AMERICAN JOURNAL OF ECONOMICS AND BUSINESS MANAGEMENT

ISSN: 2576-5973
Vol. 5, No. 11, 2022

Role Artificial Intelligence in Reducing Product Costs Agricultural "Applied Study in the National Program for the Development of Wheat Cultivation in Iraq

Researchers

Ass. Pro. Dr. Mohammed Abdelwahid Flayyih [(1)]
Accounting Department, College of Administration and Economics, Iraqi University, Baghdad, Iraq
Mohammed.hilf@aliraqia.edu.iq

Ass.Tea. Hadeel Ahmed Badr [(2)]
Hadel199494@gmail.com
Accounting Department, College of Administration and Economics, Al - Farahidi University, Baghdad, Iraq

Ass. Tea. Shaymaa Majeed Saeed [(3)]
Shaimaa.majeed79@gmail.com
Accounting Department, College of Administration and Economics, Al - Farahidi University, Baghdad, Iraq

Abstract: The aim of the research is to identify contemporary technologies and their use in the agricultural sector, as it is a vital and important sector.

As artificial intelligence techniques have been used to reduce the costs of the agricultural product represented by the cost of direct wages, as the reliance on traditional methods of cultivation and production leads to higher costs and crop production of low quality. The researchers relied on the inductive and deductive approach to enhance the theoretical aspect, while the practical aspect The researchers relied on analyzing the data obtained from the National Program for the Development of Wheat Cultivation in Iraq, and the researchers concluded that artificial intelligence has a major role in reducing the costs of the agricultural product represented by the costs of direct wages, which is reflected in the result in reducing costs.

Keywords: Artificial Intelligence, Reducing Agricultural Product Costs.

1. Introduction:

The rapid qualitative development brought about by the technological revolution, especially with the twentieth century in the field of information technologies, led to the emergence of new applications and programs characterized by diversity and continuous innovation, which intensified competition between companies on the global market level.

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

Recently, applications have contemporary technology or information technology using the most prominent applications contemporary information systems, which is the intelligence of artificial As the applications of intelligence are artificial Important In many fields and fields, for companies, it is an indispensable necessity. So Many studies and research have confirmed the importance of these applications in Economic units This is not because it can achieve several advantages, most notably:

Improving the decision-making process, solving all administrative problems, as well as reducing costs, improving quality and other advantages that directly contribute to enhancing the competitiveness of the business Economic units ensuring its survival and growth.

2.View the literature

The literature related to the research variables was reviewed A number of research articles were identified due to their importance and contribution to the study of research variables at an earlier time. In the following table, we review some of these studies

Table (1) presents the literature related to the research variables

T	Researcher's name and year	Study Title	its results
1	**(Shanawa and Al Bakri, 2018)**	The role of artificial intelligence in achieving customer satisfaction and its reflection on cost accounting	thatArtificial intelligence helps in achieving customer satisfaction by quickly responding to changes in customer tastes, and then enables the economic unit to increase its market share and grow its sales.
2	**Hamed,2019**	Reducing production costs using the agile hexagonal diffraction input	The application of the graceful hexagonal diffraction input contributes to meeting the requirements of customers by reducing production costs and delivering the product on time.
3	**(Nasr al-Din and Ibn Daql, 2020)**	The role of artificial intelligence in the product planning process in a telecom company ooredoo Algeria	Artificial intelligence helps analyze data using various analysis applications by giving information about the type of current customers, their desires, potential customers, their geographical distribution, and what products can be marketed in one region without the other.

Source: Prepared by the researcher based on the above sources

3. Artificial intelligence

1.3The concept of artificial intelligence

Intelligence is made up of artificial From two words: intelligence and the word artificial And each of them has a meaning, where intelligence is defined as the ability to understand new and changing circumstances and situations, that is, the ability to perceive, understand and learn new situations and circumstances. Artificial It is actually related to making or simulating and Then This word is given to the things that arise as a result of the activity or action that takes place through the fabrication of things, as distinct from the things that actually exist naturally without human intervention (Khawalid).11: 2019,)(Ismail, 2021: 1083). On this basis, artificial intelligence means in general the intelligence that a person makes or creates in a machine or a computer, the intelligence that comes from a person in the original and then gives it to a machine or a computer. Ottoman, 2019: 11-12).

