Economic Analysis of the Impact of Information and Communication Technology on Agricultural Entrepreneurships in Egypt

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Abstract: The current study aims to investigate the impact of information and communication technology (ICT) on Agriculture entrepreneurships in Egypt by examines such impacts on the managerial, marketing, and financial performances. Categorical regression analysis had been conducted to measure the linear relation between the dependent and independent variables. The statistical results showed that most of explanatory variables of ICT have significant impacts. With respect to managerial performance, the impact have been proved at significance level of 0.01 and 0.05 as for instance: Increasing the ability to make decisions, increasing the completion of daily work, solving business problems, providing sufficient information about work, helping to develop employee skills, empowering employees to be involved in decision making process, helping in wiping out nepotism ate work , raising the quality of work and perfection, achieving the efficiency and efficacy, reducing the administrative corruption, and helps to introduce the customer services. According to the impact of ICT on the e-marketing mix: product, price, place, and promotion. As ICT improves inventory management efficiency, facilitates participation in e-auctions, increases after-sale services, and helps match prices to the market, have a crucial role in pricing, and improving the flexibility. Regarding the impact of ICT on financial performance potential, ICT helps to activating cost control, boosting efficient use of financial resources, controlling the cost of obtaining money, making wise financial decisions to correct errors, and aiding in time savings when making crucial financial decisions.

Keyword: Managerial Performance, Marketing performance, financial performance

INTRODUCTION

Information and communication technology (ICT) is one of the most important factors of development in the current era. It has effectively contributed to the development and building of the economies of many developed countries and has become one of the main pillars of any country looking to develop and progress. ICT plays an important role in achieving agricultural development, food security, and combating hunger, as it is a goal, it works to integrate and coordinate the management and dissemination of efficient and effective technical information through the exchange of information by individuals and societies, whether locally, regionally, or globally, in achieving sustainable development and food security in the twenty-first century . Studies have shown that knowledge, science, and agricultural technology have been important in bringing about significant increases in agricultural production over time, which contributed to achieving food security. This study was set out to examine how information communication technology has been used to improve agriculture entrepreneurships in Egypt.

The problem of the study

ICT adoption has become a major requirement for all firms to improve managerial Performance, marketing Performance, and financial performance in many economic sectors. Nevertheless, there is no enough evident on how information technology affects agricultural projects.

Objective

The main objective of this study was to investigate whether the adoption of ICT has affected agriculture entrepreneurship in Egypt by investigating such impact on managerial, marketing, and financial performances.

Data Sources:

The data for the information and communication technology development Index were collected from MCIT Yearbook 2021 and Statistical Yearbook. The primary data were collected via questionnaire administered to more than one hundred agricultural companies.

ICT infrastructure in Egypt

Peña-López (2005) at the meeting in February 2005 explained that ICT infra structure of any country can be measured by the following items:

1. Fixed telephone lines per million subscribers.
2. Mobile cellular subscribers per million subscribers.
3. Internet subscribers per million subscribers.
4. Broadband Internet subscribers per million subscribers.
5. International Internet bandwidth per million subscribers and Percentage of population covered by mobile cellular telephony.
6. Internet access tariffs (20 hours per month), in US$, and as a percentage of per capita income.
7. Mobile cellular tariffs (100 minutes of use per month), in US$, and as a percentage of per capita income

Table (1) shows the indicators of information and communications technology infrastructure and access. The first indicator is the number of fixed phones per million subscribers during the period of (2010-2020). The number of subscribers was 10.43 million subscribers in 2010, then it decreased to 9.06 million subscribers in 2016. From 2017 to 2020, it increased to 9.53 million subscribers. From 2019 to 2020 the growth rate was 13.99%.

Table (1): Information and Communication Technology Infrastructure in Egypt during the period 2010-2020

