.	0	0
2. With issue on unpaid collectibles.	1	12.5
3. With issue on delayed payments.	1	12.5
4. With issue on operating capital.	2	25
5. We have other issues encountered aside from those mentioned above.	0	0

Table 2 shows the results from the responses of the respondents regarding their issues encountered in managing the financial resources of their Farm Machinery Enterprises (FME): 0% of the respondents have an issue when it comes to poor management of funds; 12.5% of the respondents have an issue when it comes to unpaid collectibles; 12.5% of the respondents have an issue when it comes to delayed payments from clients; 25% of the respondents has an issue when it comes to operating capital, and none of the respondents has other issues aside from those mentioned firsts. The findings show that the minority of the respondents has an issue with unpaid collectibles, delayed payments, and operating capital. Butzer, Mundlak and Larson (2010) pointed out that capital is a fundamental component of agricultural production, and that the accumulation of capital is key to growth in agriculture. For maintaining continuity of business operations, the RFAs, therefore, have to have a fixed source of operating capital. As such, the net income from the first operations of their farm machinery services can be used as a beginning fund for the next cropping/operation. As to unpaid collectibles and delayed payments, the RFAs must set policies with regard to the mode of payment to be imposed for all of their farmer-clients to avoid such issues.

Table 3. Fund Allocation for the Operation of Farm Machinery Enterprise (FME)

Statement	Frequency (f)	Percentage (%)
1. We allocate funds for depreciation costs.	1	12.5
2. We allocate funds for repair and maintenance.	7	87.5
3. We allocate funds for administrative costs.	0	0
4. We allocate funds for contingency use.	0	0
5. We allocate funds for fuel/diesel.	8	100
6. We allocate funds for an honorarium.	7	87.5

Table 3 shows the results from the responses of the respondents on where they allocate their funds for the operation of their FME: 12.5% of the respondents allocate funds for the depreciation cost of their farm machinery; 87.5% of the respondents allocate funds for repair and maintenance; 0% of the respondents do not allocate funds for both administrative costs and contingency use; 100% of the respondents allocate funds for fuel/diesel, and 87.5% of the respondents allocate funds for an honorarium. Most of the time, the RFAs forgot to allocate funds to what they see as unimportant. "These financial dilemmas have a major impact on one's ability to raise capital and make smart decisions about running a business" (Laney, 2013). Moreover, saving and allocating funds for depreciation costs and repair and maintenance of their farm machinery must start from the beginning of the first operation of their FME. With this, the RFAs will be able to save enough money when the time comes that their farm machinery needs repair or maintenance, as well as save enough money to buy a replacement of their farm machinery when the time comes that their current farm machinery has reached the end of its useful life. It is also essential that the RFAs allocate funds for both administrative costs and contingency use. Administrative costs are where the RFAs will get funds to buy office supplies and load allowances for their operators or their manager. Administrative costs can also be used to pay electricity and water bill as these are essentials for the operation of the FME. On the other hand, it is equally vital that the RFAs allocate funds for contingency use as the money being allocated for depreciation cost, repair and maintenance, administrative costs, and fuel may not be enough, especially now that fuel prices continue to fluctuate

III. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn from the above-mentioned results of the study:

1. There is a high level of preparedness among the selected (Subia, Mangiduyos, Turgano, 2020) respondents to operate as an enterprise through the utilization of an operational plan as their guide for their operation and management of farm machinery services and having an effective tool for an up-to-date record-keeping system of financial transactions.
2. The cited financial dilemmas encountered by respondents indicate a level of incapability for sustainable enterprise operations.
3. The operational plan and record-keeping tool provided organization for the RFAs in the operations of their FMEs, leading to fewer issues in financial resource management.

Based on the findings and conclusions, the following were recommended:

1. PHilMech, as the capability-building resource and implementer, should intensify its monitoring system with regard to the RFA's management of financial resources.
2. Reiteration of the importance of saving up for administrative costs, contingency, repair and maintenance, especially for the depreciation cost of their farm machinery.
3. Operational policies on the mode of payment for the provision of farm machinery services must be imposed to be able to avoid the challenges encountered (Abelardo, et al, 2019) on unpaid collectibles and delayed payments.
4. The government must not only provide farm machinery to the RFAs but also lend a beginning fund for the operation of farm machinery services.

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Bandwidth Optimization of Single-walled Carbon Nanotube Dipole Antenna at GHz Frequency Regime

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Abstract— *This paper presents two different materials-based carbon nanotube composite (CNT-composite) material for antenna applications. These materials are single-walled CNT SWCNT and single-walled CNT composite material SWCNT-composite. The SWCNT are coated by a thin layer of (graphite, silver, or copper) material to construct new Nano-materials. Scientific and mathematical modeling approaches are presented in order to estimate the electromagnetic properties of these materials into CST (MWS) software package. For the purpose of supporting these modeling approaches, the required mathematical analysis is presented and discussed. The dipole antenna configuration will be utilized to estimate the electromagnetic properties of the SWCNT-composite a material. The results of this work showed the enhancement in the electromagnetic properties of the SWCNT-composite materials compared with the SWCNT material, respectively. The bandwidth and fractional bandwidth are the main enhance parameters that will be focused in this work.*

***Keywords*— Bandwidth Optimization, MWS, SWCNT.**

I. INTRODUCTION

The field of THz technology and applications has been growing significantly over the bygone years [1-2]. From the electrical stand point, the CNTs have high electrical properties which make them distinguished from other materials. The CNTs have several forms of structures derived from an original graphene sheet. The CNTs are classified into single-walled carbon nanotube (SWCNT) and multi-walled carbon nanotube (MWCNT) based on their structures [3-4]. A lot of researchers assumed that the CNTs antennas technology will be at the frontier of scientific research for the next decades, especially in the wireless communication nanotechnology. This assumption was presented, based on the idea that the CNTs can radiate as a small nano-dipole antenna when it is electromagnetically excited [5-7]. With the nanometer length of CNTs dipole antenna, the electromagnetic (EM) radiation from this antenna is expected to cover a range within terahertz and optical frequency [8]. The SWCNT was presented as a theoretical study to characterize the THz antenna based on combined the Boltzmann transport equation and Maxwell's equations with boundary conditions of the electron distribution function [9-10].

The CNTs antenna can be a novel solution to reduce the gap of communication between the microscopic world and the nanotechnology devices. It would also be advantageous to the applications which required a wireless connection with the nano-scale devices like nano-sensors

[9]. The SWCNTs-dipole antenna is one of the most potential CNTs antennas in the nanotechnology antenna field, especially for the infrared (IR) and terahertz (THz) frequency ranges [2, 10-14]. For the purpose of comparison the SWCNT dipole antenna with metal dipole antenna results, it is benefit to implement a comparison of these antennas with same size and shape [2].

The CNTs-composite material is a promising nano material for different applications, where, the CNTs are coated by other materials to modify the CNTs structure properties and to construct the CNTs-composite material structure [15-18]. Therefore, these approaches make the CNTs-composite material becomes much more potential materials for various applications that have been explored in recent years.

This paper proposes the CNTs-composite materials consist of CNTs coated by a thin layer of copper and silver separately for the first time, for THz frequency band, where the SWCNT is the specific structure of CNTs utilized in this work. The mathematical model of presented structures is derived based on the mixture rule, for a simple parallel model of the radial interface of coating material and SWCNT. The comparisons between the dipole antennas of these material structures with CNTs and copper dipole antennas are presented to exhibit the enhancement of performance evaluation for the proposed dipole antennas.

II. METHODOLOGY

In this paper, a new material structure (NMS) is presented to design dipole antenna for wireless antenna applications at THz frequency band and fulfill the required enhancement for the antenna properties. The effective model approach will be used for modelling the NMS.

1.1 Structure of proposed composite material

The researchers have attempted to produce new materials, which are necessary for designing antennas for the future technology. There is an urgent demand to design and implement the antennas based on new material structure has remarkable properties. To achieve this aim, this work proposed a new material structure based on CNTs material (SWCNTs), due to their rare properties, through the integration of CNTs material with other materials. The CNTs-composite material consists of SWCNT coated by a thin layer of copper to construct (SWCNT-copper) material and SWCNT coated by silver to construct (SWCNT-silver) material. The main structure of CNTs-composite material (NMS) is illustrated in Figure 1 and Figure 2.

The dependence of the CNTs-composite material properties on SWCNT-composite length, diameter, and type of coating material has been take in to considerations when designing and implementing the dipole antennas of NMS.

In this structure, assume that the $L_1 = L_3$, that means the two terminals at the end of composite tube have the same dimensions with respect to the length of SWCNT. The electrical conductivity of NMS consists of four parts, which are Part1 & Part2 represent the coating material at the two ends of composite tube, Part3 represents the coating material over the SWCNT and Part4 represents the SWCNT material

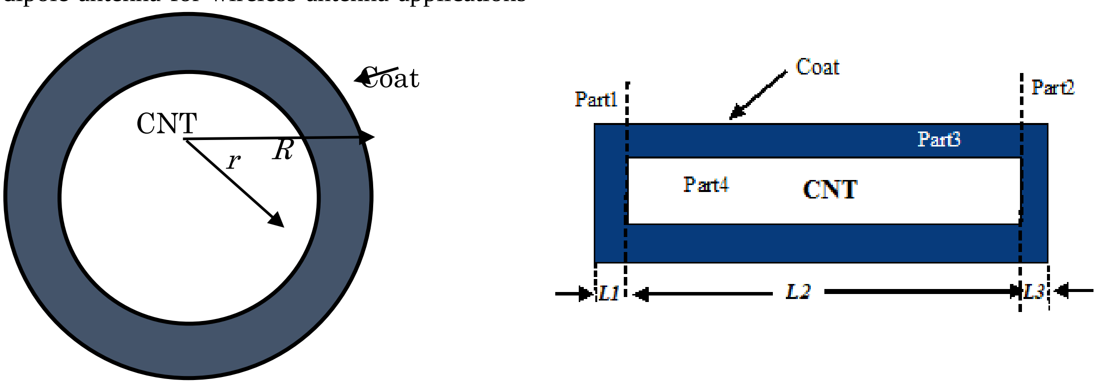


Fig.1. Structure of CNTs-composite material.

1.2 Mathematical Analysis of SWCNT-composite Material

The electrical conductivity is the important property of the NMS (SWCNT-composite material). Similarly, the influences of the SWCNT and layer of coated material are related significantly with the electrical conductivity of the NMS. Therefore, the estimation of this property for the new structure or any other similar structure is very crucial for modelling and EM simulation in the CST (MWS). In this mathematical modelling approach, the electrical conductivity of the new structure (SWCNT coated by other material) is denoted by (σ_{NMS}). Meanwhile, the conductivity of coating material is denoted by (σ_{coat}).

The mathematical model of proposed structure (NMS) is derived based on the mixture rule, for a simple parallel model of the radial interface of coating material and SWCNT. Therefore, the electrical conductivity of this structure has been derived to obtain the general formula of the electrical conductivity of NMS that was presented as follows:

$$A_{NMS}\sigma_{NMS} = C_{SWCNT}L_2\sigma_{SWCNT} + A_{Coat}L_2\sigma_{Coat} + 2A_{tip}L_1\sigma_{Coat} \tag{1}$$

Where, (A_{NMS}) represents the cross-sectional area of SWCNTs-composite structure, (C_{SWCNT}) represents the cross-section area of individual SWCNT (circumference of SWCNT), (A_{Coat}) represents the radial cross-sectional area of coating material and (σ_{SWCNT}) represents the electrical conductivity of SWCNT [2]. Then, the final expression of this conductivity was presented as follows:

$$\pi R^2\sigma_{NMS}(w) = (2\pi R^2L_1 + \pi(R^2 - r^2)L_2)\ \sigma_{Coat} + 2\pi rL_2\sigma_{SWCNYT} \tag{2}$$

$$\sigma_{NMS}(w) = \frac{1}{R^2}\left[(2R^2L_1 + (R^2 - r^2)L_2)\sigma_{Coat} + 2rL_2\sigma_{SWCNT}\right] \tag{3}$$

$$\sigma_{NMS}(w) = \frac{1}{R^2}\left[(2R^2L_1 + (R^2 - r^2)L_2)\sigma_{Coat} + \left(-j\frac{4e^2V_fL_2}{\pi^2h(w - jv)}\right)\right] \tag{4}$$

$$\sigma_{NMS}(w) = \frac{1}{R^2}\left[(2R^2L_1 + (R^2 - r^2)L_3)\sigma_{Coat} + L_3\left(\frac{4e^2V_fv}{\pi^2h(w^2 + v^2)} - j\frac{4e^2V_fw}{\pi^2h(w^2 + v^2)}\right)\right] \tag{5}$$

Where r is the radius of SWCNT, e is the electron charge, h is the reduced Plank's constant ($h = 1.05457266\times10^{-34}\ J.s$), t is average thickness of coating layer, V_f is the Fermi velocity of CNT ($V_f = 9.71\times10^5$ m/s), v is estimated phenomenological relaxation frequency ($v = \frac{6T}{r}$), when T is temperature in kelvin, so $F_v = v/2\pi$, and w is the angular frequency.

For the purpose of EM modelling and simulation the plasma frequency (W_{NMS}) is important parameter of the NMS that must be estimated in this mathematical modeling approach.

$$W_{NMS} = \frac{e}{\pi R}\left[\frac{4V_f + \pi^2hD}{h\varepsilon^o}\right]^{1/2} \tag{6}$$

$$D = \left(\frac{(R^2 - r^2)\ v\ \sigma_{Coat}}{e^2} \right) \quad (7)$$

The relative complex permittivity of the NMS is derived, based on the material parameters reported in this mathematical modeling approach and the general mathematical relation between the complex permittivity and plasma frequency.

$$\varepsilon'_{NMS} = 1 - \frac{w^2_{P,NMS}}{w^2 + v^2} \quad (8)$$

$$\varepsilon''_{NMS} = \frac{v\ \ w^2_{P,NMS}}{w^3 + wv^2} \quad (9)$$

Where, ε'_{NMS} and ε''_{NMS} represents the real part and imaginary part of the relative complex permittivity of the NMS. From the above mathematical representation and analysis for the NMS, one can conclude that the (effective conductivity, relative complex permittivity, and plasma frequency) are affected by several parameters such as the conductivity of coating material (σ_{Coat}) and average thickness of coating layer (*t*). In another context, the EM behavior of these structures will be changed corresponding to the change of these parameters.

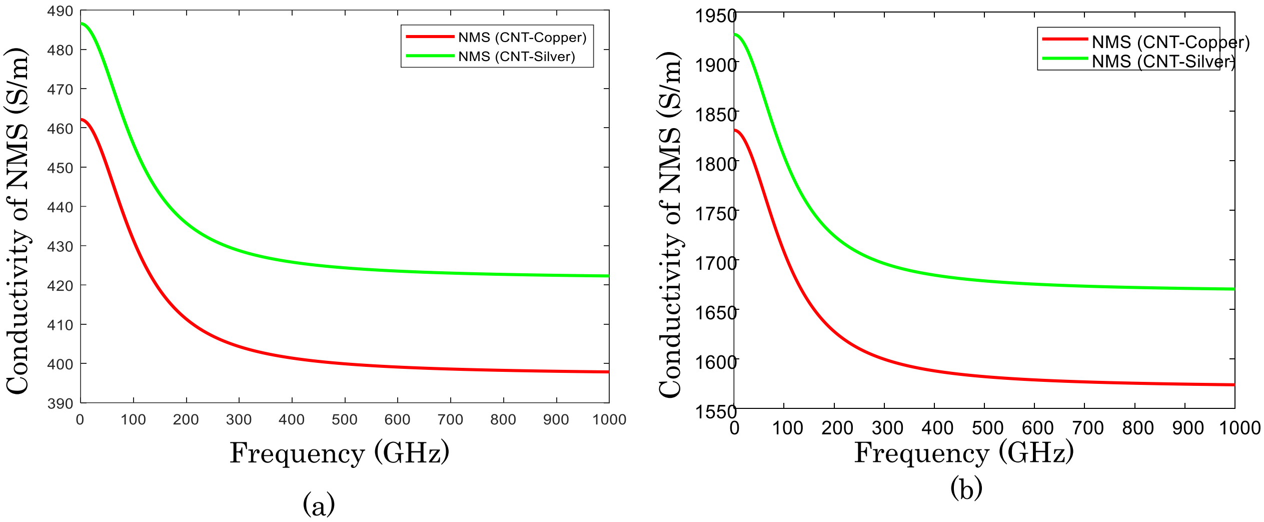
2.3 Simulation Modelling Approach of New Material Structure

In modern research of antenna applications, the investigation of electromagnetic properties is very important to candidate the materials to design and implement the modernist antennas. This work relies on the EM representation approach to represent the CNTs-composite material structure based on their major parameters that have been extracted for the purpose of EM simulation. This model is inherently limited to the case of SWCNT-composite material structure. These parameters have been employed to represent the NMS by equivalent bulk material into CST (MWS). The main objective of this modelling approach is to enable simple and efficient EM analysis for the NMS using the CST (MWS). Therefore, the material parameters of NMS have been set in the CST (MWS) to design and implement the dipole antennas of NMS to estimate the antenna parameters of NMS.

III. SIMULATION RESULTS AND DISCUSSIONS

This section presents the simulation results of the proposed material structure NMS (SWCNT-copper) and (SWCNT-silver) according to their material parameters through CST (MWS).

The behaviour of electrical conductivity of the NMS dipole antennas are presented to explain the dependency of the behaviour of this structure on the different parameters such as length of SWCNT, radius of SWCNT, type of coating material and average thickness of coating layer. In these simulation results the length of coating material at the two terminals of tube is $L_1 = L_3 = 0.005\ L_2$**.** Figure (3-a) presents the dependency of conductivity of the NMS on the frequency at SWCNT length L = 10 µm, radius of SWCNT is r = 2.71 nm and the average thickness layer of coating material is t = 2nm. At the same dimensions with SWCNT length L = 40 µm**,** Figure (3-b) present the dependency of conductivity of the NMS on the frequency. Figure 4, present the dependency of conductivity of the NMS on the frequency based on SWCNT length L = 10 µm, radius of SWCNT is r = 6.77 nm and the average thickness layer of coating material is t = 2nm. Meanwhile, the dependency of conductivity of NMS on the frequency based on SWCNT length L = 10 µm, radius of SWCNT is r = 2.71 nm and the average thickness layer of coating material are t = 5 nm and t = 2 nm have been presented in Figure 5 and Figure 6, respectively.



(a) (b)

Fig.3. Simulation results of conductivity of NMS (SWCNT-copper and SWCNT-silver) radius r= 2.71 nm, average thickness layer of coating material is t=2nm, and (a) at antenna length L = 10 µm (b) at antenna length L = 40 µm.

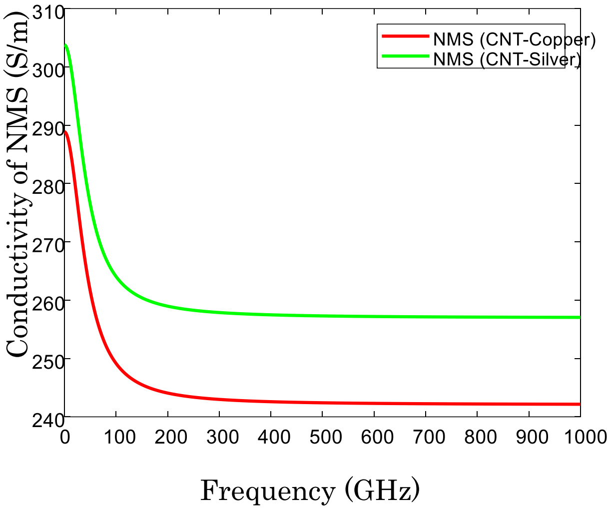


Figure 4. Simulation results of conductivity of NMS (SWCNT-copper and SWCNT-silver) radius r= 6.77 nm, average thickness layer of coating material is t=2nm, and at antenna length L = 10 µm.