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

And the term intelligence artificial It was first coined by (John McCarty) in 1956 when the first academy held a conference on this subject. And that the important thing is to know whether intelligence is artificial Science or art, in fact, intelligence is artificial It is a science and an art at the same time, as it is a science because it developed intelligent computer systems by employing mathematical principles, as well as the ability to solve difficult problems in several fields, and it is an art because it works on the basis of the idea of designing intelligence systems that are done by employing technical methods for programming, and Then The data stored in all the information can be manipulated by computer science techniques, so a Artificial intelligence is a science. and art.at same time (Smith, et. al, 2006 : 4) (Nath, 2009: 28) (Al Bakri 6: 2010,).

Intelligence is known artificial on he:

- It is a specific language that is translated by humans, which enables the machine to perform intelligent actions that are done by humans.
- Science and technology based on other branches of science such as computers, engineering, mathematics, psychology, medicine and biology
- An attempt to build machines that think and act like humans so that they are able to learn and use their knowledge to solve problems on their own (Al-Hamdani, Al-Bakri2011 261 :).

He also knows the intelligence artificial It is the field that seeks to understand the nature of human intelligence by creating programs on computers that intelligently imitate actions, actions or behaviors (Al-Obaidi).44: 2013,).

and know him Dan. Patters on "It is a kind of computer science that is concerned with the study and formation of computer systems that show some forms of intelligence, and these systems have the ability to draw very useful conclusions about the problem in question, and these systems can also understand natural languages or understand living cognition and other capabilities that require intelligence whenever needed. Implemented by man (Hajira, 2018: 81).

2.3. types of artificial intelligence

There are three types of artificial intelligence, which are as follows (Khawalid155: 2019,):-

1- Narrow or weak artificial intelligence:

It is the simplest type of artificial intelligence, where artificial intelligence is programmed to perform certain functions within a specific environment. IBM) and defeated Garry Kasparov, the world chess champion.

2- Strong or general artificial intelligence:

This type is characterized by the ability to collect and analyze information and benefit from the process of accumulating experience, which qualifies it to make independent and autonomous decisions, such as self-driving cars.

3- Super Artificial Intelligence:

They are models that are still under experiment and seek to simulate humans, and it is possible to distinguish between two basic types:

The first: It attempts to understand human thoughts and emotions that affect human behavior and has a limited ability for social interaction.

The second: It is a model of the theory of mind, where these models can express their internal state and

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

predict the feelings and attitudes of others and are able to interact with them and are expected to be the next generation of super-intelligent machines.

3.3**. The goals and importance of artificial intelligence**

Artificial intelligence aims to enable machines to process information closer to the human way of solving problems, where several orders are executed at the same time, and this is closer to the human way of solving problems. Al-Khawalid134: 2019,).

Also, the goal of artificial intelligence is evolving and continuous. The interim goal is to reach systems that think and act like humans, as he points out (Nagpal(to intelligence as building a machine that thinks and acts like human beings)Nagpal, 2010 : 3), As for reaching systems that surpass the thinking and work of humans, as for the second stage, it is and this is what we see in fantasy stories, as experimental research is working to reach this goal and achieve it through high technology (Hoavar, 2006: 9).

It highlights the importance of intelligence artificial Through several things, including (Al-Obaidi46: 2013,) :-

1. It uses a comparative approach to the human method in solving complex problems.
2. Dealing with hypotheses simultaneously, accurately and at high speed.
3. There is a specialized solution for each problem and for each homogeneous category of problems.
4. It operates at a constant scientific and advisory level that does not fluctuate.
5. Non-numeric symbolic data is processed through logical analysis and comparison.
6. Stirring up new ideas that lead to innovation.
7. Absence of feeling tired or bored.
8. Economy in expenditures and reduce human effort.
9. Reduce dependence on human experts.

4.3The advantages of artificial intelligence

One of the most important advantages of intelligence artificial (Kaur, 2012: 6-7) (Keswani, 2013:348) (Al-Bakri 4: 2018,):-

1. It is one of the most important advantages of intelligence artificial It is that his decisions are based on facts and not on emotions, and this is what distinguishes him from humans, as no matter how hard we try, it is a well-known fact that our decisions are always negatively affected by our emotions.
2. Machines in the shadow of intelligence artificial And unlike humans, it works without getting bored or tired or stopping, and then it outperforms humans in this field.
3. Transforming experience and knowledge industrial minds and machinesaOthers are made easier by copying them easily to others in this way, the time wasted in passing that knowledge to humans through training is reduced.
4. Provides answers to decisions, processes, and recurring tasks.
5. Retaining large amounts of information
6. Reduce employee training costs
7. Increase efficiency by reducing the time required to solve problems.
8. Reducing the risk of injury and human stress because the work will be accomplished by smart industrial machines.
9. Reduce time and resources.

