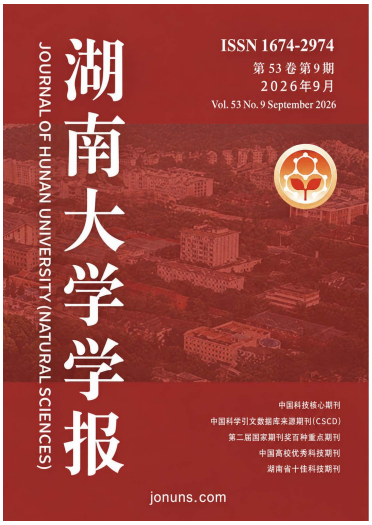


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The Impact of Digital Intelligence on Stealth Marketing

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Abstract: This study investigates the relationship between digital intelligence and stealth marketing in vocational schools in Baghdad, Iraq. Digital intelligence is conceptualized through four dimensions: digital identity, digital usage, digital security, and digital safety. Stealth marketing is operationalized through viral marketing, brand promoters, and celebrity marketing. In the context of vocational education, stealth marketing refers to indirect promotional practices in which the persuasive or commercial intent is not immediately or explicitly recognized by the target audience, including organically shared school-related content, informal endorsements by promoters, and apparently spontaneous celebrity mentions.

A descriptive-analytical cross-sectional design was employed. Data were collected from a purposive sample of

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120 school administrators using a 35-item questionnaire, supported by interviews and field observations. Descriptive statistics and regression analyses were conducted using SPSS v26, while observed-variable path relationships were examined using AMOS v24. The results revealed a statistically significant positive predictive relationship between digital intelligence and stealth marketing ($\beta = 0.527$, $R^2 = 0.277$, $p < 0.001$). The strength and statistical significance of the relationships varied across the four dimensions of digital intelligence and the three dimensions of stealth marketing. Digital identity showed particularly relevant associations with selected stealth-marketing dimensions, although the contribution of individual digital-intelligence dimensions was not uniform across all outcomes. Overall, the findings provide contextual evidence that stronger digital capabilities are associated with greater use of indirect marketing practices in Iraqi vocational education. Given the cross-sectional and self-reported nature of the data, the results should be interpreted as predictive associations rather than evidence of causal effects.

Keywords: digital intelligence; stealth marketing; viral marketing; brand promoters; celebrity marketing; vocational education.

数字智能对隐性营销的影响

摘要：本研究探讨伊拉克巴格达职业学校中数字智能与隐性营销之间的关系。数字智能通过四个维度进行概念化，即数字身份、数字使用、数字安全和数字防护。隐性营销则通过病毒式营销、品牌推广者和名人营销加以操作化。在职业教育情境下，隐性营销是指一种间接促销实践，其说服性或商业性意图不会被目标受众立即或明确识别，例如由用户自然分享的学校相关内容、推广者的非正式推荐，以及看似自发的名人提及。

本研究采用描述性—分析性横断面设计。研究通过目的抽样方式选取120名学校管理人员，使用包含35个题项的问卷收集数据，并辅以访谈和现场观察。采用SPSS v26进行描述性统计和回归分析，并使用AMOS v24检验观测变量之间的路径关系。研究结果表明，数字智能与隐性营销之间存在显著的正向预测关系（$\beta = 0.527$，$R^2 = 0.277$，$p < 0.001$）。数字智能四个维度与隐性营销三个维度之间关系的强度及统计显著性存在差异。其中，数字身份与部分隐性营销维度表现出较为显著的关联，但不同数字智能维度对各项结果的贡献并不一致。总体而言，研究结果表明，在伊拉克职业教育情境中，更强的数字能力与更多间接营销实践的使用相关。鉴于本研究采用横断面设计且数据主要来自自我报告，研究结果应被解释为预测性关联，而非因果效应的证据。

关键词: 数字智能；隐性营销；病毒式营销；品牌推广者；名人营销；职业教育。

1. Introduction

Rapid changes are affecting numerous aspects of national economies, requiring organizations of different types to adapt continuously to technological and market transformations. Among the most prominent developments are digital intelligence and stealth marketing, which have become increasingly relevant to organizational development, particularly within educational institutions [1].

The number of schools in Iraq has increased significantly, accompanied by the expansion of private educational institutions with substantial financial and organizational capabilities. These schools compete with public institutions and employ various marketing strategies to attract and retain students. At the same time, educational organizations increasingly rely on digital technologies and digital capabilities to support their marketing activities. Consequently, both public and private school administrations are placing greater emphasis on student satisfaction, enrollment, and institutional competitiveness by adapting their capabilities, resources, and strategies to a rapidly changing environment. From this perspective, the present study examines the role of digital intelligence and its relationship with stealth marketing practices within the Iraqi vocational education sector.

Stealth marketing is conceptually different from conventional digital promotion because the persuasive or promotional purpose is embedded within content or interpersonal communication rather than presented as an

explicit advertisement. Examples may include students or community members sharing school-related videos as spontaneous testimonials, graduates or parents informally recommending a school without appearing to act as paid promoters, or public figures mentioning vocational programs through social media without presenting the communication as a formal advertisement. Accordingly, in this study, viral marketing, brand promoters, and celebrity marketing are considered forms of stealth marketing only when the promotional, sponsorship, or persuasive intent is not immediately apparent to the target audience. Clearly identified paid advertisements, sponsored posts, and direct enrollment campaigns are therefore treated as conventional digital promotion rather than stealth marketing.

1.1. Research Problem

The education sector represents one of the most important service sectors contributing to the social and economic development of nations. In Iraq, educational institutions are experiencing increasing technological and digital transformation, particularly in areas related to communication, administration, and marketing. These developments create a need to better understand how digital capabilities may be associated with indirect promotional practices within vocational education.