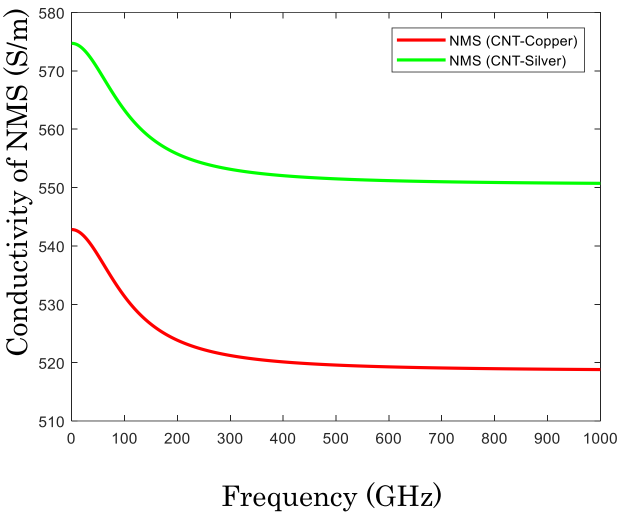


Figure 5. Simulation results of conductivity of NMS (SWCNT-copper and SWCNT-silver) radius r = 2.71 nm, average thickness layer of coating material is t=5nm, and at antenna length L = 10 µm.

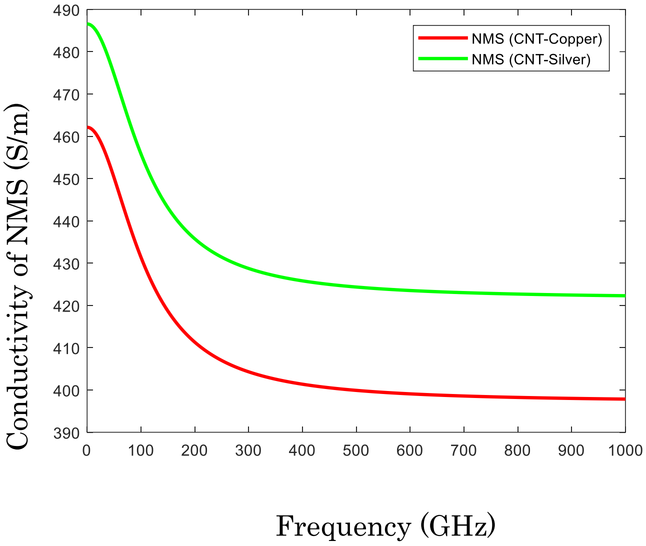


Fig.6. Simulation results of conductivity of NMS (SWCNT-copper and SWCNT-silver) radius r = 2.71 nm, average thickness layer of coating material is t=2nm, and at antenna length L = 10 μm.

As illustrated in these results, the conductivity has been inversely proportional to the radius of SWCNT based on Figures 4&5 and proportional to the length of SWCNT based on Figure 3, and the average thickness of coating layer based on Figure 5 and Figure 6. The EM simulation results of the NMS (SWCNTs-copper) and NMS (SWCNTs-silver) dipole antennas are presented in this section based on different antenna lengths L and an average thickness of coating layer (t) is between 2 to 5nm. The main parameters of the NMSs were mathematically derived and inserted into the CST (MWS), Drude dispersion method as a new normal material, in order to represent these structures in the CST (MWS). The dipole antenna of both structures of the NMSs are designed and implemented to estimate their EM properties.

Figure 7, illustrates the simulation results of S_{11} parameter of the NMS (SWCNT-copper and SWCNT-silver) dipole antennas with SWCNT radius r = 2.71 nm, average thickness of coating layer t = 2 nm, and total antenna length L = 10, 20, 30, and 40μm.

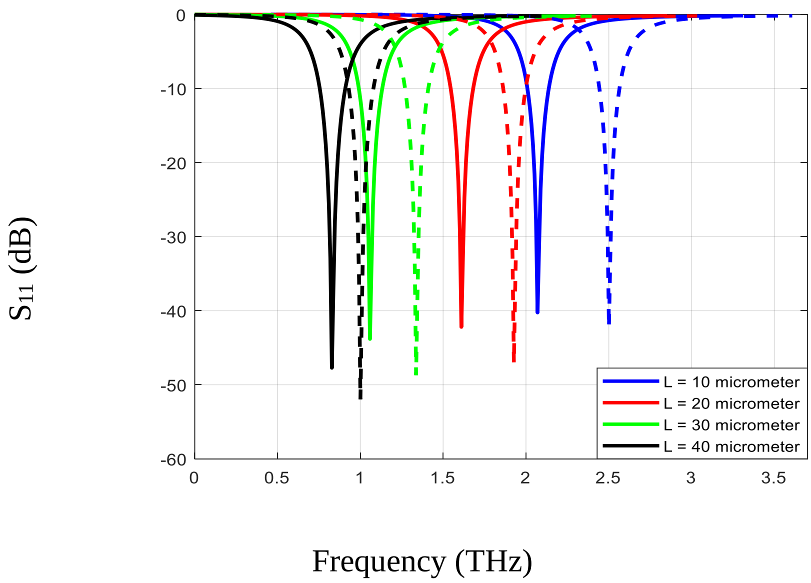


Fig. 7. Simulation results of S11 parameters of equivalent NMS (SWCNT-copper as solid line) and (SWCNT-silver as dotted line) dipole antennas where, r = 2.71 nm, t = 2 nm, and the antenna length L= 10, 20, 30, and 40 μm.

The comparisons of simulation results for the SWCNT-copper and SWCNT-silver dipole antennas with CNT dipole antenna (SWCNT dipole antenna) have been presented based on the similarity of dimensions of these dipole antennas. For this purpose, the simulation modeling approach of SWCNT presented in our previous work [4, 6], has been utilized to design and simulate the SWCNT dipole antenna into CST (MWS). The simulation results of SWCNT dipole antenna are illustrated in Figure 8, with different dipole antenna length.

According to the antenna performance, the scientific comparisons for SWCNT-copper and SWCNT-silver dipole antennas with original (CNT dipole antenna) SWCNT dipole antenna have been implemented based on the similarity of dimensions of these dipole antennas. These comparisons are implemented to clarify the advantages of these new material structures over the pure CNTs (SWCNTs) dipole antenna. Table 1 and Table 2 are present the results of these comparisons.

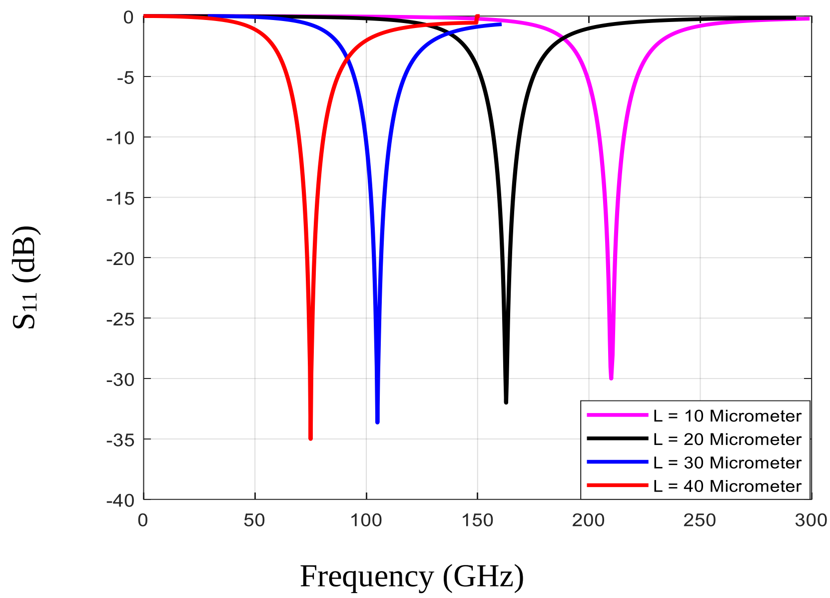


Fig.8. Simulation results of S11 parameters of equivalent SWCNT dipole antennas Where, r = 2.71 nm, and the antenna length (L= 10, 20, 30, and 40 μm.

Table 1. Summary of comparison results for SWCNT and NMS (SWCNT-copper) dipole antenna.

***L* (μm)**	**SWCNT dipole antenna**				**NMS(SWCNT-Copper) (after coating)**			
	***Fr* (GHz)**	**Directivity (dBi)**	**Gain**	**Efficiency**	***Fr* (THz)**	**Directivity (dBi)**	**Gain**	**Efficiency**
10	210	1.96	9.61×10^{-5}	6.11×10^{-5}	2.1	1.92	7.5×10^{-2}	6.33×10^{-2}
20	162	2.05	9.89×10^{-5}	6.18×10^{-5}	1.6	2.10	6.47×10-2	5.68×10^{-2}
30	105	2.21	1.07×10^{-4}	6.44×10^{-5}	1.1	1.95	7.4×10^{-2}	7.1×10^{-2}
40	76	2.14	1.10×10^{-4}	6.74×10^{-5}	0.8	1.94	8.2×10^{-2}	7.5×10^{-2}

Table 2. Summary of comparison results for SWCNT and NMS (SWCNT-silver) dipole antenna.

L (µm)	SWCNT dipole antenna				NMS (SWCNT-silver) (after coating)			
	Fr (GHz)	Directivity (dBi)	Gain	Efficiency	*Fr* (THz)	Directivity (dBi)	Gain	Efficiency
10	210	1.96	9.61×10^{-5}	6.11×10^{-5}	2.5	1.95	4.85×10^{-2}	4.2×10^{-2}
20	162	2.05	9.89×10^{-5}	6.18×10^{-5}	1.9	1.93	5.23×10-^{2}	4.75×10^{-2}
30	105	2.21	1.07×10^{-4}	6.44×10^{-5}	1.3	1.94	6.33×10^{-2}	5.9×10^{-2}
40	76	2.14	1.10×10^{-4}	6.74×10^{-5}	1.0	1.92	7.42×10^{-2}	6.85×10^{-2}

As can be seen in Figure 7 and Figure 8 with Tables 1 and Table 2, the NMS (SWCNT-copper) and (SWCNT-silver) resonate at 1.6 THz and 1.8 THz, respectively at antenna length L = 20 µm. Also, the NMS (SWCNT-silver) has a resonant frequency higher than NMS (SWCNT-copper) and SWCNT dipole antennas at the same shape, lengths and size. These differences of resonant frequencies were due to the different properties of their material structures, as well as due to the different properties of the electrical conductivity of these structures as illustrated in Figure 3, Figure 4, Figure 5 and Figure 6.

Also, the bandwidth of SWCNT dipole antenna was 11.551GHz in resonant frequency 162 GHz and the bandwidth of NMS (SWCNT-copper) dipole antenna was 0.15THz in resonant frequency 1.6 THz, at antenna length 20 µm. From these results, the NMS (SWCNT-copper) and (SWCNT-silver) is suitable for THz frequency range.

On the bases of these comparisons, the advantages of the new structures are shifting up the resonant frequency and increased the bandwidth of their dipole antenna compared with the dipole antenna of SWCNT. Additionally, the gain and efficiency for the NMS dipole antenna are enhances compare with SWCNT dipole antenna, as well as enhancement the S_{11} parameters behavior.

On the other hand, to explain the advantage of the NMS over copper material, the scientific comparison is implemented for these materials based on the same dimensions of dipole antennas. Therefore, the dipole antenna of copper material is designed and implemented using CST (MWS). The copper dipole antenna was designed with antenna lengths (DL = 10, 20, 30, and 40 µm) and radius (rcu = 4.71 nm). The simulation result of copper dipole antenna is illustrated in Figure 9. In this figure, the copper dipole antenna shows no resonant frequency which is in agreement with the finding demonstrated by [2]. On the bases of the NMS dipole antennas results that presented in Figure (7), the NMS can be considered as a good material structure for designing dipole antennas at nanoscale and microscale dimensions. This very important advantage for the NMS over copper material at these scales dimensions.

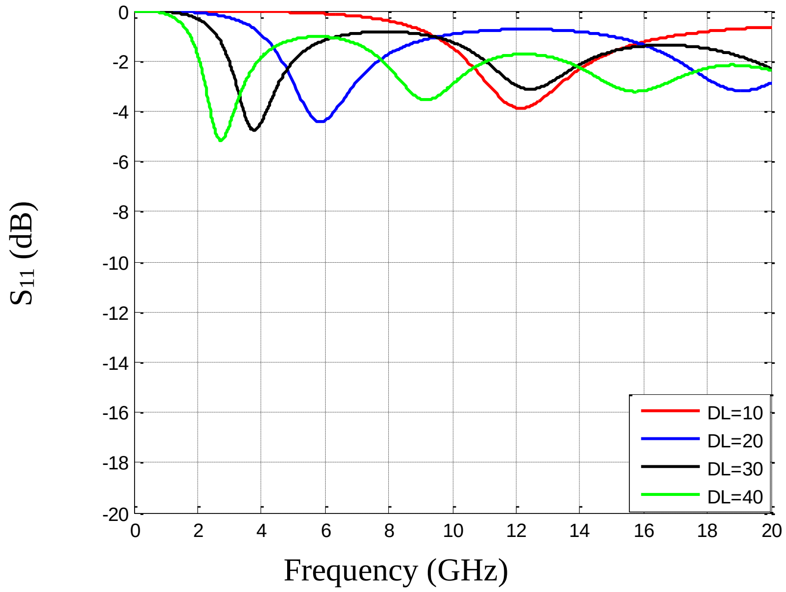


Fig.9. Simulation results of S11 parameters of Copper dipole antenna where, rcu = 4.71 nm, and the antenna length (DL= 10, 20, 30, and 40 μm.

IV. CONCLUSIONS

In this work, the new material structure (NMS), SWCNTs coated by a thin layer of a copper and silver material, respectively, are presented. The main purpose of this structure is to design the dipole antenna with two different structures (SWCNT-copper) and (SWCNT-sliver).

The NMS (SWCNT-copper) and (SWCNT-sliver) are proposed to design the dipole antennas with the enhancement of antenna parameters such as S_{11} parameter, gain, efficiency, bandwidth, and other parameters compared with the original SWCNTs dipole antenna and copper dipole antenna. All these enhanced antenna parameters are shown and elucidated in this work. Finally, on the bases of the results presented in this work, the NMS (SWCNT-copper) dipole antenna has better gain and efficiency than of other dipole antennas.

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Challenges of Learning Management Systems and Current Trends

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***Abstract*— *Information and communication technologies (ICT) and Learning Management Systems (LMSs) are important multifunctional tools developed for higher education institutions, but in fact, the success of these systems largely depends on a detailed understanding of the challenges and factors that influence the e-learning of their users. During the quarantine period due to Covid-19 in the world, Learning Management Systems were used worldwide in Higher Education as software or method to promote the course delivery. Since it was the first experience of many Egyptian higher education institutions with the use of the learning management systems during the pandemic, challenges were expected. This research aims to examine the challenges faced by LMS use and the factors influencing its use among teachers and students. The results of this research could help researchers, policy-makers, and practitioners from public and private universities to gather insights on the successful application and use of LMS during and after Covid19.*

***Keywords*— LMS; Covid-19; e-learning; ICT.**

I. INTRODUCTION

During the pandemic period "Covid-19", the past year's events showed the importance of finding out a well-designed platform acting as a gate to ensure the communication between various parties of different types of organizations to improve their employees' skills.

When it comes to the digitization era attention has to be paid to learning premises in developing countries, which face many challenges of the educational process starting from the student's registration, scheduling online sessions, discussion groups, quizzes and exams, final results, etc.

Hence the urgent need for an online system to change the education nature from face to face and instructor-centered to open and freely learner-centered based on material that could be accessed from anywhere anytime to satisfy the student's needs and to coop with the digitization technology that reshapes the education system with all its entire processes.

Where the communication between learners and their educational institutions must be done through an official portal that has the ability to manage every single detail which is known as Learning Management System (LMS) defined as a web-based software platform that provides an interactive online learning environment and automates the administration, organization, delivery, and reporting of educational content and learner outcome [1]. Also, it could be considered as a platform or software that provides an online portal to collaborate teaching and learning seamlessly, making it more productive and engaging, and providing the space for educators and learners to collaborate in a way that is progressive and effective [2].

II. LEARNING MANAGEMENT SYSTEM FEATURES

According to the concepts of both the e-learning process and LMS, it is obviously highlighting the deep connection between each other, where e-learning lead the transformation of content to digital form to easy published through the internet, also based on the LMS concept mentioned before, it has many tasks not limited to automating the administration, tracking, and reporting of training events by registering every single behavior. To achieve the goal of LMS it must be characterized by some common features:

- Robust and available anytime anywhere
- Scalable to accept the future development
- Interoperability to support different resources also can be integrated with current systems.
- Students-Centered with enhancement methods
- Availability of communication tools with both types:
    - Instructor-Student and also,
    - Students-Students' tools through discussion groups, messages, and e-mails.
- Support multimedia content
- Stable and secure: only authorized users can navigate the system.

In addition to a unique feature to each type of LMS, it will be mentioned later in a brief comparison, as there are some common features or characteristics in each category or type that has different vision and target, or how does it affect the quality and strength and could be considered evaluation criterion to LMS which is not limited to: reporting and analytics tools especially when it has customizable reporting options useful in metrics and tracking the competitors, also data migration whatever you develop in a new one or merging both old and new ones, also the collaboration tools to guarantee the full communication among different parties, flexibility to accept the new trends like mobile-based learning, or Artificial intelligence-based learning, etc

III. LEARNING MANAGEMENT SYSTEM TYPES

Choosing the LMS software is not an easy mission as a result of the presence of a large amount of it, and they are differing from each other in many aspects, especially the source code, development and testing, the way of installation, authentication, flexibility, and cost, also the users or client's type or by another meaning who will be used and where. These types could be listed in different ways it could be as follow:

- Proprietary LMS
- Open–Source LMS
- In house Housing of data LMS
- Cloud-based LMS

Or by another meaning: Self – Hosted LMS (installed), Open- source LMS, Cloud-based LMS, Commercial (corporate LMS).

How to make a decision and on what basis? Which approach should be followed? Proprietary LMS or Open-Source LMS? In-house Housing of Data or Cloud-Based LMS? Each of them has its own advantages and disadvantages and depending on the resources, control degree, security level, cost

3.1 The proprietary

The proprietary is a closed and personalized LMS, it is designed based on the client's needs, the acquisition of this type includes installation and user training, enabling the creation of any course content but has some restrictions in accessing the source code for developing process also has a limited control for testing and it is very expensive you must pay for every single feature. Where the other approach is an Open-Source LMS with a free basic package, and you will pay for advanced features like hosting fees, maintenance fees, back-ups, extra storage space, and more tech support, also it is a personalized, friendly, easy to use package with full access to source code to add a customized feature or to fix any bugs**.**

3.2 Self-Hosted LMS

Self-Hosted LMS differs from cloud-based LMS, where it is a licensed product the decision-makers in the organization have the full rights and control of the installation, upgrading, entirely deployed, and self-hosted LMS that has a high level of security than cloud-based easy in monitoring the servers. But now and then you must backup your data and the system must be updated.

3.3 Cloud-based LMS

Cloud-based LMS is a flexible, customized system that offers both free and paid backup from data, provides a secure monitor to servers, and full right for installation and upgrading, the client can choose freely the price and storage needed plan based on the business needs, by selecting this type (cloud-based) you gain a high degree of confidence to control the sensitive data and could be accessible from anywhere using any device, but it faces some drawbacks as it requires:

- Full reliable internet connection where the internet speed has a direct impact on the system efficiency.