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

5.3. Artificial intelligence application

Intelligence income artificial In unlimited applications and fields, among these areas:

1. The use of robots and robotic arms in production:

The use of artificial intelligence applications in production represents a flexible automated examination of production processes (automated control, robots programmed to meet product specifications, self-organizing robots, and robots capable of learning), as well as flexibility in diagnosis, error detection, production control, planning and management in general.(www.discovery.org.in).

So that this no The human being began to imitate dynamically and developed into programmed machines whose performance could be changed by changing their control program. And the robotic arms in manufacturing have several benefits, including (Al-Bakri5 : 2010,):-

- Do not ask for weekly, annual or occasional vacations.
- Do not be lazy or tired of work and do not stop except for the purpose of maintenance.
- It can work in factories that are not air-conditioned or lit by not strong lighting, and this leads to energy savings.
- Do not claim compensation if you were accidentally or deliberately exposed to toxic gases or harmful chemicals.
- It does not need support facilities such as nurseries, dining halls, gyms and other things that workers demand.

And that all these advantages lead to significant savings in the cost of production. The most important industrial uses of robots and robotic arms include:

- ❖ It performs jobs that are dangerous to humans.
- ❖ It is used to clean nuclear power plants.
- ❖ Do repetitive jobs that are boring or stressful for humans.

1- The use of artificial intelligence In the military

may Prepare Some that the field of intelligence artificial Not valid for society - due to the support ground on which this field depends and its connection with the military institutions in the major industrial countries, especially America and Britain, such as the Agency for Advanced Research Projects DARPA (US Defense Advanced Research Projects Agency), AI researchers have developed primary weapons or weapons-related systems that are part of a strategic computer applications initiative. The research now includes the production of the smart assistant to the captain, to help combat aviation under severe maneuvering conditions, and models of independent reconnaissance mechanisms that can enter enemy territory, avoid its attacks and transmit war data to command centers. This is in addition to the expert systems that help military leaders to reach correct decisions in light of the huge amount of complex and conflicting reports, as well as the speed that characterizes modern conflicts ((http://www.arteimi.info)

2- Use of artificial intelligence at medicine field :

Intelligence has been used artificial In managing the medical records of patients and knowing their medical history, as well as using it to analyze the results of various examinations quickly and more accurately. It also analyzes the notes in the medical reports, and on the basis of these analyzes the correct diagnosis is chosen for treatment. It also does not dispense with the use of these techniques in monitoring

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

the patient's condition and the extent of his response to treatment between repeated visits to the doctor (as a digital nurse).), Many health organizations have also created an application (Air cure app) to monitor the patient's use of treatment, where a webcam is connected with smartphones to ensure that the patient has taken the drug dose and to monitor the development of their health status (Al-Khawalid 104: 2019).

One of the benefits of using artificial intelligence in the field of medicine B.(Merizek639: 2012,) :-

1. The reliance of hospitals on the system of intelligence as It provides opportunities to raise the level of its quality and appearance Contemporary and in line with the changes of the times. In addition to the ease of communication with the outside world in the field of medical research and medicine.
2. It reduces costs, because these services, information and consultations do not require manual diagnosis or doctors.
3. Using the intelligence system artificial It will allow effective communication from competitor partners and customers because communication is done electronically and through artificial intelligence programs, and thus appropriate programs are developed for this in terms of exchanging information between hospitals as a whole and between customers to know their requests and opinions in a faster way.
4. The auditors can make reservations through these programs and know the results of the examinations and their medical history, as well as placing the patient on the website, which also means providing information at anytime and anywhere, as well as working to save time instead of going to the hospital during official working hours and avoiding transportation and waiting problems .

4- The use of artificial intelligence in the field of agriculture

With the development of science and technology at that time, artificial intelligence and agriculture have become inseparable, providing exciting and unlimited possibilities from the moment of seed germination to maintaining the integrity of crops and the actual harvest process, and artificial intelligence has been applied in the field of agriculture, as it can be divided into several categories(Hunt & Danghtry:) (2017: 5351 .)(Wang et.al, 2019 : 2) ((Ayamga, et.al, 2021 : 2(www.noonpost.com) (www.m.fpuavdrone.com):-

A- Intelligent agricultural robot: This robot performs many important agricultural tasks, such as harvesting crops with high productivity at much faster speeds than humans. This robot distinguishes that it works around the clock without getting bored and tired.

b- Crop and soil control: Agricultural crops and soils are monitored through the use of computer vision and deep learning algorithms to process data captured by drones. Software technology can also be used to monitor crop and soil health.