Accordingly, the research problem is formulated through the following questions:

1. Is there a statistically significant relationship between digital intelligence and stealth marketing in the studied vocational schools?
2. What is the level of stealth marketing in the studied vocational schools?

1.2. Importance of the Research

The importance of this study arises from the relevance of digital intelligence and stealth marketing to contemporary educational organizations. Specifically:

1. The study contributes to the literature by examining the relationship between digital intelligence and indirect promotional practices within the specific context of Iraqi vocational education, where this combination of variables has received limited empirical attention.
2. The study contributes to a better understanding of digital intelligence and its relevance to the management and marketing activities of vocational schools.
3. The study provides insights into stealth marketing practices and their application within the vocational education context.

1.3. Research Objectives

The study aims to achieve the following objectives:

1. To provide a conceptual framework for digital intelligence and stealth marketing.
2. To assess the level of digital intelligence in the studied vocational schools.
3. To assess the level of stealth marketing in the studied vocational schools.
4. To examine the predictive relationship between digital intelligence and stealth marketing in the studied vocational schools.

1.4. Research Hypotheses

1.4.1. Main Hypothesis

There is a statistically significant relationship between digital intelligence and stealth marketing.

1.4.2. Sub-Hypotheses

a) There is a statistically significant relationship between the dimensions of digital intelligence and viral marketing.

b) There is a statistically significant relationship between the dimensions of digital intelligence and brand promoters.

c) There is a statistically significant relationship between the dimensions of digital intelligence and celebrity marketing.

2. Materials and Methods

2.1. Research Methodology

The study employed a descriptive-analytical cross-sectional design to examine statistical associations and predictive relationships among the research variables. Because the data were collected at a single point in time using self-reported questionnaires, the study design does not allow conclusions regarding temporal sequence or causal relationships.

2.2. Research Instrument

The researchers used a five-point Likert scale to measure participants' responses, where 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree. For descriptive interpretation, mean scores were classified into equal intervals as follows: 1.00–1.80 = very low, 1.81–2.60 = low, 2.61–3.40 = moderate, 3.41–4.20 = high, and 4.21–5.00 = very high. These predefined intervals were applied when interpreting the level of each construct and its respective dimensions.

2.3. Study Scope and Delimitations

2.3.1. Participants

The study involved school principals and administrative assistants from vocational education schools in Iraq. A total of 120 participants were included from an overall population of 124 eligible individuals.

2.3.2. Study Location

The field study was conducted in vocational education schools located in the Second Al-Rusafa District, Baghdad Governorate, Iraq.

2.3.3. Study Period

The study was conducted from November 1, 2025, to May 1, 2026. This period included preliminary school visits, personal interviews with participants, questionnaire distribution, and questionnaire collection.

2.4. Validity and Reliability of the Instrument

The validity and reliability of the questionnaire were assessed as follows:

2.4.1. Face Validity

The questionnaire was reviewed by a group of experts specializing in administrative sciences and areas related to the study variables. Based on their feedback, several items were modified or rephrased to improve clarity and relevance. Expert agreement exceeded 90% across the questionnaire items.

2.4.2. Reliability of the Instrument

Internal consistency was assessed using Cronbach's alpha. The overall 35-item questionnaire produced a Cronbach's alpha coefficient of 0.94, indicating a high level of internal consistency. This coefficient reflects the consistency among the questionnaire items and should not be interpreted as evidence that identical responses would necessarily be obtained at different points in time.

2.5. Data Collection Methods

Data were collected using two main sources:

2.5.1. Theoretical Sources

The theoretical framework of the study was developed through a review of relevant academic literature, including books, research studies, theses, and other scholarly sources available through Iraqi university libraries and relevant online academic resources.

2.5.2. Field Data Collection

The questionnaire served as the primary instrument for collecting data for the empirical component of the study. Most questionnaire items were adapted from established scales reported in previous studies closely related to the research topic and its sub-dimensions. Table 1 presents the main variables, sub-variables, number of items, and sources of the adopted measurement scales.

Table (1) Research Scale Design

No	Main Variables	Sub-Variables	Number of Items	Source of Scale
1	Digital Intelligence	Digital Identity	5	[16]
		Digital Usage	5	
		Digital Security	5	
		Digital Safety	5	
		Total	20	
2	Stealth marketing	Viral marketing	5	[32]
		Brand promoters	5	[24]
		Celebrity Marketing	5	[34]
		Total	15	
		Total	35	

Source: Prepared by the researchers based on scientific sources.

2.6. Research Population and Sample

2.6.1. Research Population

The study was conducted in vocational schools located in the Second Al-Rusafa District of Baghdad, Iraq. The research population consisted of directors and administrative assistants working in both public and private vocational schools, including school directors, administrative assistants, technical assistants, and student affairs assistants. The total research population comprised 124 individuals representing the administrative leadership of 31 vocational schools in the Second Al-Rusafa District.

2.6.2. Research Sample

The study employed purposive sampling to select directors, assistants, and other administrative personnel from 31 vocational schools in the Second Al-Rusafa District of Baghdad. The vocational education system represented in the study included several specializations, such as industrial education, mathematics, information technology, applied arts, commerce, tourism, and agriculture, reflecting areas aligned with labor-market needs.

A total of 124 questionnaires were distributed, of which 120 valid responses were obtained, resulting in a response rate of approximately 97%.

2.6.3. Characteristics of the Research Sample

The sample consisted of 74% male and 26% female respondents. Regarding age, the largest proportion of participants, 55%, was between 26 and 35 years old.

In terms of marital status, 58% of respondents were married. With respect to educational attainment, the majority of participants held a bachelor's degree, accounting for 81% of the sample. Regarding professional experience, 45% of respondents reported between 5 and 7 years of service, indicating that a

substantial proportion of the sample had a moderate level of professional experience within vocational-school administration.