- Data Safety: there is no full protection but it may be affected by data loss and facing a direct attack.
- Cost fluctuation: charging for features that were once free, such as support services.
- The last drawback to consider when moving to cloud computing is the LMS vendors themselves. There's no getting around the fact that could-based eLearning relies on the professionalism of host platforms, their teams, and their servers.

IV. EVALUATION CRITERIA AND ASSESSMENT

Most methods developed to evaluate learning management systems combine the key criteria for rating the category, and each system evaluated is then described to determine whether it meets the requirements of the relevant standard [5]. Elaboration of evaluation criteria depends mainly on the different types of functional and technical possibilities, with the addition of financial evaluation criteria.

The key evaluation categories are productivity tools, communication tools, student engagement tools, administrative tools, tools for creating and managing learning content, pricing and licensing rights, and hardware/software requirements [6]. The categories of evaluated criteria and related criteria have been developed to maximize the ability to obtain a comprehensive assessment of the capabilities of the system under study.

All economic parameters remain outside the evaluated components, where receiving a truly comprehensive evaluation including the financial statements requires information on the proposed system price, possibly the cost of separate modules, as well as the period to be used for the subscription and the cost of implementation and integration services for open-source systems. The economic efficiency of learning management systems is a separate direction in the LMS assessment and should be considered and evaluated independently of the technical and functional capabilities of learning management systems. Defining a comprehensive list of assessment criteria for the learning management system is a complicated task. In terms, there are thousands of system functions of the different features and specific requirements of the institutions conducting the pre-implementation assessment. 11 categories of criteria were developed. In order to ensure an effective ex-post evaluation, the organizations applying the learning management system must supplement the criteria with those that are specific to it.

4.1 Develop and Organize Learning

Content tools for building learning content multimedia, and interactive resources that interact with the trainee to the maximum.

1.1 Assessment and Certification

A test complex that provides an assessment of learners' knowledge, skills, and competencies, provides feedback, and tools for administrators to analyze and process results.

1.2 Security with Speedily Access Control

Ensuring the security of personal data, providing access for different types of users, and defining access rights

1.3 Information and Notifications

This is a virtual environment for receiving notifications and informing consumers about upcoming events, expiring deadlines, etc

1.4 Communication

Tools for communication and collaboration between users that simulate the learning process to the maximum.

1.5 Reports and Statistics

Tools provide for reporting, attendance and progress analysis, and success rate for trainees for both training courses and the system as a whole.

1.6 Multi-Platform, Design, and User Experience

System design and usability, adaptive design with accessibility from /to different platforms, device sizes, and mobile access applications.

1.7 Personalized (adaptive learning and gamification)

Tools for creating and delivering customized learning content, and customized learning path for users.

1.8 Supportive

Specifically, SaaS-based LMS platforms, which include tools that deliver additional services ensuring sustainable development and quality.

1.9 Integrity

Tools to build integration with other systems, SCORM support, integration with HR management systems, and authentication systems.

1.10 Usability

Intuitively easy to apply the system.

V. LEARNING MANAGEMENT SYSTEM CONTENT (CMS – LCMS)

In the past two years, the use of the internet is played an essential role in most of aspects in our life, especially during Covid-19 pandemic, where everything and a word became preceded by the letter (e); e-marketing, e-shopping, e-learning, and most of the employees are working from home instead of the premises.

referring to LMS concept the content or learning resources are considered the core of the e-learning process, so the content or course material must be well designed or modified to meet learners' needs and styles.

Many studies declare that e-learning has different scenarios, also the content is created in different formats and styles to facilitate its complexity, so the content must be managed efficiently to achieve the required target by using a content system.

A content Management System (CMS) is a system used to manage the content and contains the most basic functionality, CMS system may also provide tools that allow publishing, editing, modifying content, and maintenance by combining rules, and processes [8].

So, it is considered an effective tool providing an environment that includes full details and information about the organization, the student, and the registration system which helps in creating a professional online course, when the integration between CMS and LMS the Learning Content Management System (LCMS) is produced to guarantee the delivery of the content via LMS to facilitate the efficiency of using e-learning system. [9] it will be summarized in the following lines are the different content formats:

A. Images

(Photos, diagrams, or illustrations) can help the reader visualize the message

B. Videos

are especially effective for demonstrating a process, such as how something is put together.

C. Webinars

are online-only workshops. They can be presentations, discussions, demonstrations or other instructional sessions and are usually presented by a subject matter expert.

D. Slide Presentations

Traditional slide presentations usually include a presenter speaking to an audience, while the content on the slides holds the listeners' attention and adds visual interest.

E. Podcasts

Is a digital audio file made available online for downloading to a computer or mobile device.

F. Forums

Is a public medium, such as a newspaper column. In a digital sense, forums are websites where ideas can be discussed or solutions to issues can be posted

G. News/Social Feeds

Are new industry developments, research reports, case studies, product launches, and articles. Providing employees with this new and updated content is part of a continuous learning process.

H. Exams/Quizzes

Are an educational staple. Online or in the classroom, they're used to reinforce the information presented in the course and to test the participant's knowledge about it.

I. Games

No one can argue about the incredible popularity of video games. But did you know they can be used to enhance eLearning? Adding gaming to online training can capture participants' attention while challenging and entertaining them—and most importantly teaching them.

J. Infographics

Are visual images that are used to represent information or data. They help explain a complex concept or provide visual clues to support information.

K. Blogs

Is an abbreviated version of "weblog," which is an ongoing series of articles and information. Blogs are often featured on website pages and usually include links to other online sources that support the information they present.

L. Ebooks

Is an "electronic book," which is a digital version of a written manuscript. eBooks consist of text, images, or both—and they can be read on computers, tablets, and mobile devices.

Why Moodle?

The learning process has its own complex nature as it deals with three main axis or pillars: instructors with their various scientific backgrounds, the students with different learning styles, and the content itself, the learning management system could solve this complexity.

Each educational organization has its own vision and strategy to improve its experience and its tools to keep the students motivated and engaged based on the right and accurate selection to LMS that satisfies the need for instructors to cover every single detail in delivering the content, student's evaluation, as for students in gaining material based on their style, assignment delivery, quizzes, final exams, and the results.

Moodle (Modular Object-Oriented Dynamic Learning Environment) as an open-source LMS is considered one of the top 20 in the educational field according to a recent statistical study, its selection is based on effective and reliable criteria as follow: User interface (UI), Usability, Integrations, and Value for money [10]. During the past years starting from 2019 -2022 many studies declare the importance of Moodle as a most popular environment which has a significant role in reshaping e-learning outcomes and achieving high rates of presence in the market, the study results have been shown in figure (1) representing Moodle's Goal study by [11] clarified the important role of Moodle before and during the quarantine, the research done within the academic year 2019-2020 used both theoretical and empirical analysis methods by filling a Google-form questionnaire to investigate 1- the goals of using Moodle system and, 2- how it could change the attitude, the sample consists of 74 students and 37 professors and the results presented clearly in the following figure 2.

The percentage of all aspects concerning the Moodle goals: using the material for practical work, studying theoretical material, exchanging information, reporting, training, tracking students, and communication indicates the critical role that Moodle played in this issue.

As for the second issue, changing the student's attitude also in this regard, the results also confirmed the importance of the role played by Moodle, where the students have the ability to study in the most convenient place and at a convenient time, friendly user interface as an advantage of the system, ability to immediately view the results of performed work, the possibility to follow up the missed classes and complete the necessary tasks. As per teachers, they change their negative perception towards using this platform in interacting with students also the same with uploading different types of resources.

Another study by [12] investigated the possibility of Moodle as a learning management system to improve the efficiency and ensure the adaptivity of e-learning and how it can fulfill the student's needs, using a well-designed questionnaire that included ten inquiries intended to explore the level of how students accepting e-Learning possibilities and the most appropriate learning styles in Moodle. The proposed system combined Moodle with an adaptive module that provides automatic sequencing of learning material under students' knowledge and learning styles. The sample consisted of 162 students, and the majority of recipients were satisfied with the quality of eLearning courses with 55%, The question regarding whether the learning style is taken into account during a Moodle course received the most significant number of positive answers with 82%, but the prevailing part of respondents does not get good in self-learning and receiving educational information by ear with 36.4%.

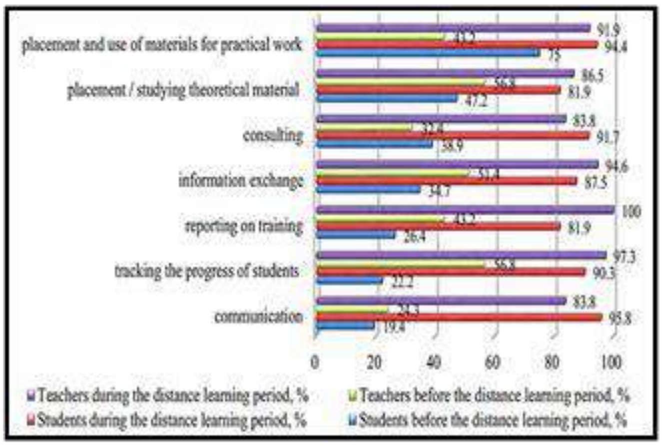

Fig.1 Goals of Moodle LMS Employment, Source [11]

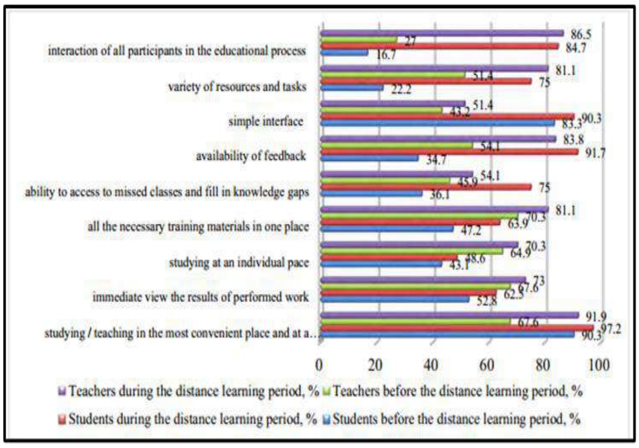

Fig.2: Assessment of Moodle LMS Advantages, Source [11]

The discussion concluded that the improvement of the model for adaptive eLearning in the Moodle LMS was based on the personalization of a learner's preparation experience.

VI. INSIGHTS ABOUT THE USAGE, NEEDS, AND REQUIREMENTS BASED ON THE CLIENT' TYPE

The characteristics of learning in the 21st century have new forms because of the utilization of ICT learning [13], digitization, and e-learning [14]. The increasing use of technology and digital learning environments presents organizations, teachers, and trainers with the challenge of supporting technology in education and training. However, the online course requires time, resources, skills, and knowledge. Utilizing learning management systems is one approach to e-learning [15], which had gained popularity among both the users (student or employee) and the administrator (organizer or institution) as a software application used to plan, implement and review the entire learning process. Also are known as the following titles knowledge virtual learning or learning environments, course management programs, and management systems. [16] Canvas, Moodle, and Blackboard have known LMS software solutions used for online learning. These systems contain features including user registration, tasks, course management, exams, quizzes, course materials upload, messaging, etc. In other words, LMS is a software solution that manages the administration, monitoring, and reporting of online courses and curricula within an organization.

After the COVID-19 became a global pandemic in 2020, many public and private organizations, including institutions, universities, and schools, have been closed down around the world [4]. By using the right tool like LMS, COVID-19 paves the way for a different form of learning and teaching [17].

6.1 Who Needs an LMS?

Any organization wishing to share training, education, or supporting materials with others should consider an LMS. Whether for work or school, using one of the many options available will help it connect with employees or learners from afar. There is now no doubt that LMS now has to be the backbone of every organization aspiring to deliver high-quality, continuous education [18].

6.2 Why do Organizations Need an LMS Today?

With the Learning Management System, the organization can store all its content in one place, reducing the risk of losing critical data and even making the organization a very simple task. Each member of the eLearning management team or other users can then access information, data, or anything else through the cloud storage system [19]. Now coming at the uses for which an organization according to its activity can use its LMS to serve the following purposes:

Distance Education. A method to teach during vacation, during pandemics, to promote education in places with poor infrastructure, or to provide courses, materials, and other important things.

Staff Training. Skilling or giving specific training to your employees. It can help arrange classes, distribute, and test learning modules for progress.

Extended Training. By providing vital knowledge about your product to third-party organizations or to the employees you outsource to your projects, the scenario is vast in the current context of open economies.

Customer Guidance. When introducing new products to customers, the organization may need to train them on some of the more critical aspects.

6.3 What do Organizations Need When Selecting an LMS?

[20] explored, the problem of choosing the platform on which to build the virtual learning environment is critical, and this choice depends on a number of factors: which requirements are placed on the environment, which functional characteristics should be present, for which users the environment is intended and above all, which means that you should buy and maintain the necessary platform. The choice will be the commercial solutions or open-source solutions.

The benefits of commercial software are well known: They are usually reliable products with appropriate user support, regular updates, and new versions. Defects of commercial software are source code is not available for enterprise technical support, so no minor user-level changes are possible. Defects of commercial software, the source code is not available for enterprise technical support, so no minor user-level changes are possible, to perform those changes via the manufacturer will tack a period of time. Besides the high cost of a commercial product, regular payments for a license and an increase in the number of users.

Where the unquestionable advantage of open-source products is the most choice for educational projects because it is based on the idea of collaboration that allows combining the talents and experiences of a large number of teachers and students. In any case, the following minimum requirements must be taken into account when deciding between commercial or open-source software [21]:

a) Learning Object Repository. The learning objects

repository is a central database that stores and manages learning content. From this point on, users will have access to individual learning objects either as individual elements or as part of a larger learning module, which may be part of a complete course; This process is defined according to the individual learning requirements. The end product can be accessed via the web, a CD-ROM, or in a hard copy. Each object can be used multiple times and for different purposes depending on the requirement

b) Automated Authoring Software. Are used to create reusable training objects, which will then be available in the question bank. The application automates the development process by providing authors with archived samples and samples containing basic design principles for educational content.

c) Dashboard (Interface for displaying). This

component provides tracking of results, links to relevant information sources, and various evaluation and feedback options from users.

d) Management Tools. This application is used to

manage user accounts, run courses, track results, compile reports about the learning process, and other simple administrative functions. This information can be passed along to the Learning Management System (LMS) designed to perform more advanced management functions.

The following table summarizes the comparison of the top recent LMS trends based on the effective criteria and the business needs requirements [22]:

Table 1: A Comparison of Top Recent LMS Trends Table

Criteria	Blackboard LMS	Canvas	Moodle
User Satisfaction	93%.	64%.	79%.
Pricing Model	Free Trial, Subscription	Free Trial, Freemium, Subscription	Free, Subscription.
License	Paid.	Open Source.	Free, Open source.
Criteria	**Blackboard LMS**	**Canvas**	**Moodle**
Overview	Large enterprises (>10,000).	Public administrations.	Large enterprises (>10,000).
	Non-profits.	Small/medium businesses.	Non-profits
	Small/medium businesses.	-	Academic.
	-	-	Public administrations.
	-	-	Small/medium businesses.
Deployment	Self-hosted cloud-based.	Mobile application.	Mobile application.
		Software as a service/cloud.	Self-hosted cloud-based.
		-	Self-hosted system.
Platforms	Apple Safari.	Apple Safari.	Apple Safari.
	Google Chrome	Google Chrome.	Google Chrome.
	-	Internet Explorer.	Internet Explorer.
	-	Mozilla Firefox.	Mozilla Firefox.
Training	Documentation	Documentation.	Documentation.
	In-person.	In-person.	Online tutorials.
	Live online.	Live online	-
	Online tutorials.	Online tutorials.	-
		Webinars.	-

Support	24/7.	24/7.	FAQ.
	Live Online.	Live Online.	Knowledge Base.
Criteria	**Blackboard LMS**	**Canvas**	**Moodle**
Support (cont.)	Online Community.	Online Community.	-
	-	Phone.	-
Activity Grading	-	Gradebook.	Course history.
	-	-	Gradebook.
	-	-	Gradebook audit trail.
	-	-	Gradebook comments.
	-	-	Manual grading (Marking).
	-	-	Multiple grading scales.
User Authentication	Manual accounts.	Self-registration.	Active Directory/ LDAP integration.
	Self-registration.	-	Manual accounts.
	-	-	No login.
	-	-	Self-registration.
User Authentication (cont.)	-	-	Self-registration w. admin confirmation.
Course Categories	-	-	Assign courses to categories.
	-	-	Create new categories.
	-	-	Manage categories.
Criteria	**Blackboard LMS**	**Canvas**	**Moodle**
Course Creation	-	Assignments engine.	Assignments engine.
	-	Built-In authoring tool.	Built-In authoring tool.
	-	Can reuse PPTs, PDFs, videos.	Can reuse PPTs, PDFs, videos.
	-	Changing Course default settings.	Changing Course default settings.
	-	Consume online video content.	Consume online video content.
	-	Scheduling LIVE events	Course backup options.
	-	Tests engine.	Drag & Drop interactions
	-	Upload courses.	Learning paths (Curriculums).
	-	-	Scheduling LIVE events.
	-	-	Survey Engine.
	-	-	Tests engine.

	-	-	Upload courses
User Enrollment	-	Attendance tracking	Attendance tracking
	-	Automated-enrollment (based on user data)	Automated Enrollment (based on User data)
	-	Self-enrollment	Guest Access Settings
	-	-	Manual-enrollment
	-	-	Progress tracking
	-	-	Self-enrollment

VII. CONCLUSION

As stated, ICT and LMS have a vital impact on the Higher education especially during pandemic period, where LMS facing many challenges despite its features based on different types and vision.

There were 11 categories of criteria developed to ensure the effectiveness of the selected LMS the fit the learners' knowledge and skills. Since the content or course material are considered the core of e-learning so it must be well designed to suit the different types of students. The learning Content Management System (LCMS) produced to guarantee the content delivery via LMS with all different formats, to achieve these goals a comparison of the top recent LMS trends had been done to select the most appropriate one, this comparison declared the importance of Moodle as a most popular environment which has a significant role in reshaping e-learning outcomes and achieving high rates of presence in the market.

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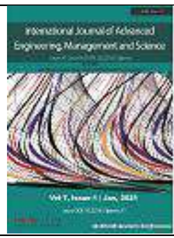

Investigating the influence of Types of Advertisement and Customer Choice

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***Abstract*— *In today's highly competitive business environment, companies frequently use advertising and ongoing promotion methods to entice customers and increase sales. The study was intended to determine whether or not shoppers in Erbil were influenced by various kinds of advertising before making purchases. The researcher employed a quantitative strategy for data analysis. The research aims to provide insight on the factors that influence customers' ad preferences among Erbil's small and medium-sized enterprises (SMEs). Researchers employed a random sampling approach to obtain data from participants so that their study would be representative of the whole population of interest. The study gathered data from many small and medium-sized enterprises (SMEs) in the Erbil area. In all, 160 questionnaires targeting small and medium-sized enterprises (SMEs) in Erbil city were sent; however, only 129 were returned with complete responses. A questionnaire was developed in order to learn how various types of advertising influence customers' willingness to make a purchase. The findings revealed that five types of advertisement had a significant and positive influence on customer choice at selected SMEs in Erbil, however it was found that online advertisement was found to be the most effective advertisement tool to influence positively and significantly on customer choice.*

***Keywords*— Advertisement, SME, Customer Choice, Erbil**

I. INTRODUCTION

Advertisements appear in a wide variety of media, including print (books, periodicals, and brochures), outdoor (billboards, events), broadcast (television, radio), the internet (social media, display advertisements), and product placement (ads displayed in movies and shows). In order to influence customers' purchasing decisions, advertising's primary objective must be convincing. It is common practice to evaluate advertisements based on how successfully they convey their intended messages or the degree to which the advertisement's stated goal was met (Högberg et al., 2019). An advertisement is a crucial part of any marketing plan since it informs customers about your goods and encourages them to make a purchase. Customers' perceptions of a product's quality might be informed by the data they collect, data that is typically provided via marketing. As a result of technical and economic shifts, companies competing against one another in this decade and the decades to come have a significant challenge in altering customers' perceptions of their products and influencing their purchasing decisions (Tseng and Wei, 2020).