Year	Fixed telephone lines per million subscribers	growth percentage	Mobile cellular subscribers per million subscribers	growth percentage1	Internet subscribers per million subscribers	growth percentage	Broadband Internet subscribers per 100 inhabitants:	growth percentage	International Internet bandwidth per inhabitant	growth percentage	Internet access tariff (20 hours per month), in US$, and as a percentage of per capita income:	growth percentage	Mobile cellular tariffs (100 minutes of use per month), in US$, and as a percentage of per capita income:	growth percentage
2010	10.43	-	58	-	17	-	109.75	-	1.1	-	4.46	-	3.43	-
2011	9	-13.7	74.6	28.6	24.15	42.05	132.22	20.5	1.5	36.3	4.28	-4.2	2.74	-20.1
2012	8.6	-4.4	92	23.3	30.9	27.95	183.21	38.5	1.9	26.6	4.12	-3.8	2.65	-3.2
2013	8.65	0.58	94.2	2.3	33.44	8.22	320.22	74.8	2.34	23.15	3.61	-12.37	2.01	-24.1
2014	6.88	-20.4	101.93	8.17	42.31	26.5	287.02	-10.4	2.80	19.6	6.43	78.11	3.2	59.2
2015	6.22	-9.5	95.75	6.06	27.25	-35.5	484.63	68.8	3.27	16.7	10.08	56.76	2.84	-11.3
2016	6.09	-2.09	95.29	-0.48	29.84	9.5	829.77	71.2	4.05	23.8	5.63	-44.1	2.38	-16.2
2017	6.55	7.5	99.91	4.8	33.72	13.002	1204.14	45.1	4.57	12.8	2.79	-50.4	1.25	-47.5
2018	7.47	14.04	97.68	-2.2	37.9	12.39	1953.73	62.3	5.64	23.41				
2019	8.36	11.91	93.68	-4.09	40.90	7.91	1219.8	-37.6	6.84	21.27				
2020	9.53	13.99	96.53	3.04	48.50	18.6	2565.78	110.3	7.81	14.18				

The second indicator is the mobile phone subscribers. According to the data of the Central Agency for Public Mobilization and Statistics, the number of mobile phone subscribers was 58 million subscribers in 2010. It increased to 101.93 million subscribers in 2014 and then decreased in 2015 and 2016. It increased to 96.53 million subscribers in 2020. The highest growth rate was 8.17% from 2013 to 2014.

The third indication is the number of Internet customers. According to table 1, there were 17 million subscribers in 2010. In 2015 and 2016, there was a noticeable decrease, which then started to increase again. In 2020, when there were 48.5 million subscribers, the value was highest. The biggest growth rate, 42.05 percent, was seen in 2011.

The average international Internet bandwidth per person is the fourth indicator. The unit of measurement is billion beats per second. In 2010, there were 109.75 billion heartbeats per second. It went up to 2565.78 billion beats per second per person in 2020. The rate of increase that was the highest was 110.3 percent in 2020, and 71.2 percent in 2016. While it was 5.82 percent lower in 2014 compared to 2013, the average annual growth rate of international Internet bandwidth for the period (2010-2014) was 95.75 percent. During the time frame (2010-2014), the average annual growth rate of international Internet bandwidth per person was 24.72 percent.

The cost of Internet access is the fifth indicator. This indicator no longer appears in publications as of 2017. Its lowest price was $2.79 in 2017 and its maximum price was 10.08 in 2015. The maximum growth rate was recorded for the year of 2014 by 78.11 followed by 56.76% in year 2015. The cost of using the Internet was calculated on based cheapest tariff available to access the Internet 20 hours per month. (10 peak hours and 10 off-peak hours)

The sixth indicator is mobile usage tariff. This indicator was also limited to data until 2017 due to the lack of data after that. It started in 2010 with a tariff of $3.43 and reached its lowest value in 2017 at $2.79. The cost of using a mobile phone was calculated on based one price paid in advance for 25 monthly calls plus 30 text messages.

RESULTS AND DISCUSSION

Descriptive Statistics of Managerial Performance:

The other objective included in this study was to what extent respondents agree with the statement on managerial performance in agriculture companies in Egypt.

Table (2) presents the distribution of managerial performance as exemplified by the first item (the use of information technology in the organization helped it achieve a competitive advantage), which had 89%, and the next two items had the same percent (81%). At the end, the percentage (information technology helps in developing employee skills) was 68.8%, which remains an acceptable number while it takes 3.44 from 5.