C- Use of unmanned aerial vehicles: By the year (2027), the market for drones in the agricultural sector is expected to reach (480) million US dollars. The use of drones is designed to help users increase crops and reduce costs. The plane is programmed, as soon as it is deployed. The device uses computer vision to record images and upload the captured data and integrate and analyze the images and data captured through algorithms to provide detailed analysis reports, and it will work for monitoring, spraying pesticides and pollinating trees.

D- Self-driving harvesters: The use of the smart harvester is able to revolutionize the agricultural field. It facilitates the process of plowing and spraying seeds at equal distances. It can also monitor the level of growth and predict the date of harvest. Therefore, researchers believe that the emergence of artificial intelligence can not only help improve agricultural efficiency, but also help Solve the challenges facing agriculture, including crop yields, soil health and resistance to pesticides, so that agricultural robots will

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

become an important application of artificial intelligence in the agricultural field.

4. The role of artificial intelligence in reducing agricultural product costs

There are applications of artificial intelligence that can contribute to the service of those in charge of agriculture, which contributes to reducing labor costs (Talaviya, 2020 : 64), and the application of many advanced technologies represented by smart agricultural machines to carry out agricultural tasks independently, as agricultural robots, drones and self-driving harvesters reduce costs by detecting agricultural diseases and pests in crops at an early date, which saves time and effort on farms In order to treat them, the drones also work on knowing if the fields are exposed to agricultural pests and then prevent the occurrence of infection (www.althaleej.ae)

On the traditional side, the process of detecting agricultural pests and diseases took about a month to identify the area of infestation, but after using artificial intelligence techniques, the detection of agricultural pests and diseases took only one hour, which contributed to reducing costs and treatment period, and at the same time the damage was reduced. The yield is large.

that theLow cost and qualityThehigheIt is certain that it achieves higher profits and thus achieves a competitive advantage with which the economic unit can face its competitors.Rewers, et al, 2016: 1). By relying on high automation, the direct costs represented in direct wages are greatly reduced and the limits of inventory and spoilage are also reduced, as direct costs represent a large proportion of production costs that may reach (75%) or more as an average for various agricultural products (David, 2015: 900-901).

And through what Researchers believe that the use of artificial intelligence for smart machines and equipment, including smart harvesters, smart agricultural robots and drones in the agricultural sector, may contribute significantly to the development of the agricultural sector in Iraq and keep pace with developments in the world in order to increase the wheat crop to achieve self-sufficiency,Given that the applications of artificial intelligence are numerous and varied in the agricultural sector, researchers will address the use of the harvester and the smart agricultural robot because of their significant impact in reducing harvest costs than they were when using traditional methods.

5. practical side

1.5 An introduction to the National Program for the Development of Wheat Cultivation in Iraq

A scientific program to transfer modern technologies, including artificial intelligence techniques, to farmers in the governorates of Iraq that are covered by the National Program for the Development of Wheat Agriculture in Iraq in order to raise the yield of the wheat crop in ways that are compatible with the farmer's mentality, degree of awareness and material income. The program has identified environmental and technical problems and provided treatments to solve them. The program areas are increasing annually in all governorates of Iraq to reach (5) million dunums in the tenth year of the program's life as a final goal to reach self-sufficiency in the wheat crop, as shown in the table (2) .

Table (2): program coverage plan in terms of area

the year	The area covered by the project (1000 acres)
first	A year of preparation and studies
the second	100
the third	400
the fourth	900
Fifth	1500
Sixth	2150

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

Seven	**2850**
eight	**3550**
the ninth	**4250**
tenth	**5000**

Source: Prepared by the researcher based on the statistics of the National Program for the Development of Wheat Cultivation

2.5 Calculating the cost of one acre for wheat crop production according to traditional methods

The National Program for the Development of Wheat Cultivation in Iraq has identified three areas for each governorate, and the table shows (3The total area of the governorate, the areas proposed by the program, and the areas of typical (lighted) farms approved in each governorate:

Table (3) The areas specified by the National Program for the Development of Wheat Cultivation in Iraq