Several investigations and research have been conducted for the purpose of getting to the bottom of just what advertising is. According to Königstorfer and Thalmann (2020), various sorts of businesses employ it for a variety of reasons since it is a potent marketing weapon that may influence people's thoughts and actions. According to Golnar-Nik et al. (2019), it is all about getting the word out about a certain concept, service, or product. In prehistoric times, artisans would adorn their wares with pictorial signs or symbols to entice buyers. Advertising used to serve only one purpose: to provide information about a product or service. Today, advertisements must also establish a positive reputation for the brand, foster a sense of loyalty to that brand, and ultimately persuade potential customers to make a purchase (Nasirzadeh and Fathian, 2020).A business's primary purpose is to generate revenue and gain a profit. A company has to earn sufficient revenue to pay its operational expenses and see a respectable profit if it is to survive and expand in the market. Due to the correlation between client base and revenue, it is crucial for businesses to run marketing efforts that persuade people to buy their products (Lou et al., 2019). In today's business environment, advertisements are crucial to the success of any marketing strategy. These days, commercials are a common way for businesses to reach out to their customers. Advertising is the most important aspect in the global success of any firm.

Nearly all businesses nowadays rely on various forms of advertising to attract more clients and, in turn, increase revenue. It's common knowledge that advertisements have the longest-lasting effect on customers of all marketing strategies. Companies that consistently see financial success invest heavily in advertising each year (Weismueller et al., 2020). Academics and researchers in the field of advertising have conducted previous studies to better understand the purpose of advertising. According to Ullal and Hawaldar (2018), advertising can have a significant impact on customers' propensity to make purchases. A company can't thrive and expand in a cutthroat market unless it can bring in enough money to cover its expenses and turn a healthy profit. Advertising efforts that persuade customers to buy a company's wares are essential to the success of any firm, as the latter depends on the former in order to stay afloat. Ads have developed into a major channel of interaction between producers and buyers of products and services. It's often accepted that advertising is crucial to the success of any company (Sanny et al., 2020). Online advertising, which includes social media, broadcast advertising (television and radio), and product placement advertising (commercials that appear in shows and movies), are just a few of the advertising options available to businesses. Ads in publications, including newspapers and magazines, as well as billboards and other outdoor displays. Advertising's principal function is to increase interest in and demand for a product or service among customers. One standard yardstick for evaluating advertising's impact is the success with which its intended message was received (Golnar-Nik et al., 2019). Advertising, as a form of promotional marketing, has the potential to be an effective method of drawing the attention of potential customers and swaying their purchase decisions. Customers typically use the advertising they see before making a final decision on the quality of a product. When businesses experience financial difficulties, the first thing to go is the marketing budget. This is because customers don't fully understand the role that advertising plays in influencing their purchase decisions. Strategic plans for budgeting may be created if businesses devote more time and energy to learning about their clients, the types of advertising, and the efficacy of each type (McClure and Seock, 2020). One of the most challenging problems that businesses face today is trying to persuade people to change their minds about a product or service. The influx of new SMEs into the Erbil market has boosted competition. A well-planned and executed advertising campaign is essential for every retail establishment that hopes to increase its customer base. In order to draw in customers, businesses need to launch well-planned advertising campaigns (Shanahan et al., 2019).

Research Model

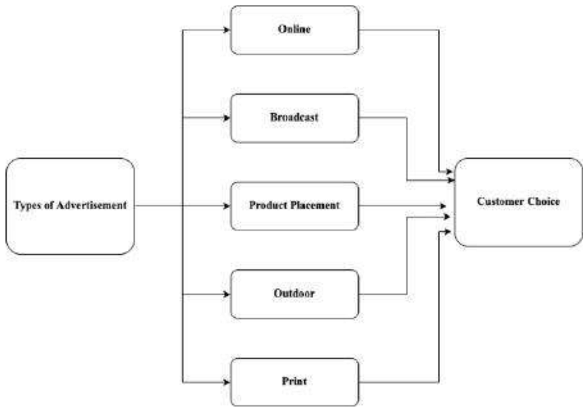

Fig.1: Research Model

Research Hypotheses

H1: Online advertising has a significant and beneficial effect on customers' SME purchase decisions in Erbil.

H2: Broadcast advertisements significantly influence customer choice in SME purchases in Erbil.

H3: Market research conducted on small and medium-sized enterprises (SMEs) in Erbil reveals a strong and statistically significant correlation between product placement advertising and shopper behavior.

H4: Outdoor advertising has a significant and beneficial effect on customers' purchase decisions at SME establishments in Erbil.

H5: Promotion via the printed media tends to have a beneficial effect on sales for small and medium-sized enterprises (SMEs) in Erbil.

II. LITERATURE REVIEW

The concept of Advertisement

Advertising may be defined as any form of mass media material whose primary goal is to encourage readers, viewers, or listeners to purchase, use, or otherwise engage with a particular good, service, or concept (Algharabat et al., 2020). Research by Tran and Strutton (2020) business tycoons, charities, and mom-and-pop shops alike employ it for a variety of reasons because, as Liu-Thompkins (2019) argue, it has the potential to influence customers' thoughts and actions. According to Leung et al. (2020), it is "a method of communicating information about a brand, product, service, or idea to a specific customer market." According to Kim and Kim (2021), advertising plays a crucial role in the marketing process between a product and the market, helping to generate fast sales by appealing to customers in far-flung locations. To that end, advertising provides us with a wealth of information on the connections between customers, businesses, brands, and the goods and services they provide. According to Heller et al. (2019), businesses will not be successful with their marketing efforts until they get insight into their customers' motivations and preferences. Using advertising as a method of internal communication is one of the most powerful ways that a company may potentially affect the market. According to Shahbaznezhad et al. (2021). According to Tyrväinen et al. (2020), one of the primary goals of advertising is to raise awareness of a product's availability among the target audience. It's not simple to make advertising sound credible, but if you can pique a customer's interest, that's all you need to sell them on giving the product a go. Furthermore, Raza et al. (2020) stated that the major objective of advertising is to portray the entire commercial idea in such a way that the product constantly stays fresh in the thoughts of customers. According to Osei-Frimpong et al. (2019), the power of advertising lies in its ability to persuade customers to choose a certain brand, which in turn boosts a company's sales and profits. It was also found by Thakur (2018) that advertisements are an excellent way to learn about new products. Both informational and image advertisements contribute to this learning process, but studies have shown that the former is more effective at fostering product knowledge retention, while the latter plays a secondary role. Furthermore, this prestige strategy is not equally effective across all product categories in facilitating this learning process. Brand perceptions may be altered by advertising (Domazet et al., 2018). Brand advertising, as underlined by Mukerjee (2018), is crucial for encouraging customers to keep buying the same products, which boosts a company's bottom line and reputation in the eyes of its competitors. The power of advertising to influence purchasing decisions is well-known at this point. They are prompted to make a purchase via advertisements. Commercials may also be a reliable way to gain customers' confidence. If a customer is looking at the items' quality and cost, he will be strongly influenced to make a purchase. Product testing and name familiarity are two more ways to stoke up customer interest (Gaber et al., 2019). Individual differences in motivation, needs, attitude, and values, as well as individual differences in personality traits, socioeconomic level, culture, age, gender, occupation, and other social influences, all have a role in shaping customer behavior (De Cicco et al., 2021).

To convince customers to buy a product or service, advertisers develop a wide variety of promotional materials. Morgeson, et al. (2020) state that advertising is a method of targeting a certain demographic with messages about a product or service. Advertising, according to Hoyer et al. (2020), is a crucial part of the marketing mix between a product and its target market since it increases sales quickly by appealing to customers in different parts of the world (Barwitz and Maas, 2018). Therefore, advertising helps customers decipher the intricate triangle formed by the brand, the business, and the customer. In order to increase the value of a business, advertising is effective since it influences customers' choices regarding which brands to purchase (Varghese and Kumar, 2022).When it comes to being a customer, everyone has their own set of criteria by which they make decisions and habits that they always follow. While every single person is unique, we can still learn a lot about how certain types of individuals or communities behave by looking under the surface at the shared patterns that exist between them. Strategic advertising decisions, such as establishing target markets and developing advertising appeal and message, benefit greatly from the advertiser's in-depth understanding of his target segments, which may be gleaned via a thorough examination of customer behavior. According to a study Varghese and Kumar (2022), this study aims to examine the impact of five distinct forms of advertising on customers' purchasing decisions:

Online Advertisement

Internet advertising, particularly social media advertising, has transformed communication between customers and businesses (Alzoubi and Inairat, 2020). Online advertising allows businesses to reach customers all over the world and perhaps influence their purchasing decisions. Iyer et al. (2018) argue that the rapid growth of online advertising revenues proves the efficacy of world-wide web advertising as an alternative to conventional approaches. Most small and medium-sized businesses (SMEs) are interested in online advertising because it has changed so quickly in the past ten years (Ali et al., 2019).

The ways in which clients and sellers interact have shifted because of the rise of online and particularly social media (Ramus et al., 2018). The Internet's global reach is a boon to commerce; it enables customers to research, compare, and ultimately profit from the offerings of companies all over the world (Hu et al., 2019). There is no question that the internet is a powerful and viable alternative to conventional media advertising, as stated by Zhong and Moon (2020): "The rapid rise in online advertising revenues suggests the feasibility of international web advertising as an alternative to that of traditional media." Because of its explosive growth over the past decade, online advertising has become increasingly alluring to businesses. The amount of time people spend online and the number of people who use the internet are both increasing (Farah et al., 2019

).Overall, it's safe to assume that 21st-century customers are more receptive to advertisements that appear on the internet than they are to traditional forms of marketing. As Liu et al. (2020) found, social networking offers several benefits, including facilitating connections between businesses and customers; establishing new relationships; and nurturing existing ones quickly and cheaply. Because of its singular nature and massive user base, social media has completely disrupted traditional forms of marketing (Tran et al., 2020). Industry executives have stated that firms need to be present on social media platforms such as Facebook, Twitter, Instagram, and others if they want to prosper in digital marketplaces (Lou and Yuan, 2019). Marketers need to investigate the appeal of sites like Facebook, YouTube, and Twitter in order to create an effective online advertising strategy centered on them. According to studies, people mostly use these sites to foster and expand their social networks (Zhang et al., 2020). Customers aren't interested in hearing from brands on social media since their primary motivation for using the sites is to build interpersonal relationships with other users, not with the brands themselves (De Veirman and Hudders, 2020). This data suggests that companies need to figure out how to join the discussion if they want to reach their customers.

According to Palos-Sanchez et al. (2019), one of the many benefits of social media is that it facilitates the establishment of connections between merchants and customers, the development of lasting relationships between the two, and the promotion of this partnership for little cost and in a short amount of time. Due to its immense popularity, social media advertising stands apart from more traditional types of advertising and has altered traditional methods of marketing and promotion (Wibowo et al., 2020).

Broadcast Advertisement

In the most recent decade, television has become a primary source of entertainment for virtually all socioeconomic groups, including the upper and lower classes, the urban working poor, and rural middle-class families (Högberg et al., 2019). Commercials on TV provide customers a chance to learn more about a company's wares before they make a purchase. According to Awad, the responses of buyers to television commercials are more effective than those to other types of commercials.

Over time, televisions have become standard in all middle-class homes, and they are increasingly common even in low-income urban and rural dwellings (Tseng and Wei, 2020). Product and service decisions are aided by the information provided by television commercials. Ad makers employ a number of methods that actively involve the audience in order to boost the appealing qualities of their ads and combat the "advertisement avoidance" (zapping) problem. Television commercials are highly effective because they engage viewers' senses of sight, sound, and motion all at once. Responses to commercials on television appear to be more intense than those to print commercials. Marketers believe that television is a more efficient medium for reaching customers than print media (Königstorfer and Thalmann, 2020). Through television commercials, marketers may reach a large audience and demonstrate their product or service to them. One of television's distinguishing characteristics is its ability to reach both literate and illiterate audiences (Hughes et al., 2019). Television advertising has an advantage over other types of advertising because it is easier to understand as a mix of audio and visual elements. It also gives products quick credibility and fame and gives the most open canvas on which to paint an original commercial (Nasirzadeh and Fathian, 2020).

Marketers also learned that television advertising is more successful at reaching customers than print media. Promoting goods and services to a wide audience is made easier through the use of television commercials. Television advertising has several advantages over other forms of advertising because it combines visual and auditory aspects; it quickly establishes the credibility and notoriety of a product; and it allows for a wide variety of creative approaches (Lou et al., 2019).

Product Placement Advertisement

According to Weismueller et al. (2020), product placement advertising is the paid inclusion of a brand's goods or services inside a media production via on-screen or in-sound references. Ullal and Hawaldar (2018) found that customers generally approve of product placement, with the exception of advertising for illegal substances including tobacco, alcohol, and drugs. To attract customers' attention, advertisers have inserted products or brand names into media scripts (Sanny et al., 2020). The term "product placement" has been defined in a variety of ways over the years, from "the practice of placing brand name products in movies as props" (Golnar-Nik et al., 2019) to "the paid inclusion of branded products or brand identifiers, through audio and or visual means within mass media programming" (McClure and Seock, 2020). More recently, it has been defined as "the purposeful incorporation of a brand into an entertainment vehicle" (Shanahan et al., 2019) The relevant literature classifies filmic placement as either verbal (Algharabat et al., 2020), visual (Tran and Strutton, 2020), or audiovisual (Liu-Thompkins, 2019), depending on the degree to which it is integrated into the story and the nature of its relationship to the film's protagonist(s). Product placement is the strategic integration of advertising into creative works for promotional purposes. Product placement has given advertisers a potential new opportunity to capture people when conventional media is dwindling; newspaper circulation is down and one in four U.S. households has a DVR that allows customers avoid commercials. To wit: (Leung et al., 2020) Product placement is generally well received, with the exception of the placement of illicit items (drugs, alcohol, and tobacco). Marketers have been known to insert items or brand names into film and television screenplays for years in an effort to catch the eye of viewers (Kim and Kim, 2021). Brand placement, the incorporation of brands into entertainment media (especially television and movies) in an effort to reach customers who actively seek to avoid commercials, has increased in popularity (Heller et al., 2019). Some examples may be found in the pages of novels, while others can be found in television programs, musicals, and other forms of live theater (Shahbaznezhad et al., 2021). Some advertisers have positioned their products in games that are a natural match for those items (Tyrväinen et al., 2020).

Brand placement, or the incorporation of businesses into entertainment mediums like television and movies, gained popularity as people looked for ways to circumvent ads (Raza et al., 2020). To better reach their target audiences, several businesses have partnered with game developers to include their products or services in popular titles (Osei-Frimpong et al., 2019).

Outdoor Advertisement

Outdoor advertising refers to promotional displays outside of buildings, most commonly along streets and highways. Outdoor advertising has been the subject of several past studies, most of which have focused on its efficacy in terms of recall (Thakur, 2018). The outdoor industry's competitive landscape has changed due to a number of issues, including increased competition and product proliferation, overcapacity, and altering customer expectations (Mukerjee, 2018).

Advertisements on billboards or other outdoor signboards, often located along streets and highways, are considered outdoor advertising. The practice of placing advertisements in public spaces dates back many decades. The "ancient Egyptians used a large stone obelisk to advertise laws and treaties," for instance. Fewer studies have been conducted on outdoor advertising compared to studies on other media. Measures of outdoor advertising's success, such brand recall and awareness, have been the subject of most research (Domazet et al., 2018). To far, there have been relatively few empirical investigations on attitudes (Gaber et al., 2019). The competitive environment of the outdoor market has shifted due to a number of factors, including increased competition and product proliferation, overcapacity, and shifting customer expectations (De Cicco et al., 2021). Although sales are up, outdoor advertising is still "one of the least investigated of any mass media" (Morgeson, et al., 2020). The elements that contribute to its efficacy have not been the focus of many of the investigations that have been done (Hoyer et al., 2020). Street furniture (Barwitz and Maas, 2018), alternative media (including arenas and stadiums, aerial, marine, and transportation), and digital signage have all played significant roles in the expansion of outdoor advertising. Varghese and Kumar (2022) predict that outdoor advertising will continue to expand and diversify in the coming decades not only due to its low cost but also because it appears to be the only unavoidable realm from which to reach customers who are becoming progressively more difficult to reach and the ideal anchor of integrated marketing communication. According to Alzoubi and Inairat (2020), the following are the most common types of outdoor advertising tools: Transit panels installed in airports, trains, subways, buses, and cabs, and billboards made up of individual panels and posters that are both stationary and visible from a distance. The most popular and commonly utilized type of outdoor advertising medium is the billboard. Highway billboards are highly valued in cultural contexts because they are more handy for vehicles and more visible from longer distances than billboards positioned in urban areas, both of which contribute to more exposure for the advertised products (Iyer et al., 2018). Billboards, according to the Outdoor Advertising is the most influential and biggest kind of out-of-home advertising. According to studies conducted by Ali et al. (2019), the real strength of outdoor media lies in its ability to artistically express the entire notion of the advertising message. It's important for outdoor advertising to stand out from the crowd by using the following elements that aren't present in other forms of media:

distinctive qualities, a professional look, an efficient use of language, and a distinctive messaging style (Ramus et al., 2018).

Despite the increase in sales, outdoor advertising is still "one of the least studied of any mass medium" (Zhong and Moon, 2020). Current forms including transportation (airports and buses), alternative media (maritime, airborne, and stadiums), and street furniture (kiosks and shelters) have all seen considerable increases in usage as outdoor advertising has expanded (Hu et al., 2019).

Print Advertisement

Many companies have relied on print advertisements to spread the word about their wares and gain customer support in the past. Point-of-purchase displays, newspapers, magazines, and other print media were frequently employed by advertising to tempt customers (Farah et al., 2019). Liu et al.

(2020) claim that customers' attitudes regarding advertising as a whole affect the effectiveness of print ads. Many businesses have historically employed print media advertising to spread the word about their wares. Newspapers, newsletters, booklets, pamphlets, magazines, and other printed publications fit the definition of "print," as opposed to "broadcast" or "electronic" forms of communication. Advertising in print has been popular with readers and individuals engaged in serious matters since at least 1605, when it emerged as the cheapest form of mass media communication (Tran et al., 2020) Advertisements in magazines, newspapers, at point-of-sale terminals, and other print media were widely used by businesses hoping to acquire new clients (Lou and Yuan, 2019). According to Zhang et al. (2020), customers' overall feelings about advertisements affect the effectiveness of print ads. It is widely accepted that print media has a significant impact on informing and molding public opinion (De Veirman and Hudders, 2020). According to, print material may be accessed whenever and wherever it is most convenient for the reader (Palos-Sanchez et al., 2019). Color print advertisements (Wibowo et al., 2019) have been shown to have a positive effect on customer behavior and financial outcomes, and so have print advertisements featuring photographic images (Hughes et al., 2019).

There is consensus that print media has a significant impact on informing and shaping public opinion (Nasirzadeh and Fathian, 2020). On top of that, print ads are always accessible and straightforward to get a hold of (Lou et al., 2019). Research from a variety of academic disciplines has shown that color print ads have a significant and positive impact on customer behavior and income (Weismueller et al., 2020).