2.7. Statistical Methods

Several statistical methods were employed to describe and analyze the collected data:

- **Arithmetic Mean:** Used as a measure of central tendency to determine the average level of each variable and dimension.
- **Standard Deviation:** Used as a measure of dispersion to assess the variability of responses around the arithmetic mean [35].
- **Coefficient of Variation:** Used to assess the relative dispersion of response values around the arithmetic mean and expressed as a percentage.
- **Simple Linear Regression:** Used to estimate the predictive relationship between one independent variable and one dependent variable.
- **Multiple Linear Regression:** Used to estimate the predictive contribution of multiple independent variables to a dependent variable while controlling for the other predictors included in the model.
- **Cronbach's Alpha:** Used to assess the internal consistency reliability of the questionnaire items.

3. Theoretical Framework

3.1. Digital Intelligence

3.1.1. Concept of Digital Intelligence

Digital technologies have become increasingly important in contemporary organizations and play a significant role in facilitating work processes, communication, decision-making, and organizational performance. Digital intelligence refers to the effective, responsible, and secure use of digital technologies, supported by the knowledge and skills required to interact successfully within digital environments. It encompasses individuals' and organizations' ability to understand, evaluate, and use digital tools appropriately while responding effectively to technological challenges and opportunities [2].

Digital intelligence also involves cognitive, social, and emotional capabilities that enable individuals to function effectively in digital environments [3], [4]. It includes the ability to understand digital concepts, solve technology-related problems, communicate through digital platforms, and adapt to rapidly changing technological conditions [5]. In addition, digital intelligence supports resilience, critical thinking, analytical ability, creativity, and informed decision-making in situations characterized by uncertainty and information overload [6], [7]. It also includes the ability to search for, evaluate, and critically analyze digital information while maintaining ethical, legal, and security awareness. These capabilities can help individuals and organizations respond to digital risks and benefit from opportunities created by technological development [8].

3.1.2. Importance of Digital Intelligence

The importance of digital intelligence can be summarized in several areas:

a. Enhancing Continuous Learning: Digital intelligence facilitates access to contemporary learning resources and enables individuals to acquire and develop new skills through continuous education. Effective continuous learning requires planning, commitment, and appropriate investment in available digital tools, thereby contributing to personal, professional, and long-term development [9].

b. Enhancing Efficiency and Productivity: Digital intelligence helps individuals use technology effectively to complete tasks more quickly and accurately. It also supports the development of new competencies, improves individual and organizational efficiency, reduces task completion time, and contributes to achieving organizational objectives and responding to customer needs [10].

c. Achieving Effective Communication: As organizations increasingly rely on digital communication tools, digital intelligence strengthens individuals' ability to communicate effectively and convey ideas clearly. It can support organizational coordination, reduce communication errors, improve teamwork, and contribute to a more productive working environment [11].

d. Digital Marketing and Customer Targeting: Digital intelligence enables organizations to better understand customer preferences and select appropriate digital marketing strategies. It also supports more precise audience targeting, personalization, and retargeting based on users' previous interactions with digital platforms and services [12].

e. Analysis and Decision-Making: The ability to analyze large volumes of data and extract useful information can improve organizational decision-making. Digital intelligence therefore contributes to more informed and timely decisions in rapidly changing digital environments [13].

f. Adapting to Technological Changes: Digital intelligence helps individuals and organizations respond to continuous technological development. Adaptation requires continuous learning, flexibility, and innovative thinking, all of which contribute to competitiveness and organizational sustainability [14].

3.1.3. Dimensions of Digital Intelligence

The present study adopts four dimensions of digital intelligence:

a. Digital Identity: Digital identity refers to the data and information that distinguish an individual or organization within digital environments, including online accounts, personal data, preferences, behavioral patterns, and social interactions. Digital identity is developed through interactions with websites, social

media platforms, digital services, and other online environments [15]. It also supports personalized digital communication and marketing through the use of data analytics and related digital technologies [16].

b. Digital Usage: Digital usage refers to the ways individuals interact with digital technologies, including smart devices, computers, mobile applications, and internet-based platforms. It concerns the use of these technologies for communication, education, work, entertainment, and other personal or professional purposes. Digital intelligence can improve digital usage by supporting more efficient interaction with technology and by enabling automation of routine activities [17].

c. Digital Security: Digital security refers to the protection of digital systems, identities, applications, and data against unauthorized access, misuse, and cyber threats. It includes identity management, authentication, third-party verification, and other security mechanisms designed to protect digital information and systems [18].

d. Digital Safety: Digital safety refers to the ability to identify and manage risks arising from digital environments, including cyberbullying, fraud, malware, privacy violations, and other harmful or illegal online activities. It includes practices aimed at protecting personal information, maintaining account integrity, and reducing exposure to digital threats [19].

3.2. Stealth Marketing

3.2.1. Concept of Stealth Marketing

Stealth marketing is an indirect form of promotion in which the target audience may not immediately recognize that it is being exposed to a deliberate advertising or persuasive campaign [20], [21]. Unlike conventional digital promotion, where the advertiser or commercial intent is explicitly disclosed, stealth marketing embeds persuasive messages within content that appears natural, spontaneous, interpersonal, or entertainment-based [22], [23].

Within the vocational-school context, stealth marketing does not refer to every use of social media or every promotional message. Rather, it refers specifically to indirect promotional practices in which school-related communication appears spontaneous, peer-driven, community-based, or non-commercial. Examples may include students or graduates sharing positive school experiences through social media, parents or community members informally recommending a school, or public figures mentioning vocational programs without clearly disclosing a promotional purpose or sponsorship arrangement.

Accordingly, viral marketing, brand promoters, and celebrity marketing are treated as forms of stealth marketing in this study only when the persuasive or promotional intent is not immediately apparent to the target audience. Clearly identified paid advertisements, sponsored content, and direct enrollment campaigns are considered conventional promotional practices rather than stealth marketing.