T	provinces	The total area of each governorate in dunams	The proposed area in acres	The area of typical farms in dunams
.1	Baghdad Rusafa	64,864	45,000	45
.2	Baghdad Karkh	106,265	45,000	45
.3	Nineveh	3,814,654	500,000	85
.4	Basra	32,278	13,000	45
.5	Diwaniyah	504,000	175,000	45
.6	Babylon	315,000	60,000	45
.7	Dhi Qar	346,189	50,000	45
.8	Diyala	480,872	50,000	45
.9	Anbar	564,000	30,000	45
.10	Maysan	351,000	50,000	45
.11	Najaf	230,000	100,000	45
.12	Salahuddin	111,075	100,000	45
.13	Wasit	1,218,345	567,000	85
.14	Kirkuk	943,957	100,000	45
.15	Karbala	100,000	75,000	45
.16	Double	226,099	65,000	45

Source: Prepared by the researcher based on the statistics of the National Program for the Development of Wheat Cultivation

The typical farms (illuminated)[1]It aims to spread a series of technologies implemented by a specialized cadre of agricultural engineers. The illuminated farms are targeted by choosing a farmer who has a standing among his family and his people, that is: the one with influence and a discourse heard by others who can influence the farmers in the event of the success of the techniques used in order to be generalized on large areas of agricultural land.

According to the traditional methods, lists were prepared to calculate the cost items for cultivating the wheat crop in the model farms of the province of Baghdad.90 acres, as shown in Table (4 .)

[1]Model farms (illuminated): are farms selected by the National Program for the Development of Wheat Cultivation in Iraq in agreement with the farm owners to apply contemporary techniques to be later applied upon the success of the experiments on larger agricultural areas. Source: Personal interview with the Director General of the National Program for the Development of Wheat Cultivation in Iraq

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

Table (4) The cost of producing the wheat crop in Baghdad governorate according to the traditional methods for the 2020/2021 agricultural season

Cost items for typical farms of 90 dunums			The cost of one acre	Total space cost
Materials	Seeds		9,000	810,000
	Fertilisers	urea	24,150	2,173,500
		dab	26,250	2,362,500
		potassium sulfate	45,000	4,050,000
		Minor elements	750	67,500
	pesticides		2,674	240,660
total material cost			107,824	9,704,160
wages	tillage wages		10,000	900,000
	Land smoothing fees		10,000	900,000
	settlement fee		10,000	900,000
	Manual sowing fee		10,000	900,000
	Fertilization Fee		5,000	450,000
	control wages		5,000	450,000
	The cost of automated work		50,000	4,500,000
	Employee wages throughout the season		19,637	1,767,330
total wage costs			119,637	10,767,330
Total direct costs			227,461	20,471,490
Until the harvest	babble		2,000	180,000
	harvest costs		20,000	1,800,000
	Loading / transporting / unloading (for materials)		300	27,000
after harvest	crop cleaning fees		8,000	720,000
Total indirect agricultural costs			30,300	2,727,000
	Download		16,000	1,440,000
	Transfer		8,000	720,000
	evacuation		8,000	720,000
total marketing costs			32,000	2,880,000
Total cost of wheat cultivation			289,761	26,078,490

Source: Prepared by the researcher

table summary (4)It can be concluded that the production costs per acre of materials and wages represent the highest percentage of costs in the case of using traditional methods in the production process, hence the importance of shifting from production by traditional methods to production according to contemporary technologies to keep pace with development and contribute to reducing costs represented in materials and wages.

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

3.5 Calculating the cost of one acre to produce the wheat crop after using artificial intelligence

After identifying the costs of producing the wheat crop according to the traditional methods in the model farms of Baghdad Governorate,yTMIn the subsequent paragraphs, the use of artificial intelligence techniques represented by the developed harvester and the smart agricultural robot to reduce the wage costs related to the cultivation of the wheat crop. The researchers have relied on a fully automated harvester with a smart agricultural robot connected to it to facilitate the harvest process and also contribute to reducing costs, time and effort, as will be discussed in the following paragraphs.

Wheat harvesterJohn Deere S690

Combine harvesters have largely saved human beings from manual labor and have become an important part of the global industrial revolution due to the presence of competition +-, the leading agricultural brands in the combine harvester industry have released a series of their combine harvesters. The wheat combine harvester is characterized by an increase in the total collecting capacity and a decrease of28% in the volume of residues. Plus, its Active Terrain Adjustment™ option adjusts the settings for the Dyna-Flo Plus when working on slopes. So if you have gradual terrain this is a must if you are going uphill or downhill.