III. METHODOLOGY

The researcher employed a quantitative strategy for data analysis. The research aims to provide insight on the factors that influence customers' ad preferences among Erbil's small and medium-sized enterprises (SMEs). Researchers employed a random sampling approach to obtain data from participants so that their study would be representative of the whole population of interest. The study gathered data from many small and medium-sized enterprises (SMEs) in the Erbil area. In all, 160 questionnaires

IV. ANALYSIS AND RESULTS

Table 1- Reliability Analysis

Numbers	Factors	Number of Questions	Value of The Cronbach Alpha
1.	Online Advertisement	8	.758
2.	Broadcast Advertisement	8	.723
3.	Product Placement Advertisement	7	.728
4.	Outdoor Advertisement	8	.787
5.	Print Advertisement	7	.791
6.	Customer Purchase Choice	7	.749

Table 1 displays the results of the reliability analysis. In this study, we determined that the alpha for online advertising as intendent factor was .758, which is more than 0.6, signifying that all questions used to evaluate online advertising were valid, the alpha for broadcast as intendent factor was .723, which is more than 0.6, signifying that all questions used to evaluate broadcast were valid, the alpha for product placement as intendent factor was .728, which is more than 0.6, signifying that all questions used to evaluate product placement were valid, the alpha for outdoor as intendent factor was .787, which is more than 0.6, signifying that all questions used to evaluate outdoor were valid, the alpha for print as intendent factor was .791, which is more than 0.6, signifying that all questions used to evaluate print were valid and the alpha for customer choice as dependent factor was .749, which is more than 0.6, signifying that all questions used to evaluate customer choice were valid.

Table 3-Correlation Analysis

		Online	Broadcast	Product Placement	Outdoor	Print	Customer Choice
Online Advertisement	Pearson Correlation	1					
	Sig. (2- tailed)						
	N	129					
Broadcast Advertisement	Pearson Correlation	.663**	1				
	Sig. (2- tailed)						
	N	129	129				
Product Placement Advertisement	Pearson Correlation	.591**	.439**	1			
	Sig. (2- tailed)						
	N	129	129	129			
Outdoor Advertisement	Pearson Correlation	.558**	.601**	.411**	1		
	Sig. (2- tailed)						
	N	129	129	129	129		
Print Advertisement	Pearson Correlation	.503**	.623**	.618**	.656**	1	
	Sig. (2- tailed)						
	N	129	129	129	129	129	
Customer Choice	Pearson Correlation	.719**	.693**	.689**	.589**	.591**	1
	Sig. (2- tailed)						
	N	129	129	129	129	129	129

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

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

Through the use of a correlation analysis, the current study found that online advertising and consumer choice at chosen SMEs have a substantial positive link (r=.719**), suggesting that there is a significant and beneficial connection between the two, broadcast advertising and consumer choice at chosen SMEs have a substantial positive link (r=.693**), suggesting that there is a significant and beneficial connection between the two, product placement advertising and consumer choice at chosen SMEs have a substantial positive link (r=.689**), suggesting that there is a significant and beneficial connection between the two, outdoor advertising and consumer choice at chosen SMEs have a substantial positive link (r=.589**), suggesting that there is a significant and beneficial connection between the two and print advertising and consumer choice at chosen SMEs have a substantial positive link (r=.591**), suggesting that there is a significant and beneficial connection between the two.

Table 4-Multiple Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.121	.119		.701	.317
Online	.712	.021	.719	.889	.000
Broadcast	.686	.039.	.693	.901	.000
Product Placement	.681	.023	.689	.922	.000
Outdoor	.579	.043	.589	1.126	.000
Print	.583	.019	.591	1.091	.000
a. Dependent Variable: Customer Purchasing Choice					

Using multiple regression analysis, this study tests five hypotheses. The results demonstrated a statistically significant link between online advertising and buyer choice for a subset of SMEs, this indicated that Online advertising has a significant and beneficial effect on customers' SME purchase decisions in Erbil. Moreover, the results demonstrated a statistically significant link between online advertising and buyer choice for a subset of SMEs, this indicated that Broadcast advertisements significantly influence customer choice in SME purchases in Erbil. Furthermore, the results demonstrated a statistically significant link between product placement advertising and buyer choice for a subset of SMEs, this indicated that Market research conducted on small and medium-sized enterprises (SMEs) in Erbil reveals a strong and statistically significant correlation between product placement advertising and shopper choice. Also, the results demonstrated a statistically significant link between outdoor advertising and buyer choice for a subset of SMEs, this indicated that Outdoor advertising has a significant and beneficial effect on customers' purchase decisions at SME establishments in Erbil, and lastly, the results demonstrated a statistically significant link between print advertising and buyer choice for a subset of SMEs, this indicated that Promotion via the printed media tends to have a beneficial effect on sales for small and medium-sized enterprises (SMEs) in Erbil.

V. DISCUSSION

The findings indicated a strong correlation between the effectiveness of certain advertising methods and consumer purchase behavior. There was a positive correlation between advertising and consumer purchasing behavior overall, although some respondents thought specific forms of advertising were more effective than others. Advertising in the SME sector helps and guides customers to make the best purchase decision they can. This study uses multiple regression analysis to examine the five hypotheses. These results demonstrated a statistically significant link between SME online advertising and purchaser preferences. The results indicated that internet advertising had a sizeable and beneficial impact on Erbil consumers' choice of small and medium-sized enterprises (SMEs). Moreover, for several types of SMEs, the results indicated a statistically significant correlation between online advertising and final purchase decisions. This found that customers in Erbil are substantially influenced by broadcast commercials while making purchases from SMEs. Furthermore, for some types of SMEs, the data indicated a statistically significant connection between product placement advertising and consumer preference. This result demonstrated that studies of Erbil's SME market showed a statistically significant and robust connection between product placement advertising and consumer preference. Finally, the results showed a statistically significant link between print advertising and buyer choice for a subset of SMEs, suggesting that promotion via the printed media has a tendency to influence customers' purchasing decisions at SME establishments in Erbil.

Although research on the social and economic effects of radio advertising is limited, what little there is suggests that it influences listeners' purchase decisions in a favorable way. About 12% of the operational budgets of supermarkets, department stores, and big shopping centers go into marketing and advertising. Radio advertisements were shown to be the most popular form of marketing when considering factors like producing a suitable communication mix and crafting messaging (Ullal and Hawaldar, 2018). Companies in the retail sector now operate in a more cutthroat market, increasing the need to inspire all demographics to shop with the brand.

Supermarkets and department stores should expect a speedy reaction time from radio commercials promoting the sale of items. Radio listeners are more likely to pay attention to advertisements that are also interesting (Sanny et al., 2020).

The most common approach used by small and medium-sized businesses when creating radio advertisements for sales promotions is to use humor with the purpose of increasing the listener's empathy. Listeners form opinions about the company based on their perception of the humor. Advertisements that strike a balance between delivering the message and being funny are more likely to influence consumers to make a purchase (Golnar-Nik et al., 2019). The commercials broadcast over the radio that were both uplifting and easily comprehended by listeners were the ones that stuck in their minds long after they had stopped playing. Radio ads may not be a huge deal in comparison to the other major types of media, but they play a significant role in advertising and marketing in major urban areas. TV commercials are another sort of broadcast advertisement; they often use recognizable presenters, convincing messaging, and eye-catching visual effects to provide an engaging presentation of products and services. Advertising on television has expanded in recent years as a result of technical advancements. Commercials bombard audiences with thousands upon thousands of messages every day. It's true that several channels help get the word out, but TV commercials have a disproportionate impact on consumers' decisions (McClure and Seock, 2020). Commercials on TV have also used humor as a way to get their messages across to viewers.

Many businesses have heavily invested in pamphlets, brochures, and flyers as a means of better communicating their products and driving sales. Despite retailers' perpetual preoccupation with the efficacy of marketing materials like flyers, this worry isn't mirrored in the academic research on the subject. A study found that shoppers who got flyers while grocery shopping spent more money than those who did not receive flyers because of the information they provided. According to Shanahan et al. (2019), sales promotion (including free gifts, samples, loyalty programs, discounts, and coupons) is extremely important to customers when choosing SMEs. Further evidence that advertising, direct mail, customer loyalty programs, and discounts are effective in luring consumers to small and medium-sized enterprises (SMEs) is provided (Algharabat et al., 2020).

The volume and variety of internet advertisements are rapidly expanding. Companies are increasing their investments in internet marketing. Organizations that actively participate in customers' social media conversations stand a better chance of influencing their final purchase decisions. Social media platforms like Facebook have transformed modern consumers into active participants in the dissemination of information about a company's products and services. Through these channels, customers are able to freely exchange ideas, insights, and experiences. According to research (Algharabat et al., 2020), customers' social media activity influences them at every stage of the food retail buying process. Facebook's capabilities make it easy for users to connect with grocery stores, make purchases, and browse reviews left by other shoppers. It's common knowledge that people may find useful information about products and services, as well as cues for their own behavior and actions, on online social networks. Customers' purchasing decisions are influenced by the topics discussed and debated online.

The popularity of outdoor advertising has skyrocketed in recent years. Outdoor billboards are useful for establishing new brands and reinforcing existing ones in the target audience's awareness. According to Liu-Thompkins (2019), everything utilized for the purpose of advertisement, announcement, or direction, whether it be in the form of words, letters, models, signs, board notices, devices, or representations, is considered outdoor advertising. It has been used as a promotional tool for centuries. Not as much research has been done on outdoor advertising as on other forms of media. The majority of the research looked at the memory and recognition rates of outdoor advertisements. There isn't a lot of research that looks at how people feel. Potential customers can find out about supermarkets through websites, fliers, billboards, and signs on public transportation vehicles, in addition to more traditional methods like putting up signs inside the store and putting up signs advertising sales and discounts (Leung et al., 2020).

Though relatively understudied, brand placement in marketing has gained popularity in the past two decades. Today, advertising is crucial because it not only affects how people think about a product or service but also how they decide to buy it. Advertisements need to be presented in such a manner that they pique consumers' interests sufficiently to prompt them to make a purchase if they are to succeed in getting consumers to try a new product. According to prior research, identifying the who, what, where, when, and how of a consumer's purchase is essential for every business, because an unstructured advertising campaign would not provide beneficial outcomes (Kim and Kim, 2021). Gender is less of a factor in the effect that advertising has on consumers' decisions to buy a particular brand across a wide range of ages and levels of education (Heller et al., 2019). Another study (Shahbaznezhad et al., 2021) came to the same conclusion:

commercials had a major effect on consumers' purchasing decisions. Ads that are both original and high in quality will encourage more customers to buy the product being promoted, leading to more profits for the company.

The results indicate a favorable and statistically significant correlation between internet advertising and consumer spending. Customers are greatly influenced by advertising on social media, which allows them to discover several ads in regards to SMEs' promotions, discounts, new products, and so on. Therefore, it is advised that store managers make an effort and design a good plan to construct a successful social media site to influence online shopping by recognizing and targeting different sorts of customers and taking actions to recognize and emphasize client interests. The results showed that broadcast advertising has a significant and positive relationship with customer purchasing choices and that residents of Erbil view broadcast advertising as an informative source of both new and existing products that influence their purchasing decisions, although it is less effective than other methods. Moreover, we found that a larger sample size had a more beneficial influence on the persuasive power of TV commercials to sway consumers to make a purchase. The data also shows that SME commercials and online marketing were the most significant factors in getting people to shop at the supermarket. According to research by Tyrväinen et al. (2020), consumers rely on social media sites like Facebook instead of traditional search engines when gathering data prior to making purchases at grocery stores. When customers interact with supermarkets on Facebook, they start to trust the brand and feel like they belong to it. This makes them more likely to buy from that supermarket.

VI. CONCLUSION

The study's findings highlight the role that advertising plays in influencing consumers' final purchase decisions at Erbil SMEs. Although many experts have investigated the correlation between different forms of advertising and consumer preferences, very few have zeroed in on the specifics of how and why shoppers choose certain SMEs establishments. Based on the results, it seems that internet advertising has the strongest association with customers' selection of SMEs stores in Erbil, while outdoor advertising has the least. Small and medium-sized enterprises (SMEs) need to adapt to changing market conditions if they want to maintain and grow their consumer bases. In the internet-savvy economy of today, it's important for SMEs to reach out to customers through social media and online shopping. The five hypotheses are put to the test by this study, which uses multiple regression analysis. The findings showed that there was a statistically significant correlation between online advertising and buyer choice for a group of SMEs. This suggested that internet advertising has a considerable effect on customers' SME purchase decisions in Erbil, and that this effect is a positive one. In addition, the findings showed that there was a statistically significant link between online advertising and buyer choice for a subset of SMEs. This revealed that broadcast advertisements strongly influence customer choice in SME transactions made in Erbil. In addition, the results showed that there is a statistically significant link between product placement advertising and buyer choice for a subset of SMEs. This indicated that market research carried out on small and medium-sized enterprises (SMEs) in Erbil reveals a strong and statistically significant correlation between product placement advertising and shopper choice. Also, the results demonstrated a statistically significant link between outdoor advertising and buyer choice for a subset of SMEs; this indicated that outdoor advertising has a significant and beneficial effect on customers' purchase decisions at SME establishments in Erbil; and finally, the results demonstrated a statistically significant link between print advertising and buyer choice for a subset of SMEs; this indicated that Promotion via the printed media has a tendency to have a positive influence on buyer choice for SMEs.

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Financial Practices of Private Schools in Nueva Ecija during Covid-19 Pandemic

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***Abstract*— *This study identified the financial practices, challenges and level compliance of selected private schools in Nueva Ecija during the COVID-19 Pandemic. Ten school treasurers from different private high schools in Nueva Ecija were purposively selected as the respondents of the study. The results revealed that while all schools were compliant to the minimum Certification Assessment Instrument (CAI) standards in the area of school budget and finances set by the Private Education Assistance Committee (PEAC) it did not exempt these schools to different financial challenges brought by COVID-19. The data gathered also determined that decrease in student enrollment, difficulty in collecting student financial obligation and decrease in revenue generated inside the school from canteen operation were the top financial challenges encountered by these schools that were mainly attributed to the distance learning modality employed by the private schools due to school lockdowns. Majority of these schools have employed common financial practices in increasing student's enrollment through increasing the budget on marketing strategy, waiving all school fees to senior high school students coming from public schools and expanding kindergarten subsidy slots and in strategies on intensifying collection of student financial liability by way of orientation on parents/guardians on payment culture, intensifying communication mechanism on collection, account cards available on demand and availability of e- payments while continuously improving the overall areas of school operation to perpetually participate as Educational Service Contracting (ESC) schools.*

***Keywords*— Financial Practices, Private Schools, ESC, PEAC**

I. INTRODUCTION

The school operation and management of the private basic education institutions in the Philippines and across the globe was adversely affected by COVID-19 [1] and its full financial impact is now unfolding [2]. In fact, the Coordinating Council of Private Educational Associations of the Philippines (COCOPEA) study in 2020 showed that 80% of the 500 private schools it surveyed were at risk of closing their operations [3]. The different areas of school operations that produce quality student performance and organizational effectiveness such as school philosophy, vision, mission goals and objectives, curriculum, assessment and instruction, instructional leadership, faculty, academic support and student development services, physical plant & instructional support facilities, administration & governance, school budget & finances and institutional planning and development [4] were affected. However, the school budget and finances tends to be the first affected area as it enables other areas to operate in the framework of private schools.

The main goal of the area in the school budget and finances is to attain financial sustainability. Broadly, sustainability refers to the ability of administrators to maintain an organization over the long term [5]. Specifically, financial sustainability is the ability of an organization to maintain a diverse source of revenue that enables it to continue to provide ongoing quality services regardless of changes in funding sources, in target population, and other changes among its internal and external environment [6]. This explains why financial sustainability is a process, not an end [6]. To be translated into a process, financial sustainability must be institutionalized and institutionalization of change requires diffusion of success cases [7]. These success cases of financial sustainability come from financial practices or the set of standard operating procedures, policies, mechanisms employed by an organization relating to accounting, budgeting and activities related to finances [8] that must be consistently implemented, reviewed and modified if necessary.

For private education institutions, financial practices related to funding are also a crucial part in financial sustainability. Private schools require working capital to fund routine operating costs [9] and having multiple sources of funds to sustain the delivery of quality services over time are necessary. These multiple sources of funds may include government subsidies like Educational Service Contracting (ESC). ESC is one of the largest public-private partnership programs in education in the world (10). The ESC is a program provided for by Republic Act 6728 or the Government Assistance To Students and Teachers In Private Education Act (11). Its main objective is to decongest public secondary schools by "contracting" the excess capacities of private high schools through the provision of subsidies for students who otherwise would have gone to public schools [12]. To implement the Program, the Department of Education contracted the Private Education Assistance (PEAC) as its service provider for the implementation and monitoring of ESC [13]. In order to become an ESC participating school, an institution must pass the rigorous compliance requirements within the necessary standards prescribed by the PEAC. This includes parameters that will check if the financial practices in the school budgets and finances are aligned with the standards.

Primarily, this study aimed to identify the financial practices of the private schools emerging from the financial challenges during the COVID-19 pandemic towards financial sustainability. In detail, the researchers attempted to answer the following:

(1) Are all indicators in the area of school budget and finances per Certification Assessment Instrument (CAI) of Private Education Assistance Committee (PEAC) have been complied with?

(2) What were the different financial problems and challenges experienced?

(3) What are the financial practices employed to combat these challenges?

(4) Have these private schools attained financial sustainability?

II. METHODOLOGY

This study utilized a descriptive research design to gather data relevant to answer the problem of the study [14]. In this design, the researchers are simply studying the phenomenon of interest as it exists naturally; no attempt is made to manipulate the individuals, conditions or events [15]. The researcher purposively gathered data from 10 school treasurers of different private catholic schools in Nueva Ecija that offer basic education. Survey questionnaires and interviews were used to collect information. These were designed, developed and validated by the researchers.

To determine the compliance of the schools in the area school's budget and finances, the researchers utilized the Certification Assessment Instrument [CAI] from PEAC using the following rating scale: 4- Evidence of compliance with standard and enhancements is presented; 3- Evidence of compliance with standard is presented; 2- Partial evidence of compliance with standard is presented; 1- No evidence of compliance with standard is presented but plan of action in line with compliance is presented; and, 0-No evidence of compliance with standard nor plan of action is presented. Consequently, consent from the respective school directors was sought. Furthermore, the researcher briefed the respondents on the significance of the survey made and communicated to them the potential utilization of the study to the private schools and other stakeholders where applicable. In the presentation and analysis of data, frequency count and percentages were used using Google Sheets.

III. RESULTS AND DISCUSSION

1.Indicators in the area of school budget and finances

One of the areas of school operations that produce quality student performance and organizational effectiveness is the school budget and finances. In the case of private schools, this area enables all other areas to operate. The researcher attempted to know if the schools were compliant in the standards of CAI set by PEAC.

Table 1 PEAC-CAI Standards of Compliance by Private Schools in the Area of School Budget and Finances

No.	***Standards of Compliance Indicator***	Score	
		W.Mean	Verbal Interpretation

1	A school financial policy and procedures manual that sets the appropriate fiscal and accounting policies and systematic procedures that ensure the effective and efficient delivery of varied services	3.00	Evidence of compliance with standard is presented
2	An annual budget approved by the Board of Trustees that is collaboratively prepared by the various Offices and responsibility centers, regularly monitored through the quarter budget performance reports and disseminated according to policy guidelines and reflective and supportive of the Standards – based School Improvement Plan	3.00	Evidence of compliance with standard is presented
3	Systematic requisition, selection and procurement protocols that are well disseminated, implemented and properly documented	3.00	Evidence of compliance with standard is presented
4	A system for ensuring that all incomes from tuition and all other fees, and donations are properly utilized according to the purposes they are collected	3.00	Evidence of compliance with standard is presented
5	A system for generating revenue and raising funds from school and outside school sources for sustainability	3.00	Evidence of compliance with standard is presented
6	A system of supervision and management of resources for optimum operational efficiency*	3.00	Evidence of compliance with standard is presented
7	A system of establishment of internal control systems in budget implementation and*	3.00	Evidence of compliance with standard is presented
8	A system of designing financial strategies for sustainability*	3.00	Evidence of compliance with standard is presented

Among the 8 standards adopted from CAI and considered in this study, all of the respondents in each indicator answered that the evidence of compliance with the standard was presented or with a rating of "3". The results show that these private schools are complying with the standards of PEAC as prescribed by the Department of Education. In effect, they have a good standing in receiving government grants as Educational Service Contracting (ESC) participating schools. ESC participating schools shall provide grantees with education that meets or exceeds the minimum standards set by DepEd [16]. ESC Grants amount to Php. 9,000 for the entire school year and grantees (grade 7 students) will receive the same amount until they reach the Grade 10 Level [17]. This also shows that the schools who are compliant may also be dependent on government subsidy programs like ESC.