3.2.2. Importance of Stealth Marketing

Stealth marketing may provide several potential advantages [24]:

a. It can reduce promotional costs by relying on digital platforms, social networks, and indirect communication rather than conventional advertising campaigns.

b. It can stimulate customer curiosity and interest by presenting promotional messages in a less explicit form.

c. It may expand the reach of promotional messages through promoters, influencers, and social networks.

d. It can encourage more spontaneous audience responses because the promotional message is delivered indirectly.

e. It may contribute to stronger emotional connections between customers and brands, thereby supporting loyalty.

f. It can help organizations better understand target audiences and improve subsequent promotional strategies.

g. It may generate self-propagating interactions among customers through social sharing and word-of-mouth communication.

3.2.3. Dimensions of Stealth Marketing

a. Viral Marketing: Viral marketing represents a digital form of word-of-mouth communication in which attractive or engaging content is shared among users through online platforms. It aims to encourage individuals to disseminate promotional messages voluntarily through videos, social media posts, and other digital communication channels [25]–[27].

b. Brand Promoters: Brand promoters are individuals who support or recommend a brand, product, or service through direct or informal communication. They may contribute to building trust, strengthening brand awareness, and encouraging customer interest by sharing positive experiences in a natural and interpersonal manner [28], [29].

c. Celebrity Marketing: Celebrity marketing involves the use of well-known individuals to increase awareness of a product, service, or brand and to influence audience attitudes or behavior. It is commonly used to strengthen brand image and increase public attention [30], [31].

In the present study, these three dimensions are considered forms of stealth marketing only when their promotional intent is not explicitly disclosed. Viral marketing is treated as stealth marketing when school-related content is shared organically rather than presented as paid advertising. Brand promoters are considered part of stealth marketing when students,

graduates, parents, employers, or community members share favorable experiences without an explicit promotional label. Celebrity marketing is considered stealth marketing when a public figure's support or mention of a school is incorporated into ordinary social-media content without clear disclosure of the promotional purpose.

d. Product Placement: Product placement refers to the integration of branded products or services into films, television programs, games, books, or other forms of media content [24], [32], [33]. Although product placement is recognized in the literature as a form of indirect promotion, it was not included in the empirical model of the present study because it was not considered sufficiently relevant to the vocational-school context. The empirical operationalization of stealth marketing therefore focused on viral marketing, brand promoters, and celebrity marketing.

4. Results and Analysis

4.1. Descriptive Analysis of Digital Intelligence

Table 2 presents the descriptive results for the dimensions of digital intelligence. The overall mean score was 3.56, indicating a high level of digital intelligence among the respondents. The overall standard deviation was 0.53, while the coefficient of variation was 0.15, suggesting relatively limited dispersion in participants' responses.

Among the four dimensions, **Digital Usage** recorded the highest mean score (M = 3.74, SD = 0.50), followed by **Digital Identity** (M = 3.68, SD = 0.41) and **Digital Security** (M = 3.56, SD = 0.44). **Digital Safety** recorded the lowest mean score (M = 3.28, SD = 0.79). These results indicate that respondents reported comparatively stronger levels of digital usage and digital identity, whereas digital safety represented the weakest dimension.

Table 2. Descriptive Statistics and Ranking of Digital Intelligence Dimensions

Digital Intelligence Dimensions	Mean	Standard Deviation	Coefficient of Variation	Rank
Digital Identity	3.68	0.41	0.11	2
Digital Usage	3.74	0.50	0.13	1
Digital Security	3.56	0.44	0.12	3
Digital Safety	3.28	0.79	0.24	4
Overall	3.56	0.53	0.15	—

Source: SPSS output.

4.2. Descriptive Analysis of Stealth Marketing

Table 3 presents the descriptive results for the dimensions of stealth marketing. The overall mean score was 3.69, indicating a high level of stealth marketing practices among the surveyed vocational schools. The overall standard deviation was 0.44, and the coefficient of variation was 0.11, indicating relatively low dispersion in respondents' assessments.

Among the three dimensions, **Celebrity Marketing** recorded the highest mean score (M = 3.85, SD = 0.50), followed by **Brand Promoters** (M = 3.78, SD = 0.42). **Viral Marketing** recorded the lowest mean score (M = 3.46, SD = 0.41). These findings suggest that celebrity marketing was the most prominent form of stealth marketing reported by respondents, while viral marketing was comparatively less prevalent.

Table 3. Descriptive Statistics and Ranking of Stealth Marketing Dimensions

Stealth Marketing Dimensions	Mean	Standard Deviation	Coefficient of Variation	Rank
Viral Marketing	3.46	0.41	0.11	3
Brand Promoters	3.78	0.42	0.11	2
Celebrity Marketing	3.85	0.50	0.13	1
Overall	3.69	0.44	0.11	—

Source: SPSS output.

4.3. Hypothesis Testing

Regression analysis was used as the primary inferential method and was performed using SPSS. AMOS was subsequently employed to represent the relationships among the observed composite variables as path models. Because the study does not report a latent measurement model or global structural equation model fit indices, the AMOS results are interpreted as observed-variable path analysis rather than full latent-variable structural equation modeling (SEM). Accordingly, the AMOS path models are used as graphical and structural representations of the regression relationships and should not be interpreted as independent evidence of causality.