The harvester featuresS690 with an impressive transport speed of 40 km/h, such features are triggered, to maintain high productivity in challenging conditions.

Estimated harvest cost44,000,000 Iraqi dinars, and the estimated useful life of the harvester is 30 years, and the value of the rubble is about 10,000,000. The depreciation provision can be calculated as follows:

$$\text{depreciation premium} = \frac{\text{Cost - Scrap}}{\text{estimated useful life}}$$

$$= \frac{10{,}000{,}000 - 44{,}000{,}000}{30}$$

=1,133,333 Annual depreciation premium

Artificial agricultural robot

System from company Congnitive Agro Pilot can be installed on any type of combine harvester. The system can independently control the harvester. The system consists of several parts:

1. A computer unit with an integrated display screen with a built-in neural processor using components that are resistant to vibration and temperature, the unit is protected by a tight aluminum casing that protects it from shock and moisture
2. The positioning and navigation module solves the tasks of positioning and evaluating the dynamics of the movement of the harvest, and provides connection to the remote control center and other equipment in the field.
3. A video camera based on the latest color sensor designed specifically for portability applications, the camera is adapted to rapidly changing lighting conditions, shadows, dust, and anything that obstructs good visibility. The camera is protected by a case,
4. Digital hydraulic unit provides reliable steering and operates on standard machine hydraulic system
5. Steering wheel angle sensor is essential for driving on a specific track with a high degree of accuracy

And Figure (1) shows the components of the system and how they are installed on any type of combine

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

harvester and where they are installed:

Figure (1) Parts of the system and their installation locations in the harvester

Source: Cognitive Pilot - autonomous driving technologies for ground transport

System advantages Agro Pilot

1. **High accuracy:** Taking into account the geometry of the field edge or crop rows, the system does not deviate from the path by more than 20 cm, which then increases the productivity by 25%.
2. **self-control:** Works independently without connecting to satellite GPS, as it does not require high-accuracy positioning
3. **safety :**The system detects obstacles, other machines and people, which reduces the risk of malfunctions caused as a result of a collision
4. **Quick install:** A day or two is only what it takes to install the system on any type of combine harvester
5. **Ease of maintenance:** The entire system can be updated through the application used, as there are no complicated settings for the system.

At the moment when the crop is capable of being harvested and before it is exposed to damage and the farmer bears irrecoverable losses due to the delay in the harvest process, an extra week in the harvest process can lead to a damage to the crop by 3-5% in addition to the volatile weather conditions that can affect the The harvest process, as the climate also requires an adjustment to the harvest schedule to regulate the time and waste the least possible amount of the crop.

The price of the integrated system is 9,500 dollars, equivalent to 13,737,000 Iraqi dinars, the productive life of the system is estimated at 1000 working hours

Depreciation of the hour = cost ÷ working hours

= 13,737 ÷ 1000

= 13,737 dinars per hour

The total costs of using the harvester and the smart agricultural robot are calculated as:came:

The wages for working on the harvester and the system are 20,000 dinars per hour, and the value of fuel is 600 dinars per acre

To facilitate the harvest process, it is necessary to purchase two harvesters, and each harvester has an integrated system represented by an agricultural robot

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

Since the work of the harvester is 40 dunams per hour and the system will cover an area of 40 dunams per hour, then the working hours can be calculated for typical farms in Baghdad governorate ascame:

Hours of work per group = total area of group ÷ area covered per hour
= 90 dunums ÷ 40 dunums
= 2.25 working hours for typical farms in Baghdad Governorate

System cost for total area = Depreciation of the hour x number of working hours
= 13,737 x 2.25
= 30,908.25

Work wages = hourly wages x hours worked
= 20,000 x 2.25
= 45,000 dinars labor wages for the total area

The price of a liter of fuel for the harvester is 400 dinars, and the fuel consumption per hour is 1.50 liters
∴ 400 x 1.5 = 600 dinars / dunam

Fuel cost = fuel cost per acre x total area
= 600 x 90
= 54,000 dinars for the total area

Harvest cost of the total area = depletion of the harvester + system cost + labor wages + fuel
=1,133,333 + 30,908.25 + 45,000 + 54,000
=1,263,241 dinars

The cost of harvesting one acre = the cost of harvesting the total area ÷ the total area of Baghdad governorate
=1,263,333 ÷ 90
=14,037 dinars / acre