However, though these schools were compliant, no rating of "4" or enhancements along the standards were presented. Can these post potential problems if some uncertain situations in school operations like disruptions due to COVID-19 occur compared when enhancements are implemented?

2. *Financial Challenges*

Private organizations like private schools may encounter financial challenges in the course of their operations. These challenges may prevent the schools from accomplishing their goals in achieving financial sustainability. This study identified the financial challenges encountered by the private schools during the COVID-19 pandemic.

Table 2 Frequency and Percentage of Financial Challenges

Financial Challenges	**f**	**%**
A. Decrease in student enrollment	10	100

B.	Difficulty in collection of student obligation	10	100
C.	Decrease in revenue generated inside the school from canteen operation	10	100
D.	Suspension of some miscellaneous fees	5	50
E.	No tuition fee increase	5	50

Table 2 illustrates the financial challenges determined by the respondents. Among these financial challenges were decrease in student enrollment, difficulty in collection of student obligations and decrease in revenue generated inside the school from canteen operation surfaced as common financial challenges to the schools. Based on the data gathered, these schools suffered a 10%-20% enrollment decrease on the average. Respondents also admitted that collections of student financial obligations became more difficult during these trying times. According to them, some parents/guardians could not afford to pay the necessary amount in a timely manner due adverse financial effects like loss of work, delayed compensation or no work at all. In addition, half of them also mentioned that suspension of some miscellaneous fees and no tuition fee increase emerged also as their financial challenges. The financial challenges in Table 2 imply that private schools are still susceptible to financial challenges brought by the COVID-19 pandemic even if compliance to the standards in Table 1 has been made. Furthermore, these financial challenges suggest that the school financial sustainability can be at stake if not addressed with appropriate financial practices.

3. *Financial Practices*

Financial practices take in many forms such as policies, programs, courses of actions and mechanisms used in the financial operations of an institution. This study determined the financial practices employed by the private schools to combat financial challenges encountered during COVID-19 Pandemic.

Table 3. Frequency and Percentages of Financial Practices used by the Private Schools to address financial challenges

Financial practices used	f	%
A. Practices employed in relation to financial challenge of decrease in enrollment		
A.1Increased budget on marketing strategy by 20%	10	100
A.2 Waiving of all school fees to senior high school students coming from public schools	7	70
A.3 Expansion of kindergarten subsidy slots	10	100
B. Practices used in relation to financial challenge of difficulty in collection of student obligation		
B.1 Orientation on parents/guardians on payment culture	7	70
B.2 Intensifying communication mechanism on collection	10	100
B.3 Account cards available on demand	10	100
B.4 Availability of e- payments	8	80
B.5 Non-cash payments alternatives such as paper and plastic bottles	10	100

C. Practices created in relation to financial challenge of decrease in revenue generated inside the school from canteen operation		
C.1 One School One Product	10	100
C.2 Expansion of Canteen's Operation	5	50
D. Practices made in relation to financial challenge in suspension of some miscellaneous fees and no tuition fee increase		
D.1 Increased Down payment upon enrollment	4	40
D.2 Strict Monitoring of Cash Flow Projection	3	30
D.3 Borrowing of fund	10	100
D.4 Receiving small amounts of cash payments from parents/guardians	6	60
D.4 Continuous improvement of overall school operations toward above-the-standards rating	10	100

Table 3 shows the financial practices used by the respondents with regard to different financial challenges they encountered. For practices employed in relation to financial challenge of decrease in enrollment, all the respondents claimed to have used strategies such as A.1. Increasing budget in marketing strategy and A.2 expanding kindergarten subsidy slot while 7 out of 10 schools A.3 waived of all school fees to senior high school students coming from public schools. Respondents revealed to have increased marketing strategy costs to 10%-15% and expanded additional 5-15 slots to the kindergarten subsidy program - a school initiated assistance program of giving 3,000.00 deductible to tuition fees of kindergarten pupils.

In Practices used in relation to the financial challenge of difficulty in aid collection of fees, B.2. intensifying communication mechanisms on collection, B.3. account cards available on demand and B.5. non-cash payment alternatives such as paper and plastic bottles were all used by these schools to induce collections from student's financial obligations. Respondents explained that structured communication mechanisms such as text blasting to parents, emails, group chats to parents were created while statement of accounts thru "account cards" became available for those parents who were not used to digital communications mentioned earlier.

While in practices created in relation to financial challenge of decrease in revenue generated inside the school from canteen operation, all the schools launched C.1 One School One Product (OSOP) program to augment the sudden decrease of revenue from canteen operations that is offered on school-to-school basis and C.2 expanded canteen's operation into activities like pasa-buy where canteens act as delivery services provider to employees, offering groceries and toiletries among employees and offering "lutong-ulam" not only within the school personnel but to walk in and outsiders.

Lastly, for practices made in relation to the financial challenge in suspension of some miscellaneous fees and no tuition fee increase, all respondents admitted in D.3 borrowing funds and emphasized the D.4 continuous improvement of overall school operations toward above-the-standards rating to enjoy the subsidy program like ESC while 4 out of 10 schools D.1 increased down payment upon enrollment, 3 out of 10 schools proceeded to D.2 strict monitoring of cash flow projection to maintain liquidity and to avoid shortages of funds

The results signify that the respondents invested more in strategies that will allow the ease in collection of student financial liability and efforts in increasing enrollment.

4. Is Financial Sustainability achieved?

The financial practices listed in Table No.3 integrated in the continuity of the school's operation show that these private schools are financially sustainable. The following factors have contributed to such: (1) they were able to maintain a diverse revenue –from inside and outside sources , more specifically a steady government subsidy arising from ESC ; (2) sound financial practices enabled them to continue providing ongoing quality services as private schools (3) regardless of changes in funding sources such as decrease in enrollment difficulty in collection of student obligations, and decrease in revenue generated inside the school from canteen operations and other changes among its internal and external environment brought by the COVID-19 Pandemic they have sustained their operations. However, financial sustainability is a process in itself, private schools have no choice but to continually seek improvements, evaluation and innovation along their financial practices to maintain and further improve their status towards sustainability.

IV. CONCLUSION

In conclusion the following findings revealed that:

1. Compliance in all standards of school budget and finances per Certification Assessment Instrument (CAI) set by PEAC does not eliminate the institution from possible financial challenges brought by the COVID-19 Pandemic;
2. Results also signify that in every financial challenge encountered, corresponding multiple financial practices were employed by these private schools in Nueva Ecija;
3. Majority of these financial practices are common to all schools and can indicate that these practices are shared among them or can be further postulated as system-generated practices;
4. These private schools are financially sustainable while being responsive to different challenges and demands like COVID-19 of the dynamic landscape of education

V. RECOMMENDATIONS

Decisions made today in the context of COVID-19 will have long-term consequences for the futures of education [18]. Thus, the following are recommended:

1. PEAC together with the Department of Education may review the current CAI to reflect adjustments or measures from the impact of COVID-19 and even in the volatile, uncertain, complex, ambiguous (VUCA) times;
2. Also, it is highly noticeable that the severe disruptions of the pandemic may require the government's intervention to help many private schools affected [19]. This can be dubbed to policy formulation and/or laws that will help the private schools to survive;
3. At the school level, the school budgets and finances section must always seek to improve their financial practices by presenting enhancements along the standards. One of them may include an action to catalyze additional resource mobilization from other sources [20];
4. Additionally, given the high level of uncertainty over containing the pandemic, comprehensive plans must be developed [21] by the private schools aimed to maintain or achieve financial sustainability;
5. It is further suggested that benchmarking to other private institutions who are in viable financial operations and standing despite the effects of the pandemic are necessary;
6. Also, training and upskilling in navigating the financial impacts and implications from COVID-19 and even beyond among the finance officers, treasures, school heads and administrators must also be conducted; and,
7. Lastly, it is also suggested that the future researchers may further study the effects of these financial practices translated into figures (Php.)

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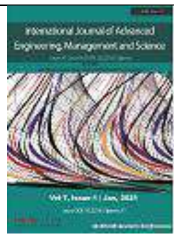

A Mediated Model of Employee commitment: The Impact of Knowledge Management Practices on Organizational Outcomes

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Abstract— *In this modern and competitive day, firms rely on innovative ideas to sustain and succeed. For today's management, it is critical to look for ways and means to knowledge management, and this study greatly emphasizes this aspect. This study investigates and investigates the impact of a knowledge management on organizational outcome as well as the role of employee commitment as a mediator. Essentially, it provides a framework via which a high-commitment work environment supports innovative work behavior in Kurdistan region of Iraq SMEs. Using the findings of this study, SMEs firms, particularly mobile network operators, can alter and innovate their services in order to thrive in a competitive market. All proven correlations are conceptually explained, practically tested, and supported by a survey of the literature. The findings revealed that all three variables in the study have a favorable association. All three hypotheses are accepted, and the association between knowledge management and organizational outcome is mediated by employee commitment.*

Keywords— ***Knowledge Management, Innovative, Employee Commitment, Organizational Outcome.***

I. INTRODUCTION

In today's fast-paced, highly competitive business world, companies that can't adapt to new situations quickly will fail. Organizations, especially technology-driven ones, are the ones that management researchers have suggested need to be creative and innovative on a constant basis in order to respond to and adapt to an uncertain and changeable business environment. According to studies, this sort of innovation is frequently the result of the employees' unique blend of skills, interests, and perspectives (Abubakar et al., 2019). People bring their own unique collection of skills, experiences, and worldviews to the workplace. This understanding has prompted a greater focus on knowledge management principles that may be implemented to encourage originality and creativity in the workplace. To this end, Ode and Ayavoo (2020) highlight the measures that businesses can take to inspire their workers to think and act more like entrepreneurs and pioneers. As a result, it is crucial to gain a deeper understanding of the motivations that inspire workers to take creative action. Knowledge management and organizational innovation are positively correlated since both have been shown to have a substantial impact on employee attitudes and motivation (Ahmed and Faeq, 2020). According to Anwar and Shukur (2015), employee behavior and outcomes can be anticipated by a level of commitment, which is necessary for innovation-seeking firms. According to the findings of these studies, firms can affect employee behavior and collaboration by instituting an efficient "knowledge management procedure" (Nisar et al., 2019). Thus, the focus of this research was on a specific set of knowledge management procedures that are consistent with the model of high-dedication workplaces. As a result, it is evident from this study that firms that want to implement an innovation strategy will need a high level of employee dedication, as this is a significant predictor of employee behavior and outcome. This research adds to the existing body of literature by shedding light on the critical functions of knowledge management and HCWS in fostering creative and original approaches to the workplace. Understanding the role of knowledge management as a mediator between a high-commitment work system and creative approaches to tasks is a significant contribution to the field. As Antunes et al. (2020) point out, high-commitment work systems can have a major impact on employees' propensity to engage in creative problem-solving on the job. Work habits that are innovative include coming up with new ideas, advocating for those ideas, and, most importantly, making an attempt to put them into action. Each of these, we believe, involves some form of knowledge sharing or what has been termed knowledge management. Researchers have hypothesized that businesses that encourage the sharing of information between their staff members will be more creative overall. They also remark that the development of new ideas frequently necessitates the use of tacit knowledge—information that an employee has picked up informally and intuitively applies—in order to succeed. For this reason, knowledge management lays the groundwork for creative workplace practices (Anwar, 2016). Businesses can strengthen their foundational strengths and compete more effectively by spreading knowledge internally (Iqbal et al., 2018). Previous studies have shown a positive correlation between HR practices and organizational and personal success (Abualoush et al., 2018). While knowledge management systems are thought to have a positive impact on employees' innovativeness in the workplace, Jiang et al. (2012) note that only a small number of studies have investigated this phenomenon. Knowledge management processes and systems are said to have little effect on employees' inventive behaviors on the job, although this claim has been met with skepticism by researcher (Faeq, 2022). This reflects the knowledge gap that needs to be filled in order to determine the specifics of the mediating mechanisms at play. It would be useful in answering the question of how HR systems might foster and mold individuals' creative approaches to the workplace (Hameed and Anwar, 2018). Some academics have described this gap as a "missing link" in our knowledge of causation. Through the application of knowledge management, our study aims to paint a more complete picture of the interplay between HCWS and IWB characteristics. Specifically, it demonstrates the direct and indirect links between organizational policies and practices and their effects on individuals' innovative actions in the workplace. If successful, this research could help practitioners better encourage creative work practices. As an added bonus, this research could aid in elucidating the value of HR systems and direct managers toward the use of such methods in order to boost the efficiency and effectiveness of their respective businesses. In the following sections, we will first present an overview of the telecom industry in the Kurdistan area of Iraq, where innovation is seen as crucial to the success of businesses. As a follow-up, we will discuss the studies that lend credence to our claims. To do this, we will employ a conceptual framework proposed to be useful in explaining the potential effects of work systems on innovation-related behaviors among workers. When we've finished explaining how and why we conducted the study, we'll say what we want to do with the results. The information technology (IT) and SMEs (com) industries have changed the globe by becoming the most rapidly expanding and technologically demanding of all businesses today. Over the past few years, the telecom industry in the Kurdistan region of Iraq has been the single most important contributor to the economy there.

II. RESEARCH CONTRIBUTION AND GAP

Knowledge management's impact as a mediator between other factors (such as employee commitment and organizational outcome) is rarely studied. What effect does knowledge management have, and what effect does employee dedication have, on the success of a company? There is a lack of academic inquiry into this question, even in the Iraqi Kurdistan region. Leaders in human resources and elsewhere in the company will benefit from this since it will inform their decisions about how best to encourage employee participation and how crucial it is to manage employees' expertise so that the business may maximize its output. Knowledge management databases let the most qualified and experienced professors in higher education institutes in the Kurdistan region of Iraq share their knowledge with the rest of the faculty and staff. This improves the quality of education for everyone involved and leads to better results for the institution as a whole.

Employee commitment

Previous research has given much emphasis to organizational commitment because of the enormous impact it has on work attitudes like job satisfaction, outcome, absenteeism, and planned turnover. According to research by Anwar (2017) conducted on IT firms, loyalty is most strongly correlated with measures of knowledge management (Cabrilo and Dahms, 2018). Employers are always coming up with new ways to keep workers and inspire them to be more dedicated to the company (Faeq et al., 2020). It has been shown that an individual's level of commitment to their organization affects both their level of job satisfaction and the success of their company as a whole (Anwar and Shukur, 2015). The amount of academic faculty members' self-actualization is related to both the success of knowledge management methods and the happiness of the academic community as a whole (Mardani et al., 2018).

Knowledge management techniques were essential at the academy. self-supporting engineering schools, in particular. When knowledge management is done in a mechanical way, it helps educational institutions based on an evaluation of the results that spans 720 degrees. Employee commitment is "the emotional, cognitive, and behavioral condition of the employee, with a focus on the intended organizational objective," as defined by Soto-Acosta et al. (2018). In this context, "employee commitment" refers to a quality shared by an organization and its staff. To put it another way, employee commitment refers to the level of mental and emotional investment workers have in their workplace. In addition, "employee commitment" (Anwar and Shukur, 2015) is a close conception of how employees feel about their jobs. Improved individual and organizational outcomes can result from a more committed workforce [49]. This includes a decrease in absenteeism, accidents, and turnover. Direct metrics of organizational success such as productivity, quality, outcome, customer happiness, profit, and business growth are positively correlated with employee dedication. Employees who are invested in their work approach it with enthusiasm and high levels of energy. The fact that they are so devoted to their jobs means that they rarely have free time (Faeq et al., 2021). Employee commitment, as acknowledged by leaders and managers worldwide, is one of the key variables influencing organizational outcomes. Traditional ideas of employee engagement, organizational loyalty, and job happiness are superseded by the steadfastness of employees' dedication to their organizations. Emotional, mental, and behavioral resources are all mobilized in service of achieving organizational objectives (Anwar and Qadir, 2017). All workers must work together for the company's success and efficiency. Committed workers, regardless of whether they feel positively about their organization on a personal, social, or psychological level, must share, support, collaborate, and create a pleasant common work environment in order to ensure long-term compliance. Positive attention and absorption at work, where time flies and it's hard to stop working, are hallmarks of commitment (Faraj et al., 2021). One of the most important ideas in business philosophy is the concept of employee participation. It is significantly broader than the ideas of "motivation" and "involvement" in the management literature and is based on the concepts of job satisfaction, organizational engagement, and public action (Naqshbandi and Jasimuddin, 2018). Commitment on the part of employees is understood to result from two-way communication between the company and its workers (Othman et al., 2020). Human resources professionals recognize the significance of employee dedication to the company's performance and competitiveness, and they know that engaged workers may make a difference in the final product. Staff members that are enthusiastic about their work are more inclined to go above and beyond their normal workload (Al-Emran et al., 2018).