Table (2): Descriptive statistics of Managerial Performance

Items	Av. Freq	SD	Rank
IT contributes to increasing the ability to make decisions	3.78	1.267	10
IT contributes to increasing the completion of daily work.	3.93	1.139	5
IT contributes to increasing the ability to solve business problems	3.66	1.249	12
IT provides sufficient information about work.	4.08	1.244	2
Management information technology helps improve overall performance	3.95	1.380	4
Information technology helps in developing employee skills	3.18	1.546	15
The use of information technology and communication empowers employees in the organization and involves them in decision-making	3.87	1.160	8
The electronic registration of work documents and employee contributes to the accuracy of information and ease of use	3.4	1.385	14
Information technology and communication has wiped out nepotism at work	3.9	1.077	7
Attracting qualified and those who have modern skills and facilitating their contact with HR.	3.78	1.267	10
The institution makes its decisions based on correspondence via e-mail	3.93	1.139	5
Do you think that using information technology facilitates administrative relations?	3.66	1.249	12
Information technology gives the upper management in your organization the opportunity to analyze the reality of the present industry and bet on the future	4.08	1.244	2
Do you think using computers in the organization is sufficient to implement the electronic management project?	3.95	1.38	4
Is your facility keen on adopting everything new in the field of information technology?	3.73	1.301	11
Does using a computer affect the quality and perfection of work?	4.13	1.06	3
Does using a computer affect the amount of performance at work?	3.53	1.158	13
Does using computers contribute to increasing efficiency and effectiveness?	3.92	1.323	6
The use of information technology in the organization helped it achieve a competitive advantage	4.45	.998	1
Information technology helps get work done in record time	2.82	1.250	9
Information technology helps reduce administrative corruption cases	3.95	1.188	4
IT specialists undergo the continuous and necessary training	3.44	1.351	14
Information technology helps provide the best services	3.73	1.08	11

Descriptive Statistics of Marketing Performance

Data in Table (3) represent the description of marketing performance includes eight items (product – pricing – location – promotion – personalization – privacy – society – customer service). The availability of data and information about the product increases the speed of its sale the most (82.2%) during the product analysis.

Table (3): Descriptive statistics of Marketing Performance

Items	Average Frequency	Standard deviation	Rank
B) The Product			
The customer can purchase the product and pay online at any time	3.75	1.192	6
The customer receives the product in the shortest possible time	3.85	1.209	4
The availability of data and information about the product increases the speed of its sale	4.11	1.22	1
Availability of a commercial process for the product, which increases the speed of its sale	3.91	1.287	3
The company seeks to develop the product's presentation on its website	3.78	1.382	5
Through interaction, the consumer contributes to the development of interaction in the development of the product's shape	3.53	1.313	9
Possibility to obtain complete information about the product before purchasing	3.85	1.225	4
Possibility to test the product before using it	3.92	1.300	2
The marketing department assigns a trading name to each product	3.41	1.484	10
The level of monopoly in the E-Market decreases	3.69	1.292	7
E-marketing contributes to raising the level of product innovation	3.65	1.366	8
C) Pricing			
Prices can be matched to the market price	4.03	1.123	2
Respond to price changes immediately	4.01	0.999	4
Inventory management and its reflection on pricing	4	1.154	5
Participation in electronic auctions	4.27	1.107	1
Participation in electronic tenders	3.97	1.291	6
Availability of after-sales services	3.85	1.422	7
Warranty companies play an important role in determining the price	4.02	1.024	3
D) Location			
The possibility of electronic delivery if the product is soft	4.66	0.768	1
Delivery through brokers or agents	3.33	1.484	4
Paying attention to banking facilities and transactions through the site	3.9	1.27	3
Link to other sites for easy distribution in all countries	3.93	0.890	2
E) Promotion			
Through electronic advertisements	3.99	1.123	2
Electronic product catalog design	3.68	1.17	4
E-link design	3.80	1.27	3
Creating an interactive chat conversation with customers	4.43	1.027	1
Forwarding messages through e-mail to customers	3.11	1.543	5
F) Personalization			
Modifying any element of the mix based on the customer's wishes	4.09	1.045	1
Modifying the product based on the preferences of a consumer who sold it by using Cookies	3.98	0.953	3
Modifying products in line with the consumer's usual taste towards certain product	4.07	1.01	2
G) Privacy			
Adopting clear provisions for the consumer privacy protection policy	4.75	0.557	1
Determining what information is collected from customers and who has the right to access and use it.	3.36	1.425	4
Adopting programs to preserve identity and privacy	3.73	1.293	3
Adopting the legal factors that govern commercial organizations operating on the Internet	4.01	1.167	2
H) Society			
Communicating with consumers through the rooms chatting	4.75	0.557	1
Preparing order lists for products and services that customers are interested in	3.36	1.425	3
Following up on customer comments on products	4.01	1.167	2
I) Consumer services			
Communicating with customers through emails	4.75	0.557	1
The help page is based on consumer assistance	3.36	1.425	3
Responding to the complaint and taking it into account	4.01	1.167	2
Using FAQ list by customers	4.75	0.557	1
Determining consumer desires	3.36	1.425	3

In Item b: Pricing, participation in electronic auctions has the highest rate at 85.4%, while in Item c: Location, the possibility of electronic delivery if the product is soft has the highest rate at 93.2%. In Item d: promotion, creating interactive conversations through chat with customers has the highest rate of (88.6%). In Item E: Personalization, modifying any element of the mix based on the customer's wishes has the highest rate (81.8%). In Item F: Privacy, Adopting clear provisions for the consumer privacy protection policy has the highest rate of adoption (95%). In Item G: Society, communicating with consumers through chat rooms has the highest success rate (95%). In Item H: Consumer Services, communicating with customers through emails has the highest rate of (95%).