From the above, it was concluded that the use of the harvester and the smart robot has reduced the costs of harvesting when switching from traditional methods to the use of artificial intelligence represented by the use of the harvester and the smart agricultural robot.1,800,000 Iraqi dinars for an area of 90 acres and so on Equivalent to 20,000 dinars per acre

While the cost of harvesting after using artificial intelligence for the total area of Baghdad Governorate became 1,263,333 dinars, which is equivalent to 14,037 dinars per acre

From the foregoing, it was concluded that the use of artificial intelligence has contributed BReducing the costs of the agricultural product represented by the harvesting process of the strategic wheat crop by a large percentage, as the percentage of reduction was as follows:

Table (5) The difference between the traditional and contemporary costs of the wheat harvest process

conservativee	Traditional harvest costs	Combine harvester and smart robot costs	The difference between the two costs	Total Reduction %
Baghdad	1,800,000	1,263,333	536,667	30%

Source: Prepared by the researcher based on the results of traditional and contemporary methods

Based on what has been achieved after using artificial intelligence in the process of harvesting the wheat crop for typical farms in the province of Baghdad, a list of costs can be prepared based on the results extracted after using the harvester and the smart agricultural robot, as shown in the table (6) :

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

Table (6)The cost of producing the wheat crop in Baghdad governorate after using artificial intelligence for the agricultural season 2020/2021

Cost items for typical farms of 90 dunums			The cost of one acre	Total space cost
Materials	Seeds		9,000	810,000
	Fertilisers	urea	24,150	2,173,500
		dab	26,250	2,362,500
		potassium sulfate	45,000	4,050,000
		Minor elements	750	67,500
	pesticides		2,674	240,660
total material cost			107,824	9,704,160
wages	tillage wages		10,000	900,000
	Land smoothing fees		10,000	900,000
	settlement fee		10,000	900,000
	Manual sowing fee		10,000	900,000
	Fertilization Fee		5,000	450,000
	control wages		5,000	450,000
	The cost of automated work		50,000	4,500,000
	Employee wages throughout the season		19,637	1,767,330
total wage costs			119,637	10,767,330
Total direct costs			227,461	20,471,490
Until the harvest	babble		2,000	180,000
	harvest costs		14,037	1,263,241
	Loading / transporting / unloading (for materials)		300	27,000
after harvest	crop cleaning fees		8,000	720,000
Total indirect agricultural costs			24,337	2,190,241
	Download		16,000	1,440,000
	Transfer		8,000	720,000
	evacuation		8,000	720,000
total marketing costs			32,000	2,880,000
Total cost of wheat cultivation			283,798	25,541,731

Source: Prepared by the researcher

6. Conclusions and recommendations

6.1 Conclusions

1. By using artificial intelligence, the costs of direct wages related to the harvesting process can be reduced as a result of relying on the harvester and the intelligent agricultural robot, thus reducing dependence on the human element. On the other hand, the human element remains of great importance in the operation and management of machines.

2. By using the harvester and the smart agricultural robot, the farmer's work in harvesting saves time, effort and cost. Through the system, the harvester is controlled and obstacles and damage to the harvest

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

are avoided, and their use has achieved a reduction in costs compared to the traditional costs.

3. By using artificial intelligence, it is possible to advance the agricultural sector in Iraq and increase wheat production to reach self-sufficiency.

6.2 for recommendations

1. The necessity of transforming the agricultural sector from traditional methods of production to the use of artificial intelligence to keep pace with developments in the developed world.

2. The use of artificial intelligence in the agricultural sector reduces cost and time, while providing a high quality product.

3. Using the world's successful experiences in developing the agricultural sector and getting acquainted with the most important developments in the world of contemporary technologies, including artificial intelligence, to advance the agricultural sector in Iraq, as it is an important and vital sector.