4.3.1. Testing the Main Hypothesis

The main hypothesis states that there is a statistically significant relationship between digital intelligence and stealth marketing. This

relationship was examined using simple linear regression, expressed as follows:

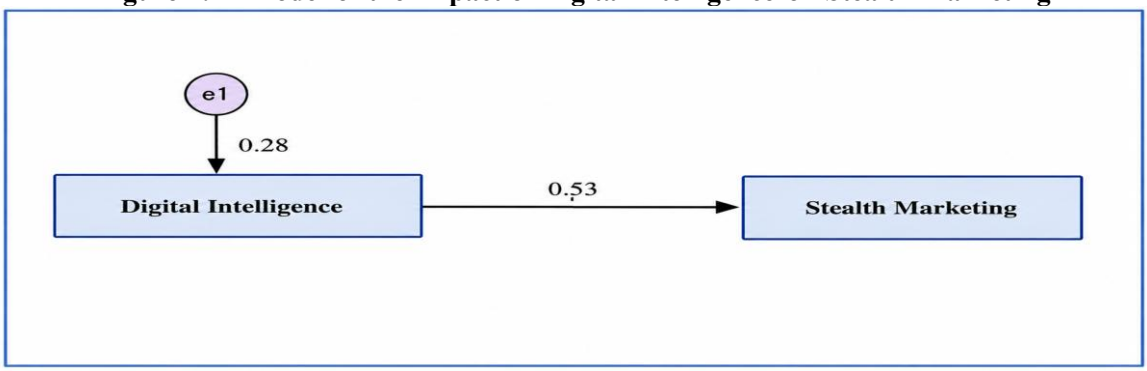
$Y = a + \beta X$

The estimated regression equation was:

$Y = 1.590 + 0.527$(Digital Intelligence)

The regression model was statistically significant (**$F = 89.838$, $p < 0.001$**) and explained **27.7%** of the variance in stealth marketing (**$R^2 = 0.277$**). Digital intelligence showed a statistically significant positive predictive relationship with stealth marketing (**$\beta = 0.527$, $t = 9.478$, $p < 0.001$**). These findings support the main hypothesis and indicate that higher levels of digital intelligence are associated with higher levels of stealth marketing among the surveyed vocational-school administrators. However, because the study employed a cross-sectional design and relied on self-reported data, this relationship should be interpreted as a predictive association rather than evidence of a temporal or causal effect.

Figure 1: A Model of the Impact of Digital Intelligence on Stealth Marketing



To provide a graphical representation of the regression relationship, an observed-variable path model was estimated using AMOS, as shown in Figure 1. Because the analysis is based on observed composite scores and does not include a latent measurement model or global SEM fit indices, the AMOS results are interpreted as observed-variable path analysis rather than full latent-variable structural equation modeling. The standardized path coefficient, unstandardized estimate, standard error, critical ratio, and significance level are presented in Table 4.

Table 4. Path Analysis of the Relationship Between Digital Intelligence and Stealth Marketing

Dependent Variable	Direction	Independent Variable	Standardized β	Estimate	S.E.	C.R.	p
Stealth Marketing	←	Digital Intelligence	0.527	0.490	0.052	9.499	< 0.001

Source: AMOS v24 output

The AMOS results are consistent with the regression analysis and confirm a statistically significant positive predictive relationship between digital intelligence and stealth marketing. The path model should be interpreted as a structural representation of the observed association and not as evidence of causality.

4.3.2. Testing the First Sub-Hypothesis: Digital Intelligence Dimensions and Viral Marketing

The first sub-hypothesis states that there is a statistically significant relationship between the dimensions of digital intelligence and viral marketing. To examine this hypothesis, multiple linear regression was performed using the four dimensions of digital intelligence—digital identity, digital usage, digital security, and digital safety—as predictors of viral marketing.

The multiple regression model can be expressed as follows:

$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$

The estimated regression equation was:

$Y = 1.526 + 0.250$(Digital Identity) + 0.100(Digital Usage) + 0.127(Digital Security) + 0.152(Digital Safety)

The overall regression model was statistically significant (**$F = 12.672$, $p < 0.001$**) and explained **18.0%** of the variance in viral marketing (**$R^2 = 0.180$**). Thus, the four dimensions of digital intelligence collectively demonstrated a statistically significant predictive relationship with viral marketing. However, the contribution of each predictor should be interpreted separately.

Table 5. Multiple Regression Analysis of Digital Intelligence Dimensions Predicting Viral Marketing

Predictor	Dependent Variable	Constant	R^2	F	Standardized β	Unstandardized B	S.E.	t	p
Digital Identity	Viral Marketing	1.526	0.180	12.672	0.250	0.205	0.205*	3.899	< 0.001
Digital Usage	Viral Marketing	—	—	—	0.100	0.086	0.086*	1.613	0.108
Digital Security	Viral Marketing	—	—	—	0.127	0.110	0.110*	2.005	0.046
Digital Safety	Viral Marketing	—	—	—	0.152	0.120	0.120*	2.320	0.021

Source: SPSS output.
The reported standard errors should be verified against the original SPSS coefficients table before publication.

At the individual predictor level, **digital identity** showed the strongest statistically significant positive relationship with viral marketing (**β = 0.250, t = 3.899, p < 0.001**). This was followed by **digital safety** (**β = 0.152, t = 2.320, p = 0.021**) and **digital security** (**β = 0.127, t = 2.005, p = 0.046**). In contrast, **digital usage** was not a statistically significant predictor of viral marketing (**β = 0.100, t = 1.613, p = 0.108**).

Accordingly, the first sub-hypothesis is supported at the overall model level, although not all dimensions of digital intelligence were individually significant predictors of viral marketing. These results should be interpreted as predictive associations rather than causal effects.

To further represent these relationships graphically, an observed-variable path model was estimated using AMOS. The corresponding path coefficients are presented in Table 6. As with the preceding AMOS analysis, the results represent path analysis of observed composite scores rather than full latent-variable SEM because a separate measurement model and global model-fit indices were not reported.

The relationships among the four dimensions of digital intelligence and viral marketing were further examined using AMOS. The observed-variable path coefficients are presented in Table 6.