Descriptive Statistics on Financial Performance

Results in Table (4) showed that respondents agreed with the statement that the active cost control was 3.95. 3.62. that the controlling cost of obtaining money at 3.65, first in rank, necessitates the implementation of appropriate financial decisions to correct deviations. 4.49, helps save time in making important financial decisions. 4.07, was agreed upon by Aal.

Table (4): Descriptive statistics of Financial Performance

Items	Average Frequency	Standard deviation	Rank
Activating cost control	3.95	1.042	3
Efficient use of financial resources	3.62	1.18	5
Controlling the cost of obtaining money	3.65	1.42	4
Taking appropriate financial decisions to correct deviations	4.49	.916	1
Helping to save time in making important financial decisions	4.07	1.044	2

Regression Analysis of the impact of ICT on Agricultural Companies performance

In this section, the impact of information and communication technology on the performance of agricultural companies will be discussed. Performance has been evaluated on several different levels: administrative, marketing, and financial performance. The usage of regression analysis needs that all variables appeared in the model is continuous variables. A continuous variable is one on which subjects differ in amount or degree such as study weight and length. Nevertheless, it is possible to include categorical explanatory variables in the regression analysis. A categorical variable is one for which the units of observations differ in terms of type or kind such as a group membership (*e.g.,* gender, marital status) or assignment to a treatment condition (Allen, 1997). As most of the data used in the current study are categorical, or on other word qualitative data, categorical regression analysis had been conducted to measure the linear relation between the dependent and independent variables.

The impact of information and communication Technology on managerial performance.

Results represented in Table (5) summarized the suggested impacts of ICT and its statistical significance on managerial performance. The statistical results showed that some the effects of ICT on managerial performance have been proved at significance level of 0.01 as for instance: Increasing the ability to make decisions, increasing the completion of daily work, solving business problems, providing sufficient information about work, helping to develop employee skills, easing the use of accurate information, achieving competitive advantage, complete the work in the due time. In Addition, other effects have been statistically proved at the level of 0.05 such as: the use of ICT empower employees to be involved in decision making process, helping in wiping out nepotism ate work , raising the quality of work and perfection, achieving the efficiency and efficacy, reducing the administrative corruption, and helps to introduce the best services. On the other hand, other suggested effects have not been statistically proved.

A standardized beta coefficient presented in table (5) compares the strength of the effect of each individual explanatory variable to the dependent variable. The higher the absolute value of the beta coefficient, the stronger the effect. Standardized beta coefficients have standard deviations as their units. This means the variables can be easily compared with one another. Namely, standardized beta coefficients are the coefficients that you would get if the variables in the regression were all converted to z-scores before running the analysis (Agresti, 2003). Multiple coefficient of regression model was used to measure the goodness of fit of independent variables on predicting the changes on dependent variable. Adjusted R-squared was 0.99 (0.99%). Since this was a multiple regression model. Therefore, 99% of the variations on the dependent variable managerial performance were explained by the independent variables used in the regression model, while 0.01% of variations were explained by other factors outside the model. This means that the independent variables are good predictors. F-value confirmed the significance of the model at level of 0.01 (426.58).

Table (5): Regression analysis for the impact of ICT on the managerial performance