Knowledge Management

An organization's knowledge is a valuable asset since it allows the company to adapt, grow, and make the most of its resources (Faeq et al., 2021). The efficiency, competitiveness, and productivity of an organization are directly tied to the quality of its knowledge management (Anwar and Shukur, 2015). In addition to playing a role in shaping employee attitude, the utilization and growth of an organization's knowledge assets is what constitutes "knowledge management" (Abdullah et al., 2017). Community members engage in knowledge creation, transformation, archiving, and dissemination through knowledge management. Organizational knowledge flows are controlled through knowledge management systems (Shujahat et al., 2019). By integrating and enforcing various knowledge management strategies, businesses can gain an advantage in their industries (Sadq et al., 2020). Knowledgeable organizations see the expertise of their employees as a form of capital, so they've set up policies and procedures to make it easier for new information to be made and shared (Anwar and Abd Zebari, 2015). The term "knowledge process" refers to the "organized coordination to manage knowledge effectively" (Faeq et al., 2022). The steps of producing, acquiring, transforming, applying, and safeguarding knowledge are all part of the same process (Abualoush et al., 2018). It has been underlined by Anwar (2017) that the acquisition, conversion, implementation, and fortification processes of KM can have a significant impact on the success patterns of businesses using the same KM systems. Organizational success is positively correlated with knowledge management, according to the research of Faeq et al. (2022), even when absorptive capacity is a factor. Human strategy, organizational structure, and knowledge processes of translation and application are strongly related to organizational outcome, as explored by Anwar (2017), who looked into the connection between KM strategy, KM enablers, and KM processes and organizational outcome in software organizations. Knowledge acquisition, application, and protection were also found to be substantially correlated with business success by Gaviria-Marin et al. (2019). The above explanation lends support to the idea that enhancing the KM process will yield beneficial results for a business (Anwar, 2017). Previous research has also identified the KM process as a mediator between KM strategy and business outcome, as well as between KM enablers and firm outcome (Faeq et al., 2022). According to the study, better results for a business are predicted if KM procedures are enhanced (Faeq et al., 2021). Thus, in the higher education institutions in Tamil Nadu, organizational commitment mediates the connection between KM procedures and organizational outcome. According to some of the prior literature findings (Anwar, 2016), knowledge worker productivity may be positively impacted by enabling individual KM arrangements and knowledge management methods in academic engineering faculties. Pham et al. (2019) outlined a few guidelines for increasing KWP: giving workers more control over their work while also providing them with ongoing training and education; improving both the quality and quantity of their output; treating them as valuable assets and providing them with knowledge-based tasks; and so on (Anwar and Surarchith, 2015). Knowledge management (KM) methods aid in facilitating the creation and operation of knowledge, which in turn boosts the efficiency of an organization's knowledge workers (Butt et al., 2018). As a result of their newly acquired and applied expertise, workers are better equipped to complete their work in an original, efficient, and acceptable manner (Faeq, 2022). Consumers of research have argued that KM ensures the continuous improvement of organizational outcomes through employee empowerment and hands-on learning opportunities; the adoption of total quality management (Sadq et al., 2021); the management of information workers as a strategic asset in accordance with the knowledge-based value model (KBV), and so on (Sadq et al., 2020). Together, we can accomplish more if we share what we know, as proposed by Barley et al. (2018). When it comes to knowledge, "knowledge management is tied to a set of actions that contribute to knowledge and information sharing and help others to share their expertise". In terms of business innovation, knowledge management is crucial, as it affects both the rate at which new ideas may be implemented and the quality of those ideas. "A culture where individuals may share their information, ideas, views, skills, and experience" is one definition of knowledge management (Faeq et al., 2020). Management of "experience, task-related information, and response concerning any process or product" is another definition of knowledge management. The transfer of information from a source to a target is another definition of knowledge management. It's a process whereby two people collaborate to reimagine and generate new information. While the academic community's definition of "knowledge management" shifts from context to context, "knowledge sharing" often refers to the free flow of information across groups inside an organization. Literature suggests that when people share what they know, it helps them, their teams, and their company as a whole become more productive and innovative [20]. When applied to the development, amassing, and upkeep of corporate procedures, knowledge management becomes known as "knowledge management." The value and application of knowledge management to organizations will determine how far the field develops in the future. Therefore, knowledge management is the process of sharing and spreading one's ideas, experiences, and expertise with others for the purpose of preserving and perpetuating such knowledge in an organization (Anwar and Ghafoor, 2017). Knowledge management, as defined by Faeq (2022), is the process through which individuals share their insights and expertise with one another to boost both individual and organizational productivity. In the business world, "knowledge" refers to "habits, abilities, competence, experience, and understanding gained through formal or informal training". Knowledge sharing is a social activity in which workers freely impart their expertise and insights to colleagues. Rare, unique, and irreplaceable resources are shared since doing so creates more opportunities for individuals and businesses [29]. According to research conducted by Anwar (2017), it was determined that sharing information helps businesses succeed. To stay ahead in today's cutthroat economic climate, many companies now have dedicated "knowledge management" divisions whose mission it is to collect and organize information from a variety of sources, including employees, for the purpose of driving service and product innovation. Because information is a resource, employees should contribute to the company by sharing what they've learned. A good knowledge management system facilitates this process.

Organizational Outcome

According to Al Kashari and Al Taheri (2019), research, dedication serves a twofold purpose: it allows for the free flow of information between workers and their superiors, and it helps managers zero in on workers' areas of improvement. Management's attention to, and investment in, employee happiness ultimately benefits the business. By calculating the monetary benefits of the project's operations, managers and financial professionals are able to direct their attention toward achieving the project's desired outcomes, which include increased profits and stable revenues for the business. Satisfaction and staff dedication, two non-financial characteristics that have a significant effect on the longevity of a business, are given less attention by researchers. Employee dedication is an asset to every outcome-focused business. Keeping up with the competition and boosting organizational profitability requires an awareness of employee attitudes. Organizations should demonstrate their strategic planning ideas and share staff commitments and organizational outcomes, according to researchers. "Careful planning, efficient execution, and dedicated staff can guarantee enormous returns on this investment, to the direct benefit of our communities and stakeholders." (Anwar and Climis, 2017). In spite of Bolisani and Bratianu (2018) claim that human problems are being overlooked, it is now common knowledge that happy workers produce better results, spark more innovation, and inspire their employers to stick to their mission. However, the poll indicates that management is struggling to improve the organization's performance due to a failure to adequately evaluate the non-financial components of human capital that represent the equilibrium of the workplace and the productivity of the organization. One further thing that can make or break an organization is the dedication of its staff. Employees who are happy and committed to their jobs provide a significant competitive advantage to their employers. Employees that take part in more aspects of the company's operations tend to stay longer, miss less work, and leave the company less often. High-quality organizational results are the end result of such drive and determination (Anwar and Louis, 2017**)**. The term "absorption" is used to describe a state in which one is completely engrossed in their task without giving any thought to the amount of time that they have spent on it. Absorption occurs when an employee is so engrossed in their work that they have trouble tearing themselves away from it. In order to succeed, businesses frequently take workers' salaries into account. When planning for success, businesses should consider more than just the bottom line. Non-monetary elements can improve the success of any company, regardless of size or sector (Ardito et al., 2019).

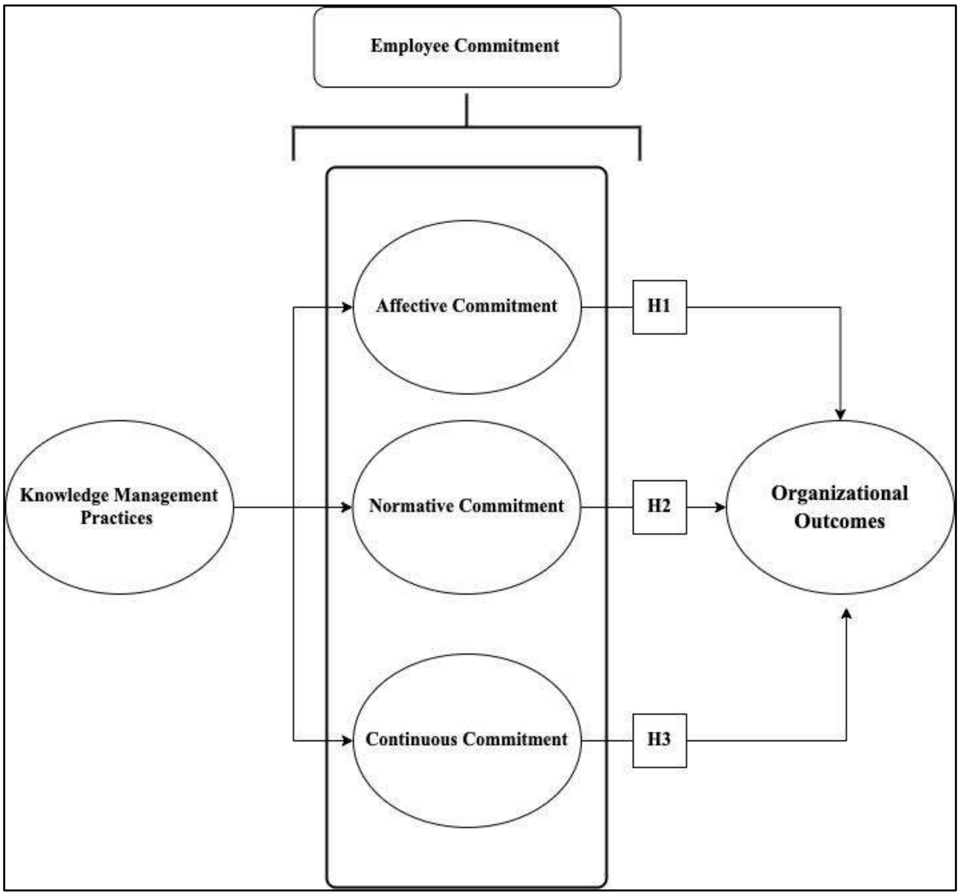
Employee commitment and organizational outcome

The success of both the individual and the company depends on the level of dedication shown by its staff. Employee performance, business results, and financial outcomes can all be anticipated. Employee commitment has an effect on the organization's output and efficiency, customer outcomes, staff turnover, advocacy, and the culture and reputation of the business (Singh et al., 2021). By blocking out distractions and giving your full attention to the task at hand, you may get more done in less time than usual while facing the least amount of difficulty. Dedicated workers typically outperform their peers and add significantly to an organization's success. Inspiration, excitement, and active participation on the part of workers are at the heart of devotion. A company's success is predicated on its ability to implement employee commitment methods that have been carefully thought out, clearly communicated, and are actually effective. Many different commitment, impact, and refinement tools have been developed by researchers in an effort to unravel the mystery of employee dedication (Maravilhas and Martins, 2019). Six areas of focus are proposed by Abubakar et al. (2019). issues of management, distribution, fairness, cohesion, success, and significance. They claim that conversations, the exchange of ideas, and the sharing of opinions are all ways in which employers and workers can acknowledge each other's contributions to a certain project (self-employment) or self-expression. When looking at employee commitment, the vast majority of research has looked at both the factors that affect commitment and the individual and organizational outcomes that are linked to it (Ode and Ayavoo, 2020).

III. METHODOLOGY

This paper aims to measure the influence of knowledge management practices on organizational outcomes with the mediation role of employee commitment at private sectors in Kurdistan region of Iraq. In order to effectively measure the mediation role, the study selected three dimensions of employee commitment which consists of (affective commitment, normative commitment, continuous commitment) as mediators between knowledge management practices and organizational outcomes. The researcher used quantitative research method via using a survey to measure the present research. The questionnaire was distributed randomly among 28 private businesses in Kurdistan region of Iraq. However, the researchers were able to gather 102 completed questionnaires. All items in the questionnaire were evaluated by using five point Likert scale ranging from 1=Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree to 5= Strongly Agree. After the completion of data gathering, all data were examined by SPSS to analyse the the influence of knowledge management practices on organizational outcomes with the mediation role of employee commitment at private sectors in Kurdistan region of Iraq. In order to effectively measure the mediation role, the study selected three dimensions of employee commitment which consists of (affective commitment, normative commitment, continuous commitment) as mediators between knowledge management practices and organizational outcomes.

IV. RESEARCH MODEL



Research Hypotheses

H1: Affective commitment mediates the relationship between knowledge management practices and organizational outcome.

H2: Normative commitment mediates the relationship between knowledge management practices and organizational outcome.

H3: Continuous commitment mediates the relationship between knowledge management practices and organizational outcome.

Table 1- KMO and Bartlett Sphericity Test of Self-rating Items

Variables	Number of Questions	Sample	KMO	Bartlett test	
				Chi-Square	Sig
Knowledge Management	5	102	.691	1.978	.000
Affective Commitment	5	102			
Normative Commitment	4	102			
Continuous Commitment	6	102			

Organizational Outcome	7	102			

As we can see in table (1), the result of KMO for all factors including Employee commitment (affective commitment, normative commitment, continuous commitment), knowledge management practice and organizational outcome. It was found that the value of r; is .691 which is higher than .001 this indicates that the sample size utilized for the present study was more than adequate. Moreover, the result of Chi-Square is 1.978 with the significant level .000. Accordingly, the findings revealed that all variables used to measure the mediation role of employee commitment between knowledge management practices and organizational outcomes found to be significant.

Table 2: Reliability analysis

Variables	Number of Question	Sample	Cronbach's Alpha
Knowledge management	5	102	.739
Affective Commitment	5	102	.778
Normative Commitment	4	102	.725
Continuous Commitment	6	102	.717
Organizational Outcome	7	102	.744

The reliability analysis was conducted to measure the reliability for each variable used to measure the relationship between knowledge management practices and organizational outcome along with the mediation role of employee commitment. The results of reliability analysis were found to be (as seen in table-2), the Cronbach alpha for knowledge management practices was found to be more than 0.7 for five questions (r=.739), the Cronbach alpha for affective commitment was found to be more than 0.7 for five questions (r=.778), the Cronbach alpha for normative commitment was found to be more than 0.7 for four questions (r=.725), the Cronbach alpha for continuous commitment was found to be more than 0.7 for six questions (r=.717), and lastly the Cronbach alpha for organizational outcome was found to be more than 0.7 for seven questions (r=.744).

Table 3: Correlation Analysis

Variables		(1)	(2)	(3)	(4)	(5)
Knowledge management practices (1)	Pearson Correlation	1				
	Sig. (2tailed)					
	N	102				
Affective Commitment (2)	Pearson Correlation	.601**	1			
	Sig. (2tailed)	.000				
	N	102	102			
Normative Commitment (3)	Pearson Correlation	.629**	.671**	1		

	Sig. (2tailed)	.000	.000			
	N	102	102	102		
Continuous Commitment (4)	Pearson Correlation	.599**	.491**	.601**	1	
	Sig. (2tailed)	.000	.000	.000		
	N	102	102	102	102	
Organizational Outcome (5)	Pearson Correlation	.677**	.573**	.419**	.701**	1
	Sig. (2tailed)	.000	.000	.000	.000	
	N	102	102	102	102	102

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

Table 4-Hierarchal Multiple Regression

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.009	.187		2.781	.000
	Affective Commitment	.611	.029	.619	1.978	.000
2	(Constant)	1.103	.112		1.078	.000
	Affective Commitment	.617	.045	.624	1.977	.000
	Knowledge management	.599	.051	.606	1.226	.000
a. Dependent Variable: Organizational Outcome						

The current study applied hierarchal multiple regression to analyze the relationship between knowledge management practices and organizational outcome at selected private businesses in Kurdistan region of Iraq. The results showed that the B value between affective commitment and organizational outcome was .611 this indicated that there is a positive and significant relationship between affective commitment and organizational outcome. On the other hand, it was found that B value between effective commitment and knowledge management to be .599 this indicated that there is a positive and significant relationship between affective commitment and knowledge management.

Table 5: Sobel Test

Input:			Test statistic:	Std. Error:	*p*-value:
a	.617	Sobel test:	8.91988392	0.04143361	0
b	.599	Aroian test:	8.90623209	0.04149712	0
s_a	.045	Goodman test:	8.93359873	0.04137	0
s_b	.051	Reset all	Calculate		

P-value is significant at level 0.005

Table (5), illustrates the findings of Sobel test to find the mediation analysis, the result demonstrates the direct relationship between technology infrastructure as knowledge management principle and enhanced production at cement manufacture, P-value =.0000 this indicated that there is a significant and positive direct relationship between technology infrastructure as knowledge management principle and enhanced production at cement manufacture. Furthermore, P-value is .000 as indirect relationship between technology infrastructure as knowledge management principle and enhanced production at cement manufacture. Moreover, the results proved that there is a positive and significant direct and indirect relationship between technology infrastructure as knowledge management principle and enhanced production at cement manufacture, moreover project management improvement program has a positive and significant mediating role between technology infrastructure as knowledge management principle and enhanced production at cement manufacture.

H1: Affective commitment mediates the relationship between knowledge management practices and organizational outcome.

Table 6: Hierarchal Multiple Regression

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.331	.119		1.761	.000
	Normative Commitment	.495	.029	.503	1.671	.000
2	(Constant)	1.178	.191		1.328	.000
	Normative Commitment	.519	.023	.526	1.076	.000
	Knowledge Management	.556	.031	.561	1.912	.000
a. Dependent Variable: Organizational Outcome						

The current study applied hierarchal multiple regression to analyze the relationship between knowledge management practices and organizational outcome at selected private businesses in Kurdistan region of Iraq. The results showed that the B value between normative commitment and organizational outcome was .495 this indicated that there is a positive and significant relationship between normative commitment and organizational outcome. On the other hand, it was found that B value between normative commitment and knowledge management to be .556 this indicated that there is a positive and significant relationship between normative commitment and knowledge management.

Table 7: Sobel Test

Input:			Test statistic:	Std. Error:	p-value:
a	.519	Sobel test:	14.04060815	0.0205521	0
b	.556	Aroian test:	14.03216643	0.02056447	0
s_a	.023	Goodman test:	14.04906512	0.02053973	0
s_b	.031	Reset all	Calculate		

P-value is significant at level 0.005

Table (7), illustrates the findings of Sobel test to find the mediation analysis, the result demonstrates the direct relationship between Enhanced production at cement manufacture and enhanced production at cement manufacture, P-value =.000 this indicated that there is a significant and positive direct relationship between enhanced production at cement manufacture and enhanced production at cement manufacture. Furthermore, P-value is .000 as indirect relationship between enhanced production at cement manufacture and enhanced production at cement manufacture. Moreover, the results proved that there is a positive and significant direct and indirect relationship between enhanced production at cement manufacture and enhanced production at cement manufacture, moreover cultural experience has a positive and significant mediating role between Enhanced production at cement manufacture and enhanced production at cement manufacture.

H2: Normative commitment mediates the relationship between knowledge management practices and organizational outcome.

Table 8: Hierarchal Multiple Regression

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.552	.2661		1.365	.000
	Continuous Commitment	.559	.049	.568	1.422	.000
2	(Constant)	1.292	1.221		1.677	.000
	Continuous Commitment	.559	.036	.568	1.291	.000
	Knowledge Management	.543	.061	.551	1.002	.000
a. Dependent Variable: Organizational Outcome						

The current study applied hierarchal multiple regression to analyze the relationship between knowledge management practices and organizational outcome at selected private businesses in Kurdistan region of Iraq. The results showed that the B value between continuous commitment and organizational outcome was .559 this indicated that there is a positive and significant relationship between continuous commitment and organizational outcome. On the other hand, it was found that B value between continuous commitment and knowledge management to be .543 this indicated that there is a positive and significant relationship between continuous commitment and knowledge management.

Table 9: Sobel Test

Input:			Test statistic:	Std. Error:	*p*-value:
a	.559	Sobel test:	7.72264756	0.03930478	0
b	.543	Aroian test:	7.71062229	0.03936608	0
s_a	.036	Goodman test:	7.73472926	0.03924339	0
s_b	.061	Reset all	Calculate		

P-value is significant at level 0.005

Table (9), illustrates the findings of Sobel test to find the mediation analysis, the result demonstrates the direct relationship between Knowledge management as knowledge management principle and enhance production of cement manufacture, P-value =.000 this indicated that there is a significant and positive direct relationship between Knowledge management as knowledge management principle and enhance production of cement manufacture. Furthermore, P-value is .000 as indirect relationship between Knowledge management as knowledge management principle and enhance production of cement manufacture. Moreover, the results proved that there is a positive and significant direct and indirect relationship between Knowledge management as knowledge management principle and enhance production of cement manufacture, moreover project management improvement program has a positive and significant mediating role between Knowledge management as knowledge management principle and enhance production of cement manufacture.

H3: Continuous commitment mediates the relationship between knowledge management practices and organizational outcome.

V. CONCLUSION

Knowledge management (KM) includes knowledge acquisition, storage, creation, sharing, and implementation. As discussed previously, organizational performance is comprised of crucial elements like productivity, financial performance, staff performance, innovation, work relationships, and customer satisfaction. The research model among SMEs has been conceptualized and made practical by taking these factors into account. Knowledge sharing was shown to have a greater factor loading than other KM practices, while financial success was found to have a larger factor loading than other components of organizational performance. Furthermore, the SMEs' KM practices were found to considerably and favorably affect the efficiency of the businesses. On the whole, our results suggest that enhancing KM practices can have a major impact on the productivity, financial performance, staff performance, innovation, work relationships, and customer satisfaction of SMEs and hence on their organizational success [25, 26]. Additionally, the findings of this study indicate that KM practices are the key factors in improving SMEs' performance. Knowledge that has been recognized, gained, and stored can then be put to use by SMEs in their investigation of problems and development of solutions, yielding a framework that promotes efficacy and efficiency. Small and medium-sized enterprises (SMEs) in today's fast-paced and complex business environment must constantly seek out, generate, disseminate, store, and apply new knowledge in order to make informed choices that boost their productivity, financial and employee performance, innovation, working relationships, and customer satisfaction. So, in order to improve the results of SMEs, their managers should work hard to create an environment and culture that makes it easy for employees and managers to use the KM practices listed above.