Table 6. Path Analysis of Digital Intelligence Dimensions Predicting Viral Marketing

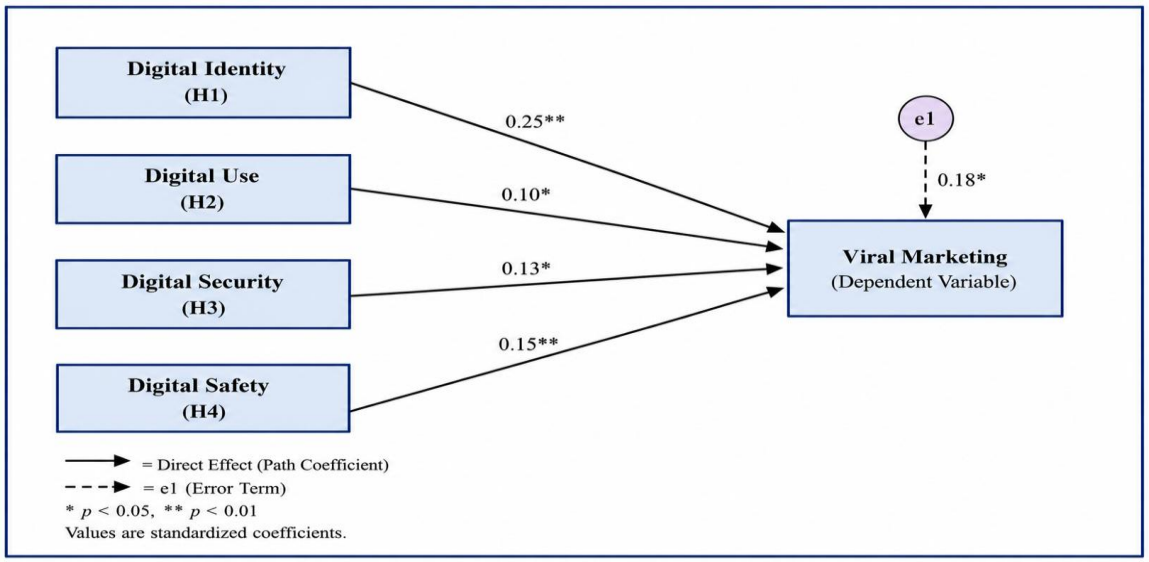
Dependent Variable	Direction	Predictor	Standardized β	Estimate	S.E.	C.R.	p
Viral Marketing	←	Digital Identity	0.250	0.205	0.052	3.933	< 0.001
Viral Marketing	←	Digital Usage	0.100	0.086	0.053	1.627	0.104
Viral Marketing	←	Digital Security	0.127	0.110	0.054	2.022	0.043
Viral Marketing	←	Digital Safety	0.152	0.120	0.051	2.340	0.019

Source: AMOS v24 output.

The AMOS results are generally consistent with the multiple regression findings obtained using SPSS v26. Digital identity showed the strongest statistically significant positive relationship with viral marketing (**β = 0.250, C.R. = 3.933, p < 0.001**), followed by digital safety (**β = 0.152, C.R. = 2.340, p = 0.019**) and digital security (**β = 0.127, C.R. = 2.022, p = 0.043**). Digital usage did not show a statistically significant relationship with viral marketing (**β = 0.100, C.R. = 1.627, p = 0.104**).

Figure 3 provides a graphical representation of the observed-variable path relationships between the dimensions of digital intelligence and viral marketing.

Figure 3. Path Model of Digital Intelligence Dimensions Predicting Viral Marketing



4.3.3. Testing the Second Sub-Hypothesis: Digital Intelligence Dimensions and Brand Promoters

The second sub-hypothesis states that there is a statistically significant relationship between the dimensions of digital intelligence and brand promoters. To examine this hypothesis, multiple linear regression was performed using digital identity, digital usage, digital security, and digital safety as predictors of brand promoters.

The multiple regression model can be expressed as follows:

$$Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4$$

The regression equation reported in the manuscript was:

Y = 1.875 + 0.126(Digital Identity) + 0.007(Digital Usage) + 0.069(Digital Security) + 0.004(Digital Safety).

The multiple regression model for brand promoters was statistically significant (**F = 6.851, p < 0.001**) and explained **10.6%** of the variance in brand promoters (**R^2 = 0.106**). The regression results are presented in Table 7.

Table 7. Multiple Regression Analysis of Digital Intelligence Dimensions Predicting Brand Promote

Predictor	Dependent Variable	Constant	R^2	F	Standardized β	Unstandardized B	S.E.	t	p
Digital Identity	Brand Promoters	1.875	0.106	6.851	0.126	0.121	0.064	1.881	0.061
Digital Usage	Brand Promoters	—	—	—	-0.007	-0.007	0.065	-0.109	0.913
Digital Security	Brand Promoters	—	—	—	0.121	0.122	0.067	1.826	0.069
Digital Safety	Brand Promoters	—	—	—	0.199	0.184	0.063	2.895	0.004

Source: SPSS output

At the individual predictor level, **digital safety** was the only statistically significant predictor of brand promoters (**β = 0.199, t = 2.895, p = 0.004**). Digital identity (**β = 0.126, t = 1.881, p = 0.061**), digital usage (**β = -0.007, t = -0.109, p = 0.913**), and digital security (**β = 0.121, t = 1.826, p = 0.069**) were not statistically significant at the 0.05 level.

Accordingly, the second sub-hypothesis is supported at the overall model level, although only digital safety demonstrated an individually significant predictive relationship with brand promoters.

To further represent these relationships, an observed-variable path model was estimated using AMOS. The resulting path coefficients are presented in Table 8. As in the preceding analyses, the AMOS results are interpreted as path analysis of observed composite scores rather than full latent-variable structural equation modeling.