Items	Stand beta	Std. Error	T	Sig.
IT contributes to increasing the ability to make decisions	0.063	0.237	3.179	0.002
IT contributes to increasing the completion of daily work.	0.079	0.260	4.068	0.000
IT contributes to increasing the ability to solve business problems	0.096	0.243	4.832	00.000
IT provides sufficient information about work.	0.102	0.312	3.981	0.000
Management information technology helps improve overall performance	0.086	0.172	5.495	0.000
Information technology helps in developing employee skills	0.065	0.212	3.012	0.004
The use of information technology and communication empowers employees in the organization and involves them in decision-making	0.051	0.283	2.370	0.020
The electronic registration of work documents and employee contributes to the accuracy of information and ease of use	0.077	0.225	3.787	0.000
Information technology and communication has wiped out nepotism at work	0.065	0.394	2.319	0.023
Attracting qualified and those who have modern skills and facilitating their contact with HR.	0.040	0.956	0.503	0.616
The institution makes its decisions based on correspondence via e-mail	0.003	1.120	0.031	0.975
Do you think that using information technology facilitates administrative relations?	0.068	1.049	0.794	0.430
Information technology gives the upper management in your organization the opportunity to analyze the reality of the present industry and bet on the future	0.027	0.924	0.363	0.718
Do you think using computers in the organization is sufficient to implement the electronic management project?	0.044	0.319	1.516	0.134
Does your institution keen to adopt everything new in the field of information technology?	0.032	0.895	0.416	0.679
Is using a computer affect the quality and work perfection?	0.184	1.124	2.328	0.023
Is using a computer affect the amount of performance at work?	0.090	1.166	1.009	0.316
Is using computers contributing to increasing efficiency and efficacy.	0.159	0.929	1.972	0.052
The use of information technology in the organization helped it achieve a competitive advantage	0.108	0.541	3.037	0.003
Information technology helps to get work done in record time	0.072	0.268	2.691	0.009
Information technology helps reduce administrative corruption cases	0.074	0.451	2.094	0.040
IT specialists undergo the continuous and necessary training	0.021	0.260	.910	0.366
Information technology helps to provide the best services	0.071	0.470	2.128	0.037
Adjusted $R^2 = 0.99$ F = 426.58				

The impact of information and communication Technology on the marketing performance

Businesses can benefit from technological advancements in a variety of ways, but doing so frequently necessitates adjusting the marketing mix, for example, to allow for customer interaction through more common technologies like online messaging and digital advertising. Therefore, it was preferable to measure the impact of information and communication technology on the e-marketing mix (Kalyanam and McIntyre, 2002) classification model of the e-marketing mix is adopted in which the marketing mix involves product, price, place, promotion, personalization, privacy, customer service, community, and security.

A) The impact of ICT on thee-marketing mix: product

The results of the regression analysis for the impact of ICT on the product development are given in table (6). The explanatory variables are customer can purchase the product and pay online at any time, receives the product in the shortest time, data and information about the product availability, commercial process for the product, research and development of the product, the consumer contribution in the product development, Inspect the product before buying, Ease of assigning a brand to each product, reducing the monopoly practices, and increasing the product innovations.

All the mentioned variables were statically significant at level 0.01. Adjusted R2 indicates that the mentioned variables included un the model explain 97.4% of all variance occurred in the product development while about 2.6% of the dependent variable are explained by other variables outside the model. F test indicates that the model is highly significant at level 0.01.

The results of the analysis were in line with (Higón, 2012) (Bhatt and Ved, 2013, Tarafdar et al., 2013, Silva et al., 2016) in terms of ICT-enabled innovations in products and processes deployed for market development, enable developmental outcomes through reduction of market separations, and leads to tangible business benefits and also helps in strengthening their competitive advantage.

Table (6): Regression analysis for the impact of ICT on the product

Items	Stand beta	Std. Error	T	Sig.
The customer can purchase the product and pay online at any time	0.158	0.565	4.399	0.000
The customer receives the product in the shortest possible time	0.111	0.425	4.073	0.000
The availability of data and information about the product increases the speed of its sale	0.144	0.411	5.386	0.000
Availability of a commercial process for the product, which increases the speed of its sale	0.140	0.422	4.841	0.000
The company seeks to develop the product's presentation on its website	0.143	0.289	6.704	0.000
Through interaction, the consumer contributes to the development of interaction in the development of the product's shape	0.129	0.528	3.503	0.001
Possibility to obtain complete information about the product before purchasing	0.124	0.477	3.975	0.000
Possibility to test the product before using it	0.150	0.462	4.707	0.000
The marketing department assigns a trading name to each product	0.104	0.389	3.383	0.001
The level of monopoly in the E-Market decreases	0.114	0.328	5.037	0.000
E-marketing contributes to raising the level of product innovation	0.171	0.335	7.016	0.000
Adjusted $R^2 = 0.974$ F = 344.04				

B) The impact of ICT on the e-marketing mix: product price

Price in e-business is highly variable and dependent on market conditions. Bigdata technologies make it feasible for pricing plans to have a unique character for each user. Thus, how can ICT impact the pricing policy have been tested in Table (7). The findings demonstrate that ICT improves inventory management efficiency, facilitates participation in e-auctions, increases after-sale services, and helps match prices to the market. It also demonstrates that guarantee firms have a crucial role in pricing. At level 0.01, each of the characteristics is statistically significant. All of the hypothesized benefits account for approximately 92.2 percent of the total variance in pricing policy, according to the adjusted determination coefficient value of 0.925. Additionally, the tested model's strong significance is indicated by the F value of 175.2.