The findings of this study contribute by helping small and medium-sized enterprises (SMEs) gain a deeper understanding of the value of knowledge management (KM) techniques such as knowledge acquisition, storage, creation, sharing, and application in boosting organizational effectiveness. Further, this study shows the significance of KM for better business performance by tying these difficulties to results. The benefits of KM practices in boosting productivity, financial performance, employee performance, creativity, work relationships, and customer happiness should not be lost on the management of small and medium-sized enterprises (SMEs). Knowledge management (KM) executives in SMEs should allocate resources, both internal and external, to effectively apply relevant knowledge. Thus, one of the long-term and strategic benefits of implementing KM best practices is potentially enhanced performance. Managers of SMEs would do well to alter the norms and conditions of the workplace to encourage the use of knowledge management (KM) methods among workers. Gathering information from customers, suppliers, and other stakeholders is simple for SMEs; organizing it using modern informational technologies or even traditional means is simple; sharing organized knowledge across all levels of an organization is simple; and putting it all together to overcome challenges and improve performance is simple. So, one of the most important things for SME managers to do is to use KM methods as a part of their strategy.

VI. IMPLICATIONS

This research may provide organizational leaders and industry professionals with some food for thought regarding how to encourage innovative work behavior within a business. This exemplifies the significance of putting human resource management strategies into practice in order to accomplish a specific goal. It explains to HR managers how the integration of knowledge management processes may play a vital role in attaining their goals. It instructs the managers of companies in the telecom sector and other companies in this region that are focused on innovation on how to develop high-commitment work systems that have a beneficial influence on knowledge management and inventive work behavior of employees inside the organization. Primarily, it advises organizations in the telecom sector on how they can improve their organizational practices, productivity, and the outcomes of their employees by taking into consideration the role that knowledge management plays in their organizations, encouraging innovative work behaviors, and managing knowledge in the workplace. The management receives fresh information as a result of the fact that HR systems should be created in accordance with the aims of the firm. Alterations to the knowledge management system have the potential to multiply the results and favorably affect the outcomes that are desired by the organization. It offers academics fresh opportunities to investigate or investigate further a certain aspect of research. In addition to the backdrop of the Kurdistan region of Iraq, this study has a great deal of value. This is due to the fact that the majority of organizations in the Kurdistan area of Iraq do not consider knowledge management to be an essential driver for the outcomes of organizations. It can serve as a guide for decision-makers who are employed in organizations in the Kurdistan region of Iraq who are focused on innovation.

VII. LIMITATIONS

Despite the fact that this research contributes to the existing body of knowledge and has a wide range of implications for future research, it does have some restrictions. Data collection makes use of non-probability proportional quota sampling followed by convenience sampling due to the ease with which respondents can be reached and the constraints placed on the amount of time available. Because the sample is not collected in a random fashion, this means that not all of the participants will have an equal opportunity to take part in the study. Because of this, the generalizability of the findings and conclusions of this research may be restricted to some degree. Because of time and budget constraints, researchers are only able to examine the telecom providers that are active in a particular region of a country. This can restrict the amount of information that can be gleaned from their findings. In this analysis, only mobile network businesses that represent the telecom sector were taken into consideration; land line and internet service provider networks were not taken into account at all. Due to time constraints, the suggested research is a cross-sectional study. The data from this kind of study may make it harder to draw conclusions about the causes of events.

VIII. FUTURE DIRECTIONS

In further studies, researchers can investigate the impact of a variety of moderating factors on the variables and the related connections that were taken into consideration in this investigation. As a result of the fact that there are probably a great number of other factors that can have an effect on the connection between high-commitment work systems and innovative work behaviors, In addition, researchers have the ability to strengthen the validity of these findings by including a wider variety of control variables in this study, in addition to a wider variety of prospective variables. In addition, a longitudinal study could be carried out in order to achieve results that are both more efficient and dependable. In addition, the practices that were investigated for this study served as a broad representation of the factors that were investigated. According to the culture of the country as well as the setting of the industry, there may be a great number of additional practices or bundles of practices and objects that can be incorporated. In order to generalize and counter-verify the findings of the study, a similar study might be conducted in an industry that prioritizes innovation but is not the SMEs industry.

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Analysis of the Factors Affecting the Performance of Online Food Delivery Services in Cabanatuan City

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Abstract— *Food delivery services have influenced consumers' eating patterns because of the rise in consumer internet activity (Flores, 2020). They now have the appropriate and effective means of making food purchases whenever and wherever they like. The birth of online food delivery services applications was prompted by the development of new technologies and the COVID-19 outbreak, which forced food service providers to produce creative procedures and platforms to reduce human interaction when ordering and consuming meals. The online food delivery services (OFDS) made its significant mark during the occurrence of the global pandemic, it was considered the foremost savior of the food industry. OFDS can be defined as any food delivery transaction with monetary value that is done through mobile devices (Ngai, 2007). In connection with the current situation, this study investigated the performance of OFDS to find the relevant factors affecting online food delivery service time and efficiency that have direct effect on the business opportunities. Based on the findings of the study, most online food delivery service users are aged from 23 to 31 years old. Females are more likely to use OFDS platforms when ordering food compared with males. In terms of the civil status, single persons are more likely to use OFDS applications than married ones. Three factors were found to have significant relationship with the consumer's level of satisfaction and affecting the performance of the OFDS in Cabanatuan City. These factors were ease of use, delivery, and affordability of the foods.*

***Keywords*— affordability, delivery, ease of use and online food delivery services**

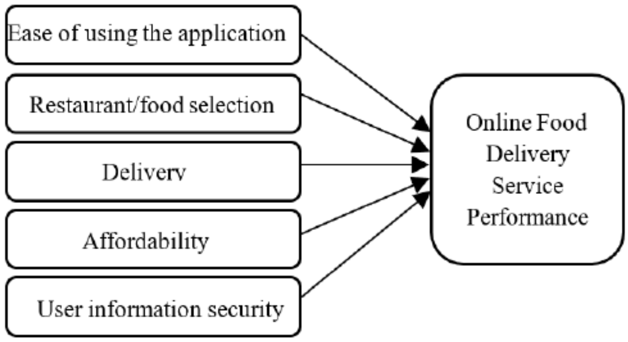
I. INTRODUCTION

The COVID-19 pandemic clearly posed threats to most businesses and the global economy in general. Every industry was affected by this health crisis all over the world. The food industry is no different from the other industries that were also affected. However, the effects in the food industry from other industries is much evident because the production and consumption of food are very essential for daily life. In addition, the food industry is a very important sector with regards to agriculture and economy (Aday, 2020). The fast-moving lifestyle of the Filipinos intensely influence their purchasing power as a consumer. The Filipino households spend about 42.6% on their expenses on food consumption. (Philippine Statistics Authority, 2018). The emergence of new technologies and the situation during the COVID-19 outbreak required the service providers to offer innovative practices to limit human contacts for food ordering. (Karim et al. 2020). The quarantine also gave the online food delivery service industry the chance to the growth of demand during the pandemic (Kim et al. 2021). It was found that the availability of the anticipated food at the desired time and the easy access to the internet are the primary reasons for using delivery services (Sethu, H. & Bhavya, S., 2016).

According to the survey by Euromonitor in 2020, there was an increase in the demand for e-commerce during the implementation of ECQ in the Philippines, 46% of the consumers have appreciated the ability to order at any time and from anywhere (Euromonitor, 2020). Certainly, COVID-19 pandemic shifted the conventional kind of food service to online processing and delivery of food to consumers. (Garceau, 2020). The online food delivery service made its significant mark during the beginning of the global pandemic, it is the foremost savior of the food industry (Gamilla, 2021) Existing research studies on food ordering and delivery have examined those consumers are more likely to use their mobile phones since online delivery has been offering more opportunities for collaborating and modified online marketing (Burke, 2002). OFDS has several useful features including maps showing nearby restaurants and comprehensive menus. With the relevant impact of the digital lifestyle on the customers, food delivery services are progressively and continuously being established to expand the selections available for the consumers (Vitali, 2019).

Additionally, with the increasing number of smartphones substituting the PC as the main device of a customers' daily lives, customers are progressively shifting to ordering through their smartphones. It provides power to customers to buy whatever and whenever they want. (Vitali, 2019). Technology has played an important role in transforming the food delivery service, it has contributed to the variations in consumer preferences as their dependency to technology has driven them to do everything online, including getting their food delivered to their doorstep (Das, 2019). The technological improvement in different industries have caused business models to grow. Well-organized systems can help improve the efficiency and viability of a restaurant. The use of online food delivery system is thought to lead the restaurant businesses to grow through time and will help the restaurants to simplify online operations (Hong, 2016). The competencies of online communication and technology is fulfilling and improving business management and service delivery (Chavan, et al. 2015).

CONCEPTUAL FRAMEWORK



The figure above illustrates this research study's conceptual framework that primarily intends to analyze the relevant factors affecting the performance of the OFDS that oversee the industry for the mutual benefits of the stakeholders such as the customers, food merchants, and OFDS firms. There were five (5) independent variables, or the factors identified which were ease of using the application, restaurant/food selection, timeliness of delivery, affordability and user information security, while the performance of the OFDS is considered as a dependent variable in this study.

The factor "ease of using the application" mainly pertains to how convenient and comprehensible the OFDS applications can be used, the factor "restaurant/food selection" pertains to how OFDS applications display and offer food and menus from the available restaurants around the area, while the factor "delivery" pertains to all underlying aspects involved in the delivery service of the OFDS like the timeliness of delivery and OFDS riders, the factor "affordability" pertains to the cost of service and food ordered and lastly the factor "user information security" relates to the confidentiality of the recorded users' basic information when doing food delivery transactions. These factors were correlated to the performance of the OFDS in terms of the customers' level of satisfaction in order to gain appreciation of what factors have direct effect on the performance of OFDS perceived by the customers.

Specifically, this study described the socio demographic characteristics of the respondents in terms of age, sex, and civil status and the factors affecting online food delivery as well as identifying significant relationships between the respondents' socio-demographic characteristics and the factors affecting the performance of online food delivery services.

II. METHODOLOGY

This research utilized descriptive-correlational design (Subia, Salangsang & Medrano, 2018). Descriptive correlational design is used to determine relationships among variables and to permit the forecast of future events from present knowledge (Walinga, 2019). The researcher gathered data from 50 respondents through a purposive/convenience sampling method who are OFDS users in Cabanatuan City. The respondents who were chosen purposively (Subia, 2018) were composed of 19 males, 31 females aged from 18 to 40 years old and up with a total of 28 singles and 22 married respondents. The respondents answered a four-part survey form through the Google sheets. The first part of the questionnaire was composed of questions about their socio-demographic profiles, the second part was composed of the factors and their descriptions that were rated using a 4–point Likert scale which were rated as: 4 – Strongly agree, 3 – Agree, 2 – Disagree and 1 – Strongly disagree with the legend of 3.25 - 4.00 (SA), 2.50 - 3.24 (A), 1.75 - 2.49 (D) and 1.00 - 1.74 (SD) as the measurement used. Part 3 includes the rating of the Level of Customer Satisfaction using also a 4–point Likert scale which were rated as: 4 – Highly satisfied (HS), 3 – Satisfied (S), 2 – Dissatisfied (D) and 1 – Highly dissatisfied (HD). Lastly, part 4 composed selection regarding the frequent problems encountered by OFDS users. Pearson Correlation analysis was used to determine the relationship between the variables. The researcher used the PSPP Data Analytics application for the analysis of data gathered.

III. RESULTS AND DISCUSSION

1. The respondents' socio-demographic characteristics

For the age, 11 of the respondents were 18-22 years old (22%); 13 of the respondents were 23-27 years old (26%); 13 of the respondents were 28-31 years old (26%); 7 of the respondents were 32-35 years old (14%); and finally, 6 of the respondents were 36 years old and up (12 %). The age range of the respondents was 18-40 years old, with an average of 27.66 and has a standard deviation of 5.47 that means ages ranging from 23-31 years old have the tendency to buy food through online food delivery services. For the sex, there were 31 female respondents (62%) and 29 male respondents (38%) which implies that most of the online food buyers in Cabanatuan City, Nueva Ecija are female. Gender is an important predictor of a consumer's intention to make purchases over the web. (Slyed et al. 2002) Lastly, the majority of the respondents (56%) were single while 44% were married. The data gathered showed that single persons tend to use online food delivery applications to buy food, since they still do not have a family to feed than the married respondents who are more conscious of their budget.

2. Factors affecting the performance of online food delivery services

The five (5) factors were assigned with different descriptions and statements compelling with the given factors. For every factor, the were also five (5) statements which were rated by the respondents whether or not they agree with statements according to their experiences.

Table 1. Over-all mean and verbal description of factors/independent variables

Factors	Mean	Verbal Description
Ease of Using the application	3.62	SA
Restaurant/Food Selection	3.24	A
Delivery	3.65	SA
Affordability	3.45	SA
User information security	3.23	A
Overall Weighted Mean	**3.44**	**SA**

Legend: 1.00 to 1.74-Strongly Disagree; 1.75 to 2.49-Disagree; 2.50 to 3.24-Agree; 3.25 to 4.00-Strongly Agree

Table 1 displays the result on the factors affecting the performance of OFDS as perceived by the respondents. The overall mean was 3.44 which was described as strongly agree that implied that the respondents have strongly agreed to the statements given under each category. The factor delivery got the highest pooled mean of 3.65 described as strongly agree while the factor user information security got the lowest pooled mean of 3.23 described as agree only. According to the data gathered, three of the factors (ease of using the application, delivery and user information security) are found to be with highest pooled means that are considered significant in terms of utilizing the OFDS application.

3. Correlation analysis between the socio demographic profile of the respondents and the factors affecting the performance of OFDS

The socio demographic profiles of the respondents were correlated with the factors affecting the performance of OFDS, in order to identify and analyze if the respondents' socio demographic profiles have significant effects on the factors identified.

Table 2. Correlation analysis between the socio demographic profile of the respondents and the factors affecting the performance of OFDS

		Ease of using the application	**Resto/Food Selection**	**Delivery**	**Affordability**	**User information security**
Age	Pearson Correlation	-.182	-.194	-.055	**-.308***	-.128
	Sig. 2(-tailed)	-.205	-.177	.705	0.030	.375
	N	50	50	50	50	50
Sex	Pearson Correlation	-.109	-.220	-.209	-.198	**-.430****
	Sig. 2(-tailed)	-.453	-.125	-.146	-.168	-.002
	N	50	50	50	50	50
Civil Status	Pearson Correlation	-.220	**-.362****	-.160	**-.370****	-.185
	Sig. 2(-tailed)	-.125	-.010	-.267	-.030	-.000
	N	50	50	50	50	50

**. Significant correlation at the 0.01 level (2-tailed)

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

Results show that age has negative significance related to the affordability factor and based on the coding on the PSPP Data Analytics application, this implies that younger respondents believe that products offered for online delivery are affordable. Similarly, sex was also found to be negatively but highly and significantly related to the factors affecting the performance of OFDS in terms of safety and security. This implies that females' respondents are confident enough to say that it is safe and secure to order in OFDS. In addition, civil status was also found to be negatively but highly and significantly related to the factors affecting the performance of OFDS in terms of food selection/options and affordability. The results imply that single respondents strongly agree that there is a variety of foods to choose which are also affordable. Therefore, the hypothesis "there is no significant relationship between the socio-demographic characteristics and the factors affecting the performance of OFDS" is rejected.

4. Online food delivery services performance rating according to the respondents

For the third part of the survey, the respondents were asked to rate the performance of the online food delivery services that they have used in terms of the level of their satisfaction.

Table 3. Online food delivery services performance rating according to the respondents

Rating	**Respondents n=50**	**Percentage**
4 – Highly Satisfied (HS)	**29**	**58**
3 – Satisfied (S)	18	36
2 – Dissatisfied (D)	3	6
1 – Highly Dissatisfied (HD)	0	0

Table 3 summarizes the performance of OFDS in terms of the level of satisfaction of the respondents. A total of 29 respondents (58%) said that they are highly satisfied, 18 respondents (36%) said they are satisfied, and lastly, 3 respondents (6%) said they are dissatisfied. There was no respondent who rated highly dissatisfied with the performance of online food delivery service applications.

5. Correlation analysis between the factors affecting the performance of OFDS and the satisfaction level of respondents

The results from parts two and three of the survey form were then tested to identify their significant correlations using PSPP Data Analytics application

Table 4. Correlation analysis between the factors affecting the performance of OFDS and the satisfaction level of respondents

Factors		**Performance of OFDS**
Ease of using the application	Pearson Correlation	**.666****
	Sig. 2(-tailed)	.000
	N	50
Restaurant/food selection	Pearson Correlation	.528
	Sig. 2(-tailed)	.000
	N	50
Delivery	Pearson Correlation	**.556****
	Sig. 2(-tailed)	.000
	N	50
Affordability	Pearson Correlation	**.728****
	Sig. 2(-tailed)	.000
	N	50
Users' information security	Pearson Correlation	.537
	Sig. 2(-tailed)	.000
	N	50

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

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

Table 4 shows that the factor "ease of using the application" was highly and significantly related to the performance of the OFDS that suggests that respondents are highly satisfied with OFDS applications that are convenient and easy to use. Similarly, the factor "delivery" was also found to be highly and significantly related to the satisfaction level of the respondents which implies that respondents are highly satisfied with prompt and accurate delivery of the products that they have ordered. Lastly, the factor "affordability" was also found to be highly and significantly related to the performance of the OFDS which suggests that the respondents are highly satisfied affordable products and services. Thus, the hypothesis "there is no significant relationship between the factors affecting the performance of OFDS and the level of satisfaction of the respondents" is rejected.

6. Problems encountered by online food delivery service users

In this part of the results discussion, there were seven (7) problems stated in the survey questionnaire and the respondents were asked to select the most frequent problem they encountered when using online food delivery services.

Table 5 shows that "additional charges/high delivery fee" attained a highest frequency of 18 respondents or a total of 36% of the total number of respondents that ranked as top problem encountered by online food buyers. The statement "lack of security" got the lowest frequency of 0, and ranked as the least problem encountered by online food buyers.

IV. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were made based on the results and discussions:

1. For the socio-demographic characteristics of the respondents, the majority of online food delivery service users are aged from 23 to 31 years old. Females are more likely to use OFDS platforms when ordering food compared with males. In terms of the civil status, single persons are more likely to use OFDS applications than married ones.
2. There were three (3) factors that significantly affect the performance of online food delivery services such as "ease of using the application", "delivery" and "affordability". Ease of using the application which is directly relatable with the convenience in ordering food anytime and anywhere. Delivery as supposed to be one of the significant factors due to its help in aiding the issues of social distancing during pandemic, based on the survey, fast delivery is a considerable factor that consumers expect Lastly, affordability also conveys significance in the performance of the OFDS platforms because consumers anticipate the value of their money for every purchase they do.
3. The factors "ease of using the application", "delivery" and "affordability" were found to be highly and significantly related to the performance of OFDS. The results suggest that the respondents are highly satisfied with OFDS that are fast, convenient, with affordable products and services and offer easy transactions.
4. According to the results, the additional fees in every food delivery transaction were perceived as the most frequent challenges encountered (Abelardo, et al, 2019) by the respondents.

RECOMMENDATIONS

Based on the results obtained, the following recommendations are drawn to help Online Food Delivery Services firms and future researchers:

1. Online food delivery service platforms must be user-friendly, convenient to use and accessible to any type of consumers particularly in the devices they are using.
2. Delivery of food must be timely and accurate; the food must also be handled with utmost care.
3. Local government units must coordinate with food delivery services and food merchants in cascading laws and regulations that will protect all stakeholders.
4. Online food delivery services must have service hotlines and websites where customers can share their experiences, feedback and recommendations to improve the quality of delivery services.
5. Food riders can be offered with compensating schemes that will also protect and promote their well-being especially if there are online scammers and fraudsters.
6. Future researchers can expand this study by adding other variables and to improve this study.

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