Table 8. Path Analysis of Digital Intelligence Dimensions Predicting Brand Promoters

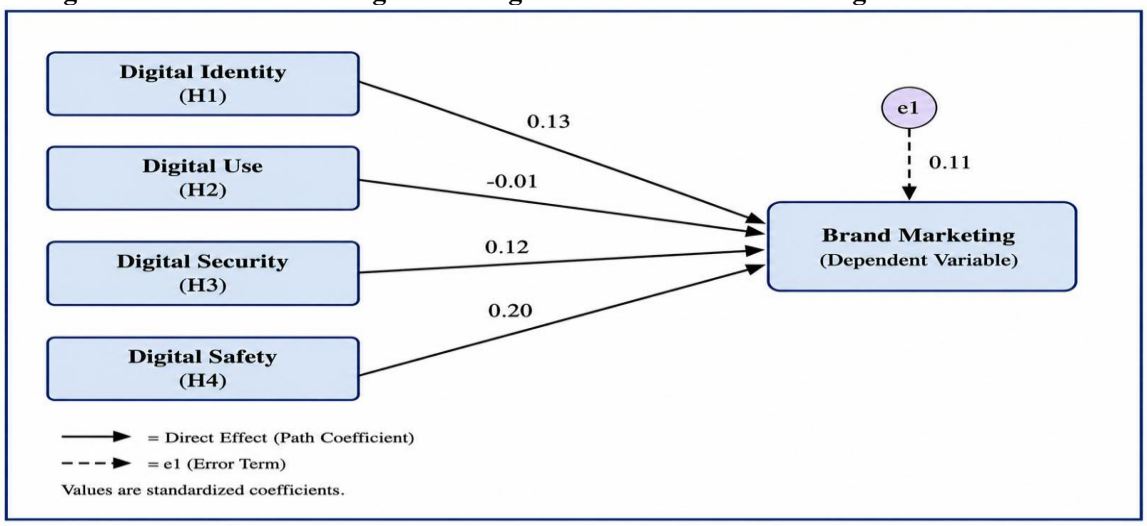
Dependent Variable	Direction	Predictor	Standardized β	Estimate	S.E.	C.R.	p
Brand Promoters	←	Digital Identity	0.126	0.121	0.064	1.897	0.058
Brand Promoters	←	Digital Usage	-0.007	-0.007	0.065	-0.110	0.913
Brand Promoters	←	Digital Security	0.121	0.122	0.066	1.842	0.066
Brand Promoters	←	Digital Safety	0.199	0.184	0.063	2.920	0.003

Source: AMOS v24 output.

The AMOS results are consistent with the SPSS regression findings. Digital safety showed the only statistically significant positive relationship with brand promoters (β = 0.199, C.R. = 2.920, p = 0.003). Digital identity, digital usage, and digital security did not reach statistical significance.

Figure 4 presents the graphical representation of the observed-variable relationships between the dimensions of digital intelligence and brand promoters.

Figure 4. Path Model of Digital Intelligence Dimensions Predicting Brand Promoters



4.3.4. Testing the Third Sub-Hypothesis: Digital Intelligence Dimensions and Celebrity Marketing

The third sub-hypothesis states that there is a statistically significant relationship between the dimensions of digital intelligence and celebrity marketing. To examine this hypothesis, multiple linear regression was performed using digital identity, digital usage, digital security, and digital safety as predictors of celebrity marketing.

The multiple regression model can be expressed as follows:

$$\mathbf{Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4}$$

The regression equation reported in the manuscript was:

Y = 1.439 + 0.200(Digital Identity) + 0.132(Digital Usage) + 0.132(Digital Security) + 0.130(Digital Safety)

The overall multiple regression model was statistically significant ($F = 10.289$, $p < 0.001$) and explained 15.1% of the variance in celebrity marketing ($R^2 = 0.151$). These results indicate that the four dimensions of digital intelligence collectively have a statistically significant predictive relationship with celebrity marketing.

The contribution and statistical significance of each individual digital-intelligence dimension should, however, be interpreted separately based on the regression coefficients presented in Table 9.

The multiple regression model for celebrity marketing was statistically significant (**$F = 10.289$, $p < 0.001$**) and explained **15.1%** of the variance in celebrity marketing (**$R^2 = 0.151$**). Based on the unstandardized coefficients reported in Table 9, the regression equation is:

Y = 1.439 + 0.166(Digital Identity) + 0.116(Digital Usage) + 0.115(Digital Security) + 0.104(Digital Safety)

Table 9. Multiple Regression Analysis of Digital Intelligence Dimensions Predicting Celebrity Marketing

Predictor	Dependent Variable	Constant	R^2	F	Standardized β	Unstandardized B	S.E.	t	p
Digital Identity	Celebrity Marketing	1.439	0.151	10.289	0.200	0.166	0.054	3.066	0.002
Digital Usage	Celebrity Marketing	—	—	—	0.132	0.116	0.055	2.102	0.037
Digital Security	Celebrity Marketing	—	—	—	0.132	0.115	0.056	2.038	0.043
Digital Safety	Celebrity Marketing	—	—	—	0.130	0.104	0.053	1.942	0.053

Source: *SPSS output.*

At the individual predictor level, digital identity showed the strongest statistically significant positive relationship with celebrity marketing (β = 0.200, t = 3.066, p = 0.002). This was followed by digital usage (β = 0.132, t = 2.102, p = 0.037) and digital security (β = 0.132, t = 2.038, p = 0.043). In contrast, digital safety was not statistically significant at the 0.05 level (β = 0.130, t = 1.942, p = 0.053).

Accordingly, the third sub-hypothesis is supported at the overall model level, although only three of the four digital-intelligence dimensions were individually significant predictors of celebrity marketing. These findings should be interpreted as predictive associations rather than evidence of causal effects.

To further represent these relationships, an observed-variable path model was estimated using AMOS. The corresponding path coefficients are presented in Table 10. As in the preceding analyses, the AMOS results are interpreted as path analysis of observed composite scores rather than full latent-variable structural equation modeling.