The results are consistent with many previous researches (Dolan and Moon, 2000) stated that studied pricing and market making on the internet and found that it is optimal for the firms to use a different pricing mechanism on different channels. (Baker et al., 2001)and (Ancarani and Shankar, 2004)referred that e-markets do not drive prices down and may help firms to design better pricing strategies and multi-channel retailers in e-marketing have the highest prices and pure play e-marketers may have the lowest prices in the e-marketing if shipping costs are included. (Kurata and Bonifield, 2007)showed that e-business can improve its profit by taking into account customer.

Table (7): Regression analysis for the impact of ICT on the product price

Items	Stand beta	Std. Error	T	Sig.
Prices can be matched to the market price	0.182	0.427	4.367	0.000
Respond to price changes immediately	0.121	0.393	3.531	0.001
Inventory management and its reflection on pricing	0.241	0.402	5.953	0.000
Participation in electronic auctions	0.205	0.371	5.729	0.000
Participation in electronic tenders	0.247	0.269	8.190	0.000
Availability of after-sales services	0.293	0.304	7.775	0.000
Warranty companies play an important role in determining the price	0.160	0.497	3.601	0.001
Adjusted $R^2 = 0.925$ F = 175.58				

C) The impact of ICT on thee-marketing mix: product delivery (Place)

Place is the location where a customer can find goods or services. The right goods must be placed in the appropriate location, this typically refers to publications or shops. To fulfil the user's unique needs, there are many more channels available with e-marketing. The current research focuses on some ICT contributions to facilitate the product delivery for instance: the possibility of electronic delivery if the product is soft, delivery through brokers or agents, paying attention to banking facilities and transactions through the site, and link to other sites for easy distribution in all countries. The results of the regression analysis of the impact of hypothesized benefits of ICT and the product delivery are represented in table (8). The findings of the analysis showed that all the assumed benefits are statistically significant at level 0.01. The value of adjusted determination coefficient is 0.957 indicating that all the assumed benefits of ICT to the product delivery explain about 95.7% of the total variance of the product delivery and 4.3% of the rest variance is due to other unexamined benefits. F value of 546.4 confirms the statistical significance of whole the model.

Table (8): The regression analysis of the impact of ICT on the product delivery (Place)

Items	Stand beta	Std. Error	T	Sig.
The possibility of electronic delivery if the product is soft	0.275	0.581	9.455	0.000
Delivery through brokers or agents	0.491	0.243	20.829	0.000
Paying attention to banking facilities and transactions through the site	0.393	0.328	14.413	0.000
Link to other sites for easy distribution in all countries	0.290	0.380	13.155	0.000
Adjusted $R^2 = 0.957$ F = 546.40				

D) The impact of ICT on the e-marketing mix: promotion

The incorporation of ICT into marketing campaigns in highly competitive marketplaces may greatly benefit businesses in terms of cost and brand. In light of this, the current study's empirically examine the impact of electronic advertisements, electronic product catalog design, E-link design, conversations chat Interactive with customers, and forwarding messages through e-mail to customers on the promotion activities. The statistical results presented in table 9 show that the assumed promotional activities via ICT are highly significant at level 0.01 except the role of the virtual chat rooms. The adjusted R^2 value of 0.915 implies that the assumed variables explain about 91.5% of the total variance of promotional performance. The statistical significance of the all the model has been proved at level of 0.01.

Table (9): Regression analysis of the impact of ICT on the promotion

Items	Stand beta	Std. Error	T	Sig.
Through electronic advertisements	0.246	0.821	5.296	0.000
Electronic product catalog design	0.397	0.727	9.197	0.000
E-link design	0.384	0.698	8.599	0.000
Create conversations chat Interactive with customers	0.024	1.155	.404	0.687
Forwarding messages through e-mail to customers	0.359	0.469	9.865	0.000
Adjusted $R^2 = 0.915$ F = 213.315				

E) The impact of ICT on thee-marketing mix: personalization

Personalization is becoming a more popular tool for marketers to use to boost the effectiveness of their advertising. Although mass marketers have used customization for decades, firms that have used mass marketing techniques are now also using it more. The anticipated advantages of one-to-one marketing and customer relationship management are a major motivator for personalization. Marketers try to satisfy client expectations while avoiding spam responses. Information and communication technology advancements have created new options for customer data collection, analysis, and tailored marketing.