Sources

1. Ismail, Abdel Rahim Nader Abdel Rahim, (2021), "The mediating role towards modern technologies in the relationship between the use of artificial intelligence and marketing innovation," Journal of Financial and Commercial Research, Volume (22), Issue (3).
2. Bakri, a. Dr. Riad Hamza, Al-Hamdani, m. Dr.. Bahaa Hussein,(2011),**Comprehensive management accounting, the reality of development in light of practical progress and the concept of artificial intelligence**, College of Administration and Economics, University of Baghdad.
3. Bakri, a. Dr.. Riad Al-Hamza, Shanawa, m. Dr.. dear medal,(2018)The role of artificial intelligence in achieving customer satisfaction and its reflection on cost accounting, Journal of Financial Studies (JAFS), Volume Three, Issue 45.
4. Hamed, Jihad Salem. (2019), "Reducing productivity costs by using the green hexagonal diffraction approach", unpublished master's thesis, College of Administrative Technology, Middle Technical University.
5. Dr. Khawald Abu Bakr ,(2019) ,"Applications of Artificial Intelligence as a Modern Direction to Enhance the Competitiveness of Business Organizations", Publisher: The Arab Democratic Center for Strategic, Political and Economic Studies, Berlin, Germany, first edition.
6. Al-Saadi, Wissam Aziz Shanawa,(2016),"The challenge of cost accounting (appropriate for use in light of artificial intelligence and its role in achieving customer satisfaction), PhD thesis, Council of the Higher Institute for Accounting and Financial Studies, University of Baghdad.
7. Al-Obaidi, M. Raafat Asi, (2015),**The role of artificial intelligence in achieving green production**Kirkuk University Journal of Administrative and Economic Sciences, Volume 5, Issue 1.
8. Othmaniyeh, Omnia, (2019), "Basic Concepts of Artificial Intelligence," a collective book entitled "Applications of Artificial Intelligence as a Direction to Enhance Business Competitiveness", Arab Democratic Center for Strategic, Political and Economic Studies, Berlin, Germany.
9. Merizek, Dr. negligence,(2012) ,"Artificial intelligence and telemedicine in the field of health care in consideration of the Algerian reality", the eleventh annual scientific conference on business intelligence and knowledge economy, Faculty of Economics and Administrative Sciences and Al-Zaytoonah University of Jordan.

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM

10. Nasr El-Din, Salmi, Bin Daql, Kamal, (2020), "The role of artificial intelligence in the product planning process in a companyooredoo Algeria Journal of Economic, Facilitation and Commercial Sciences, Volume (13), Issue (01).
11. Hajira, Sheikh, (2018), "The role of artificial intelligence in managing the electronic customer relationship of the Algerian People's Credit", the Academy for Social and Human Studies.
12. Smith. Chris, McGuire. Brian, 7Huang. Ting, (2006), "The History of Artificial Intelligence", University of Washington.
13. David, FR, & David, FR (15th Edition),. (2015). 'Strategic management: Concepts and cases: A competitive advantage approach.' Pearson Education.
14. Kaur. Harpreet, (2012), "Artificial Intelligence: Bringing expert knowledge to computers."
15. Keswani. G, Gaurav, (2013), "Artificial Intelligence- Is Our Future Bright or Bleak."
16. Nath. Rajakishore, (2009), "Philosophy of Artificial Intelligence", A Critique of the mechanistic theory of mind, Florida, USA,
17. Rewers, P., Trojanowska, J., & Chabowski, P. (2016). "Tools and methods of Lean Manufacturing-a literature review". In 7th International Technical Conference TECHNOLOGICAL FORUM (pp. 135-139).
18. Talaviya, T., Shah, D., Patel, N., Yagnik, H., & Shah, M. (2020). "Implementation of artificial intelligence in agriculture for optimization of irrigation and application of pesticides and herbicides". Artificial Intelligence in Agriculture, 4, 58-73
19. Honavar. Vasant "Articial Intelligence: An Overview". 2006.
20. Hunt Jr, ER, & Daughtry, CS (2018). What good are unmanned aircraft systems for agricultural remote sensing and precision agriculture?. International journal of remote sensing, 39(15-16), 5345-5376.
21. Wang, P., Tian, J., Niu, H., & Chen, Y. (2019, August). Smart Agricultural In-Field Service Robot: From Toy to Tool. In International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (Vol. 59292, p. V009T12A050). American Society of Mechanical Engineers.
22. Ayamga, M., Tekinerdogan, B., Kassahun, A., & Rambaldi, G. (2021). Developing a policy framework for adoption and management of drones for agriculture in Africa. Technology Analysis & Strategic Management, 33(8), 970-987
23. (www.discovery.org.in)
24. (www.m.fpuavdrone.com)
25. (www.althaleej.ae)
26. (www.noonpost.com)
27. (http://www.arteimi.info)

ISSN 2576-5973 (online), Published by "Global Research Network LLC"
under Volume: 5 Issue: 11 in November -2022
https://www.grnjournals.us/index.php/AJEBM