Table 10. Path Analysis of Digital Intelligence Dimensions Predicting Celebrity Marketing

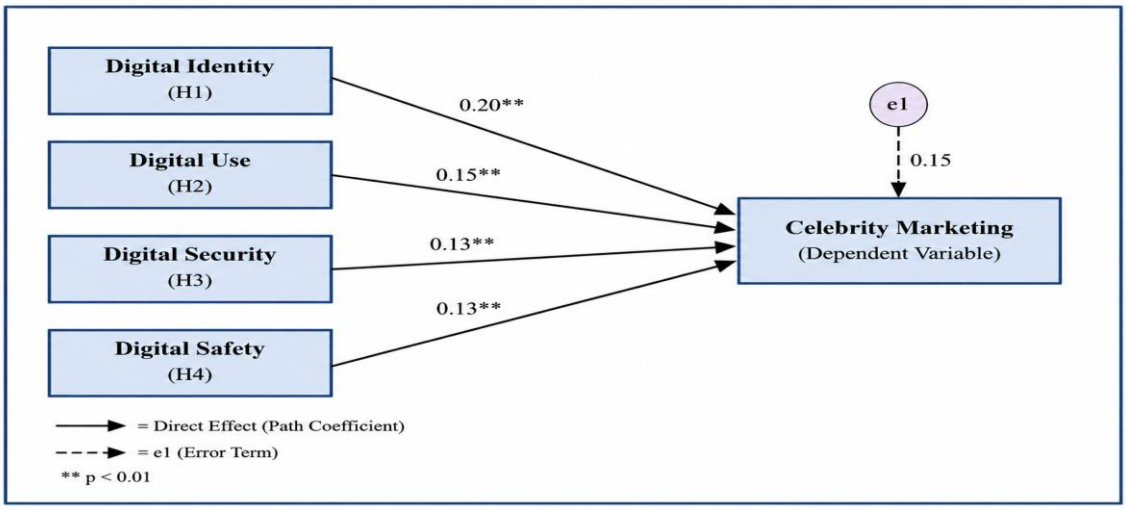
Dependent Variable	Direction	Predictor	Standardized β	Estimate	S.E.	C.R.	p
Celebrity Marketing	←	Digital Identity	0.200	0.166	0.054	3.092	0.002
Celebrity Marketing	←	Digital Usage	0.132	0.116	0.055	2.120	0.034
Celebrity Marketing	←	Digital Security	0.132	0.115	0.056	2.056	0.040
Celebrity Marketing	←	Digital Safety	0.130	0.104	0.053	1.959	0.050

Source: AMOS v24 output.

The AMOS results are broadly consistent with the SPSS regression findings. Digital identity, digital usage, and digital security showed statistically significant positive relationships with celebrity marketing. Digital safety was at the conventional significance threshold in the AMOS analysis (p = 0.050) but was not statistically significant in the SPSS regression analysis (p = 0.053). This small difference should be interpreted cautiously and does not materially alter the overall pattern of results.

Figure 5 presents the graphical representation of the observed-variable relationships between the dimensions of digital intelligence and celebrity marketing.

Figure 5. Path Model of Digital Intelligence Dimensions Predicting Celebrity Marketing



5. Conclusions

1. The descriptive results indicate a high level of digital intelligence among the surveyed vocational-school administrators, with an overall mean of 3.56. Among the four dimensions, digital usage recorded the highest mean, whereas digital safety recorded the lowest.
2. Stealth marketing also demonstrated a high overall mean of 3.69. Among its three operationalized dimensions, celebrity marketing ranked first, followed by brand promoters, while viral marketing ranked third.
3. Digital intelligence showed a statistically significant positive predictive relationship with stealth marketing ($\beta = 0.527$, $R^2 = 0.277$, $p < 0.001$). The model therefore explained 27.7% of the observed variance in stealth marketing, while the remaining variance may be attributable to factors not included in the present model.
4. The predictive relationships differed across the dimensions of digital intelligence. Digital identity, digital security, and digital safety were significantly associated with viral marketing, whereas digital usage was not significant. For brand promoters, digital safety was the only statistically significant predictor. For celebrity marketing, digital identity, digital usage, and digital security were significant predictors, whereas digital safety was not statistically significant.
5. The findings confirm the relevance of digital intelligence to indirect promotional practices within the vocational-school context. However, because the study employed a cross-sectional design, the results should be interpreted as predictive associations rather than evidence of causal relationships.
6. The contextual contribution of the study lies in demonstrating how digital capabilities may be associated with viral communication, informal brand advocacy, and celebrity-related promotion in Iraqi vocational education, particularly in situations where promotional intent is embedded within communication rather than explicitly presented as advertising.

6. Recommendations

1. Vocational-school administrators should strengthen digital-intelligence capabilities, particularly digital safety, digital identity management, and responsible digital usage, through targeted training and clearly defined institutional procedures.
2. Schools should clearly distinguish transparent digital advertising from indirect promotional practices and establish ethical guidelines for viral content, brand advocacy, and celebrity-related communication, particularly where promotional intent or sponsorship may not be immediately apparent.
3. Digital communication strategies should be informed by evidence derived from student and community engagement data while maintaining appropriate standards of privacy, digital safety, and responsible use of personal information.
4. Schools should evaluate the effectiveness of indirect promotional practices using measurable indicators, such as engagement rates, inquiries, and enrollment-related responses, rather than assuming that greater online exposure automatically produces favorable outcomes.
5. Future studies should replicate the proposed model in other educational contexts, employ broader or probability-based samples where feasible, and use longitudinal or experimental research designs to examine temporal and causal relationships more rigorously.
6. Future research should also further validate the 35-item measurement instrument through construct-specific reliability analysis and

confirmatory factor analysis and compare stealth marketing with clearly disclosed conventional digital promotion.

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