Table (10) presents the findings of the model that examines how ICT might facilitate the personalization process the statistical findings demonstrate that ICT can be improved by altering any component of the mix in accordance with customer preferences, altering the product in accordance with a consumer who purchased it by using cookies, and altering products in accordance with a consumer's typical taste for particular goods with a significance level of 0.01. Adjusted R2 value of 0.682 shows that 68.2% of the dependent variable's variance is explained by the posited components and approximately 32% of the remaining variance is explained by additional factors outside the model. Additionally, the F value at level 0.01 has demonstrated the relevance of the entire model (72.063)

Table (10): Regression analysis of the impact of ICT on the Personalization

Items	Stand beta	Std. Error	T	Sig.
Modify any element of the mix based on the customer's wants	0.534	0.936	7.684	0.000
Modify the product based on the preferences of a consumer who sold it by using Cookies	0.407	0.837	7.189	0.000
Modify products in line with the consumer's usual taste towards certain products	0.291	0.970	4.190	0.000
Adjusted $R^2 = 0.682$ F = 72.063				

F) The impact of ICT on thee-marketing mix: privacy

Online marketing activities can provide businesses with many options to promote their brands and goods affordably and successfully, but they must take great care to make sure that their strategies don't get them in legal or other troubles. The size of the internet consumer market is expanding rapidly. The ability of online businesses to collect, store, transfer, and analyze huge amounts of data has been improved by technology, which has also increased customer worries about online privacy. Customer privacy concerns need to be addressed in order to maintain consumer confidence in this new sector and its future expansion (Cadogan, 2004)

The results of the regression analysis of how ICT improve the consumer privacy are presented in table (11). The finding show that adoption of clear provisions for the consumer privacy protection policy, determine what information is collected from customers and who has the right to access and use it, and adoption of the legal factors that govern commercial organizations operating on the Internet have the positive impact in terms of enhancing the consumer's privacy with statistical significance level of 0.01. In contract, adopting programs to preserve identity and privacy is not statically proven. About 0.76.4 percent of the dependent variable's total variation can be explained by the three previously mentioned factors, while the remaining 23.6 percent can be explained by other factors not included in the model.

Table (11): Regression analysis of the impact of ICT on the Privacy

Items	Stand beta	Std. Error	T	Sig.
Adoption of clear provisions for the consumer privacy protection policy	0.259	1.631	4.145	0.000
Determine what information is collected from customers and who has the right to access and use it	0.523	0.549	9.725	0.000
Adopting programs to preserve identity and privacy	-0.008	0.563	-.165	0.869
Adoption of the legal factors that govern commercial organizations operating on the Internet	0.431	0.733	7.327	0.000
Adjusted $R^2 = 0.764$ F = 81.181				

G) The impact of ICT on e-marketing mix: society or people

It's important to consider people while making marketing decisions for the website. Both staff members who work directly with customers and those involved in internet distribution are necessary for great goods and enterprises. Measuring and assessing how a company interacts with its clients as well as how its employees engage with clients will help to answer the question of whether people are a key component of the marketing mix.

Thus, three ways of how ICT effect the communication between the companies and their customers have been statistically tested. According to the findings in table (12), ICT facilitates social interaction by creating order lists for goods and services that customers are interested in, and by monitoring customer feedback on products at a significance level of 0.01. Contrarily, there is no statistical support for conversing with customers in online chat rooms. The F value implies that the model as all is statistically significant at level 0.01. Preparing order lists for products and services that customers are interested in, and follow up on customer comments on products can explain about 87.1% of the total variance of the dependent variable.

Table (12): Regression analysis of the impact of ICT on e-marketing mix: society or people

Items	Stand beta	Std. Error	T	Sig.
Communicate with consumers through the rooms chatting	-0.132	1.039	-1.845	0.070
Preparing order lists for products and services that customers are interested in	0.747	0.349	18.823	0.000
Follow up on customer comments on products	0.632	0.460	14.753	0.000
Adjusted $R^2 = 0.871$ F = 222.896				

H) The impact of ICT on e-marketing mix: customer services

When a firm implements e-marketing, customer service is a key strategy. Attention to respond to the complaint and take it into account (Help desk) and frequently asked questions (FAQ) are the two new implementation strategies. The link that directs consumers to a help desk or support website with the necessary customer service resources will be clicked by the customer.

In this context, communicate with customers through e-mail, the help page is based on consumer assistance, attention to respond to the complaint and take it into account, Using of FAQ list by customers, and determine consumer desires have been statistically tested. The results of the regression analysis of the impact of ICT on customer services show that three factors from five are statistically proved at 0.01 which are the help page is based on consumer assistance, attention to respond to the complaint and take it into account and using of FAQ list by customers. On the other hand, communicate with customers through emails and determine consumer desires are not statistically proven.

Table (13): Regression analysis of the impact of ICT on e-marketing mix: customer services

Items	Stand beta	Std. Error	T	Sig.
Communicate with customers through emails	-0.061	2.708	-0.387	0.700
The help page is based on consumer assistance	0.501	2.730	4.137	0.000
Attention to respond to the complaint and take it into account	0.185	0.603	6.003	0.000
Using of FAQ list by customers	0.549	2.857	3.279	0.001
Determine consumer desires	-.157	2.640	-1.334	0.186
Adjusted $R^2 = 0.959$ F = 392.7				

The impact of ICT on the financial performance

The development of information and communication technologies (ICTs) has increased the possibility of improving financial management efficiency and effectiveness in contrast to the conventional manual system. Information and communication technology is a hub for expertise in workforce solutions, policy development, labor market research, and ICT business analytics. ICT may boost the usage of financial management while also improving, coordinating, and controlling the operations of numerous businesses. SME's do well when their business processes are documented and promptly reported. ICT is typically regarded as one of the most trustworthy ways to offer a solid foundation for an efficient system of internal control over financial reporting. It seems sense that a reliable ICT system offers a sure and guarantee.

The current study makes the following assumptions regarding the potential of ICT: activating cost control, boosting efficient use of financial resources, controlling the cost of obtaining money, making wise financial decisions to correct errors, and aiding in time savings when making crucial financial decisions. The results represented in table (14) show that all the assumptions are statistically proven at significance level of 0.01. Furthermore, the hypothesized roles of ICT can explain 90.07% of the total variance of the dependent variable as the adjusted R2 value is 0.907. In addition, the F value by 195.14 implies that the whole model is significant at level 0.01.

Table (14): Regression analysis of the impact of ICT on the financial performance

Items	Stand beta	Std. Error	T	Sig.
Activate cost control	0.219	0.836	4.159	0.000
Efficient use of financial resources	0.223	0.542	5.864	0.000
Controlling the cost of obtaining money	0.317	0.644	5.692	0.000
Take appropriate financial decisions to correct deviations	0.286	0.970	5.272	0.000
Helps save time in making important financial decisions	0.232	0.547	6.700	0.000
Adjusted $R^2 = 0.907$ F = 195.14				

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تحليل اقتصادي لأثر تكنولوجيا المعلومات والاتصالات على المشروعات الزراعية في مصر

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تهدف هذه الدراسة إلى اختبار اثر تكنولوجيا المعلومات والاتصالات (ICT) على ريادة الأعمال الزراعية في مصر من خلال دراسة هذه التأثيرات على الأداء الإداري والتسويقي والمالي. تم إجراء تحليل الانحدار الرتبي لقياس العلاقة الخطية بين المتغيرات التابعة والمستقلة. أظهرت النتائج الإحصائية أن معظم المتغيرات المفسرة لأثرتقنية المعلومات والاتصالات لها تأثيرات معنوية. فيما يتعلق بالأداء الإداري، تم إثبات التأثير عند مستوى معنوية ٠,٠١ و ٠,٠٥ على سبيل المثال: زيادة القدرة على اتخاذ القرارات، زيادة إكمال العمل اليومي، حل مشاكل العمل، توفير معلومات كافية عن العمل، المساعدة في تطوير المهارات الإداريةللموظف، وتمكين الموظفين من الانخراط في عملية اتخاذ القرار، والمساعدة في القضاء على المحسوبية في العمل، ورفع جودة العمل، وتحقيق الكفاءة والفاعلية، والحد من الفساد الإداري، والمساعدة في التعريف بخدمات العملاء. كما ثبت أيضاً معنوية تأثير تكنولوجيا المعلومات والاتصالات على مزيج التسويق الإلكتروني: المنتج، والسعر، والمكان، والترويج. نظرًا لأن تكنولوجيا المعلومات والاتصالات تعمل على تحسين كفاءة إدارة المخزون، وتسهل المشاركة في المزادات الإلكترونية، وتحسين خدمات ما بعد البيع، وتساعد على مطابقة الأسعار مع السوق، ولها دور حاسم في التسعير، وتحسين المرونة. اما فيما يتعلق بتأثير تكنولوجيا المعلومات والاتصالات على الأداء المالي، فوُجد ان تكنولوجيا المعلومات والاتصالات تساعد على تفعيل التحكم في التكاليف، وتعزيز الاستخدام الفعال للموارد المالية، والتحكم في تكلفة الحصول على الأموال، واتخاذ قرارات مالية حكيمة لتصحيح الأخطاء، والمساعدة في توفير الوقت عند اتخاذ القرارات المالية الحاسمة.

الكلمات الدالة: الأداء الحدي - الأداء التسويقي - الأداء المالي